UCRSEA

Report of the
1st Regional Curriculum Development Workshop

7-8 February 2017, Thailand Environment Institute (TEI), Bangkok, Thailand

**Co-hosted by Mahasarakham University (MSU) and TEI under the
Urban Climate Resilience in Southeast Asia Partnership (UCRSEA)**

Summary of collective agreements and actions points

✓ Physical science and social science need to be linked or integrated to create a collective understanding (interdisciplinary thinking) and common vision (national and regional). Sustainability might be differently perceived and understood in different contexts, by different disciplines and by different countries, to reach a common understanding of multi-discipline is essential.

✓ The Sustainability Science programme should be research-based and requires a multi-disciplinary approach.

✓ The structure of the programme has to be further defined, including target groups, learning outcomes, teaching methods, resource materials, etc. Ideally, a master or doctoral programme should be preferred.

✓ Fruitful SS research results can be used to inform the policy makers and support recommendations.

✓ Regional collaboration of academics and universities are essential to move forward the SS Degree Program. Exchanging knowledge, exploring funding for SS research at country and regional levels are crucial to achieve the SS goal.

✓ Different administrative or bureaucratic structures in academic institutions might put limitations to the development of the SS Degree Programme; countries have to re-think what kind of curriculum or teaching course is best to match their national and/or regional needs.

✓ Taught SS theories and subjects should be trans- and/or interdisciplinary.

✓ Tools and methodologies are essential and useful to influence decision-making processes and foster sustainability in the region, such as the application of geo-spatial software.

✓ A powerful network can produce a comprehensive databank and use available software which would facilitate filtering and analysis of data.

✓ Countries have different limitations to develop and implement the SS programme effectively (e.g., lack in technical equipment in Myanmar; complex bureaucratic structures of Cambodia; limited human resources in Laos; etc.). Collaboration between countries and universities are thus essential as overcome those barriers.

✓ Cases studies with a focus on regional and transboundary issues should in included in the resources materials.

✓ Critical thinking or 'out of the box' thinking are essential and should be promoted for guiding way of learning by students.

Important Subjects

Ecology and applied ecology, such as human and urban ecology;

Environmental monitoring and surveillance – including air, quality, emission inventory, marine and coastal zone, citizen science, local wisdoms, and access to information;

Green production and growth – including cleaner production, renewable energy, green technology, infrastructure development, entrepreneur and innovation, and agriculture and food security;

Behavior change: Asian culture;

Sustainable governance – including public policy/advocacy, equity and justice, and urban administration;

Seminar: Trans/inter-disciplinary research approaches;

System thinking

Very Important Subjects

Sustainability theory and practices – including issues in urban, social, gender, economics, environmental governance and politics;

Climate change as trans-disciplinary: Adaptation, mitigation, transformation and trans-boundary;

Environment and natural resource management – including issues in waste water, energy, soil and air;

Environmental management approaches: EIA, SEA, EQA, HIA, ecological economics;

Sustainability policy and planning - including law/regulations, ethics, public policy, advocacy, regional policy, decision-making, land use planning and public participation;

Technical tools for environmental assessment: GIS-spatial technology, remote sensing, environmental modeling, environmental planning;

Research and internship – including research methodology and data analysis;

Skills: Communication, problem-solving and critical thinking, ethics;

Introduction, objectives and workshop program

The 1st Regional Curriculum Development Workshop was held on 7-8 February 2017 in the Thailand Environment Institute (TEI) in Bangkok, Thailand. This workshop aimed to influence teaching and research agendas in the GMS to address emerging challenges in urban climate resilience and to align with regional and global sustainable development goals.

The Urban Climate Resilience in Southeast Asia Partnership (UCRSEA) project is designed to strengthen the research capacity of multiple stakeholders in Southeast Asia and Canada in addressing core issues around regionalization, urbanization, climate change and people-centered vulnerability. It also aims to build collaborative networks of academics, researchers and post-graduate students to develop and test innovative conceptual and methodological frameworks in urban climate resilience and vulnerability assessments.

UCRSEA is implemented in the Mekong region. Being one of the most rapidly urbanizing regions in the world, the Mekong region is also highly vulnerable to climate change and natural disasters. While urbanization is a complex process driven by many forces, in particular, the regional economic integration through the ASEAN Economic Community (AEC) is driving much of the rapid urban change across the region. As the region becomes more physically, socially, and economically connected, the vulnerabilities and impacts of climate shocks are not only determined and bounded by location, but cascade through these inter-linked and inter-locked systems that transcend administrative and political boundaries.

Ultimately, UCRSEA aims to contribute to achieving national, regional and global agendas of sustainability and resilience. Within the framework of ASEAN-UN cooperation, the ASEAN member states are encouraged to create synergy between the ASEAN Community Vision 2025 and the 2030 Agenda for Sustainable Development. In addition, the role of climate action planned and implemented under the Paris Agreement is important for the attainment of both Vision 2025 and 2030 Agenda. The focus of UCRSEA can contribute to the SGDs 11 (Making cities and human settlements inclusive, safe, resilient and sustainable) and 13 (Taking urgent action to combat climate change and its impacts).

As an important project component, UCRSEA is supporting the development of a curriculum that will incorporate cross-cutting issues and cross-disciplinary approach of urban climate resilience concepts and practices. This will build on the existing platform of the environment-related field of established academic institutions in the Mekong region. However, it is recognized that in order to effectively contribute to achieving the sustainable development goals, particularly SDG11, there are gap and limitations within the existing teaching and research agendas. UCRSEA is designed to fill in some of the gaps.

The development of curriculum under UCRSEA is a collaborative process that will require inputs from senior academics and researchers from selected universities in the GMS to reshape and refine teaching and research strategies. This process will begin with dialogues and consultations to identify needs and gaps in current teaching and research agendas across the region. Networks of universities and academics will be involved in collaborative efforts to draft and plan teaching courses applicable to the Southeast Asian context. Participating academics will discuss approaches in integrating new curriculum into existing teaching and research agendas.

Twenty-nine participants from five GMS countries, including Cambodia, Lao PDR, Myanmar, Thailand and Vietnam, attended the workshop. The workshop was co-hosted by the Faculty of Environment and Resource Studies (FERS) from Mahasarakham University (MSU) and TEI.

Dr Pakamas Thinphanga, Co-Director and Programme Manager at TEI, led together with Dr Yanyong Inmuong, Dean at FERS-MSU, the workshop as main facilitators; Dr Arika Bridhikitti, Lecturer at FERS-MSU, served as moderator, and Ms Astrud Lea Beringer, Research Coordinator at FERS-MSU, as rapporteur.

Workshop agenda

6 February 2017	Participants travel to Bangkok
7 February 2017	
Morning	9-9.30am - Introduction of participants
Session 1	9.30-9.45 - Objective and expected outputs of this meeting (Pakamas)
	9.45-10.00 - Framework of Curriculum Development (Dr Yanyong)

	10.00-10.30
	- Brief introduction to UCRSEA conceptual framework, regional context and case studies (Pakamas)
	    o Urbanisation, regionalisation
	    o Urban poverty and vulnerability
	    o Climate change
	    o Socio-economic development
	    o What are priorities for the Mekong region?

Coffee break 10.30-10.45	
Session 2 10.45-12.00	Brainstorming Question 1 – How can we achieve SDG11? What can universities do to contribute to achieve this? - Teaching / Research / Academic Services
	Brainstorming Question 2 – How can we achieve SDG13? What can universities do to contribute to achieve this? - Teaching / Research / Academic Services
Lunch 12.00-13.30	

Session 3
13.30-14.30
	Combining physical and social sciences
	    o ADPC to present SERVIR – technical tools for teaching and research
	    o Q&A, discussion

Session 4 14.30-15.30	Existing university curriculum and teaching courses - What subjects or topics exist already in your faculty / department in relation to Session 2? - Which subjects or topics meet your university faculty / department needs? - Are we missing any subjects or topics to contribute to the SDGs 11 and 13?

Coffee break	
	Wrapping up
Group dinner 6.30pm	
8 February 2017	
9.00-9.30	- Quick recap from Day 1
9.30-10.30	Brainstorming Question - To develop and design Sustainability Science Degree Programme – what teaching course should be included in your faculty or department? - Discussion in 3 groups
Coffee break 10.30-10.45	
10.45-12.00	Discussion - Question 1 – what resources are needed to meet your needs and requirements to develop and implement Sustainability Science Degree Programme? - Question 2 – what can we share or do to support this network?
Lunch 12.00-13.30	

13.30-14.30	Discussion
	- Next steps?
	  o Work to be done between February and next workshop in May?
	  o Who should be involved in the next meeting?

	- Wrapping up
	Participants depart Bangkok, travel home

Summary account of discussions

DAY I

Tuesday, 7 February 2017

SESSION I

OBJECTIVE AND EXPECTED OUTPUTS

Dr Pakamas Thinphanga, Co-Director and Programme Manager at TEI, opened the workshop and stated as key objective to advance academic networks and innovative teaching in Sustainability Science (SS) in the GMS. Key outputs were, i) to form an academic network to share information and resources with MSU and/or TEI as focal points; ii) to develop a Sustainable Science Degree Programme (establishing essential subjects or topics in the GMS context and as an international programme); and iii) to agree on next steps.

FRAMEWORK OF CURRICULUM DEVELOPMENT

Dr Yanyong Inmuong, Dean at FERS, MSU, outlined the framework and needs of the curriculum framework. He emphasized that SS is strongly needed in the GMS due to the following:

- The 17 SDGs replaced the Millennium Development Goals (MDGs) in 2015 while SDG 11 and 13 become a major focus for building urban climate resilience;
- High regional economic integration in the GMS;
- Environmental and social changes;
- Active collaboration and cooperation between GMS countries;

He identified six essential steps for drafting a curriculum:

1) Identification of Issue/Problem/Need – what is the purpose? The GMS region needs a new curriculum that deals with SDGs, regional integration, urbanization, etc.
2) Characteristics of Learners, Needs? (Undergraduate, Postgraduate, Researcher)
3) Learning Outcomes/Objectives?
4) Key relevant contents/resource materials: What? Resource material has to match the regional context;
5) Methods to accomplish learning outcomes: How to teach? Research-oriented?
6) Evaluation of methods, content, and intended outcomes: Mixed methods?

Dr Yanyong pointed out that there is no teaching course yet in Thailand that focuses on sustainability science connected to the SDGs. He suggested to develop a **research-based** curriculum which emphasizes students undertaking enquiry-based learning. Last, the curriculum development means 'dealing with complexity' as there are multiple pressures or drivers of active regional integration, growth, urbanization, resource flow and climate change; SS needs a **multidisciplinary nature**.

INTRODUCTION TO UCRSEA CONCEPTUAL FRAMEWORK, REGIONAL CONTEXT & CASE STUDIES

Dr Pakamas gave an introduction to the UCRSEA conceptual framework, regional context and case studies. UCRSEA's major objective is to build capacities of multiple stakeholders (researcher and students) on interactions between regional integration, urbanization and climate change. It also aims to i) build networks of students, academics and researchers, ii) influence new research and teaching agendas, iii) strengthening civil society capacity development, and iv) contribute to changes of policy development and policy debates.

In order to comprehend urban climate resilience, it is necessary to understand the meaning of 'urban', the term 'city' and climate change in an urban context, the meaning of resilience (To what? To whom?), and how to assess vulnerabilities in urban areas. This project works at the city level on secondary cities, engaged with universities.

Dr Pakamas pointed out that urban is not only about location but about process. It is important to identify the drivers of urbanization, such as economic development, transformation from agriculture to industry, but also migration, labor and movement of people (rural to urban) have an impact on urban growth. Different drivers makes the region more connected. Some urban centers that are located in climate risk areas or hazardous places (floodplain areas) are more vulnerable to climate shocks. Driven by economic development, changing land use and resource flows often have significant implications for urban areas in the event of extreme weather.

Climate change is affiliated with uncertainties and unpredictable patterns. Urban processes are changing or creating risks and vulnerabilities. It is essential to move away from traditional climate studies approaches of 'predict and act' in order to build urban climate resilience. Urban systems are complex and face cascading impacts (direct and indirect). A major challenge that many Southeast Asian cities are facing is governance.

UCRSEA makes use of the Climate Resilience Framework (CRF) which focuses on three urban components: Agents, systems and institutions. The tool of Shared Learning Dialogues (SLDs) is used to create understand and learning of those three components. It is an iterative process of assessing vulnerabilities and identifying resilience actors in a public domain. The concept of resilience fits well with dealing of shocks and crisis as it focuses on a multi-scale level and dynamics. It analyzes how different people interact and access urban systems such as energy, water, food, transport or waste (interlinked and interdependent). For instance, when electricity falls out, the water pumps will stop working.

UCRSEA has three major guiding questions for research activities in the GMS region:

1) *How will climate change impact the poverty and vulnerability of urban residents in Southeast Asia?* – It is often assumed that poor people are more vulnerable to climate change but in changing urban areas this is not always the case. It is challenging how to assess vulnerability of different people in different cities.
2) *What does knowledge from both academic literature and action research, tell us about creating climate resilient urban governance that is both inclusive and equitable?*

3) *How can we strengthen the agency of individuals, groups and institutions to improve economic, physical and social well-being in urban areas, particularly in response to climate change?*

SESSION II

BRAINSTORMING SDGs

SDG 11: "Make cities and human settlements **inclusive, safe, resilient and sustainable"**

SDG 13: "Take urgent action to combat **climate change** and its **impacts**"

The participants were encouraged to consider the question, *how academics and universities can contribute to achieve SDG 11 and 13*, and to write their ideas on sticky notes with respect to three categories: i) Teaching, ii) research, and iii) academic services. The results are presented in annex I.

In an **open forum**, the participants shared their reflections on the group activity. Statements made included the following:
- Academic Services: There is a different understanding in different countries. In Vietnam, for instance, academic services means to support the establishment of a hub or place for communities to go to if there are problems. In Thailand, it means the university faculties deliver consultation services for public or private agencies and outreach activities for communities.
- Research:
  o Research findings can contribute to the improvement of real-life situations. Research conducted and led in Southeast Asia is necessary as most research comes from developed countries.
  o Funding for research is difficult to acquire, in particular in public universities.
  o In Myanmar, there has yet to be separated faculties established for environment and resource studies; until now it is still integrated into other disciplines. Hence, there is more separated than collective research conducted in the field of environment.

SESSION III

COMBINING PHYSICAL AND SOCIAL SCIENCE

ASIAN DISASTER PREAREDNESS CENTER (ADPC) PRESENTS SERVIR – TECHNICAL TOOLS FOR TEACHING AND RESEARCH

Dr Peeranan Towashiraporn, Chief of Party, presented ADPC's SERVIR MEKONG program, technical tools for teaching and research. It is a partnership between USAID and NASA to establish long-term partnerships and tools for decision-makers, to identify, address and resolve data and information challenges, with a focus on climate change and implications on land-use, agriculture, biodiversity, among others. The overall goals is to enhance climate change adaptation and landscape management in the Lower Mekong Region through increased application of geo-spatial data.

The outputs are: i) Improved capacity of institutions to use earth observation information and geospatial information technologies, ii) awareness of stakeholders, iii) user-tailored geospatial data, products and tools, and iv) ADPC strengthened. SERVIR's approach is focused and demand-driven, building partnerships, develop regional outcomes, building on existing efforts, and use an adaptable and sustainable approach.

SERVIR develops special decision support tools, such as i) virtual rain and stream gauge data, ii) surface water mapping, iii) regional land cover monitoring system, iv) regional drought monitoring system, and v) capacity building strategy for university partners.

SESSION IV

EXISTING UNIVERSITY CURRICULUM AND TEACHING COURSES

Dr Pakamas and **Dr Yanyong** outlined that it is important to revisit ideas on SS and consider *what is missing* in existing university curriculums or teaching courses, *what to teach*, *what research* is needed, *what academic services*, *what methods, methodologies and tools*, *what skills* are needed to contribute to achieve the SDGs 11 and 13.

The participants were encouraged to consider three questions:

1) *What subjects or topics exist already in your faculty / department in relation to Session 2?*
2) *Which subjects or topics meet your university faculty / department needs?*
3) *Are we missing any subjects or topics to contribute to the SDGs 11 and 13?*

The results are presented in annex II.

In an open forum, the participants shared their reflections on the presentation. Statements made included the following:

- In the PhD program of the Faculty of Humanities and Social Science in Khon Kaen University, students are encouraged to pick up research topics, such as urban resilience and development, urban energy planning or urban poor. The program lacks a supporting class on knowledge production and methods.
- The Department of Geography in the University of Mandalay teaches Environmental Geography and Urban and Settlement Geography but lacks in computer facilities and application software. New subjects such as Urban and Climate Management are needed.
- Dr Buapun Promphakping, Director of the Civil Society Nonprofit Management Center (CSNM) and head of the Wellbeing and Sustainable Development Research Group in Khon Kaen University, questioned how climate change tools could be used in social science and how social science methodologies can be used in natural science. He suggested 'citizen science' as one good approach.
- Dr Yanyong suggested to develop a guideline or handbook for lecturers of the SS programme.
- Dr Le Thi Trinh, Dean of the Faculty of Hanoi University of Natural Resources and Environment, raised her concern how to improve student's skills in order for them to apply and use the knowledge after their graduation.
- More focus on resource management is needed in Southeast Asia; in the United States of America, climate change mitigation is a major focus while climate change adaptation is more relevant in Southeast Asia.
- Transboundary issues at a regional level were mentioned as essential to be included into the SS programme; textbooks also need to take in regional case studies.
- Students need to learn how to think critical and 'out of the box'.
- Environmental ethics and environmental law are further important teaching subjects.

- Dr Hue Le Thi Van from the Center for Natural Resources and Environmental at Vietnam National University Hanoi suggested to include Gender into the SS programme.
- Dr Nguyen Thi Van Ha, Dean of the Faculty of Environment at Ho Chi Minh University of Natural Resources and Environment, said that climate change needs to be integrated into different curriculums. Moreover, community-tailored projects should be included in student activities in order to build innovations for communities.
- Dr Vattanimixay Chansomphou, Assistant Dean at the Faculty of Environmental Science, National University of Lao PDR, found climate economics and environmental statistics as essential teaching subjects.

DAY II

Wednesday, 8 February 2017

Recapturing key points from the first workshop day

Dr Yanyong and Dr Pakamas recaptured the findings from the 1st workshop day:

In view of the course content following key elements have to be considered:

- Networking;
- Collaboration and partnership: Need to help each other and carry on the vision;
- Sustainable Science Degree Programme:
    - Content: Curriculum for Doctoral and/or Master; Course could be also for Bachelors;
    - Tools and methodologies: There are many tools available – most appropriate ones have to be identified;
    - Skills: What are the teaching tactics or strategies?

Reasons for the need of Sustainable Science in the GMS are as following:

- Social equity and justice;
- Gender issues;
- Rural-urban linkages (not enough understanding about the interactions);
- Governance, administration and services (politics, fairness, and public participation);
- Urban development, planning and public policy (challenging issues such as traffic jam, air pollution, etc.);
- Environmental issues;
- Disasters, climate change (climate variation and temperature changes – long term up);
- Cross-boundary issues, regionalization (recent changes in the region; one education – one development);

Reasons for the need of new course or degree are as following:

- Linking hard and social science? - Little knowledge of other discipline;

- Research to practice to policy? - Fruitful research results can inform the policy maker and make recommendations;
- Student need to think 'outside of the box'? - How to bring in a new way of thinking to students? Need to overcome conventional thinking;
- Universities are lagged behind and need to address emerging issues? – There are new risks due to a changing and transforming region. Teaching and its content is often still based on issues 30 years ago which might create barriers in framing research. No universities are yet teaching sustainability science in the region which means they are not addressing emerging issues and do not understand the impact of climate change and urbanization.

Following points, the participants have <u>agreed on</u>:

- A rapidly changing region: Young generations do not know the value of the Mekong delta for the region and the world. There is a need to bring in bio-physical assets or values of the region to be taught in the programme.
- Social, environmental and economic implications have to be considered.
- We need to shape and influence transformation, and prepare for our futures.
- Regional collaboration of academics and universities are essential.

BRAINSTORMING I – DESIGN OF SS DEGREE PROGRAMME

The participants were encouraged to consider <u>following two questions</u>:
1) *What resources are needed to meet your needs and requirements to develop and implement Sustainability Science Degree Programme?*
2) *What can we share or do to support this network?*

In an **open forum**, the participants discussed and shared their reflections on the two questions. Statements made included the following:

- A powerful network can produce <u>a big databank and use one software</u> which would facilitate filtering and the analysis of data.
- Myanmar lags behind with the <u>application of new technologies</u>; difficulties are given as permissions have to be acquired from the higher level.
- Dr Ha shared key learnings from her faculty:
  o SS is a concept and cannot stand alone but should interact with different fields and sectors.
  o Communication and public relations are more important knowledge than mathematics.
  o Good model: In the EU and US, five universities collaborated to form the "Sustainability Alliance of Urban Network in Asian Cities to build capacities for Sustainability Science" with a focus on smart and sustainable cities, sustainable development and energy.
  o Master degree is better to bring in students with different backgrounds.
  o A pilot programme is needed.
- Dr Hue also found <u>master and doctoral programme</u> more suitable than Bachelors. The focus should be on the green and brown sector, including urban, sub-urban and waste management.

- Dr Seak Sophat, Head of the Department of Natural Resource Management and Development, Faculty of Development Studies at Royal University of Phnom Penh, explained that <u>sustainability is differently understood</u> in different contexts, different disciplines and different countries.
- Dr Hamid Mehmood from the ADPC emphasized the need for GIS as a tool for SS; courses can also be advertised on the website of SERVIR MEKONG.

BRAINSTORMING II – DESIGN OF SS DEGREE PROGRAMME

The participants were encouraged to consider <u>following question</u>: *To develop and design Sustainability Science Degree Programme – what teaching course should be included in your faculty or department?* The participants wrote their ideas on sticky notes divided in two categories, i) important, and ii) very important subjects.

The results are presented in annex III.

In an **open forum**, the participants discussed and shared their reflections on the question above. Statements made included the following:

- Structure of the course has to be defined.
- Credits for course have to be adjusted to country system.
- Target students have to be identified as well as the vision of the course (national? Regional or international?), clear objectives and capacity of the students. Interdisciplinary thinking is important. What skills should the students acquire?
- Subjects such as environmental law have to be based on national (and regional?) law.
- Curriculum should be realizable within the given time of the project/program of UCRSEA; administrative or bureaucratic limitation have to be considered (different in each country).
- Sustainability theory should be trans- and/or interdisciplinary.
- Methods for research design are essential.
- Limitations are given through language barriers (teaching language?).

In a concluding discussion, the 'very important' and 'important' subjects that are aimed to be included into the SS degree programme were re-structured and re-defined:

VERY IMPORTANT SUBJECTS

1. **Sustainability theory and practices** – including issues in urban, social, gender, economics, environmental governance and politics;
2. **Climate change as trans-disciplinary**: Adaptation, mitigation, transformation and trans-boundary;
3. **Environment and natural resource management** – including issues in waste water, energy, soil and air;
4. **Environmental management approaches**: EIA, SEA, EQA, HIA, ecological economics;
5. **Sustainability policy and planning** - including law/regulations, ethics, public policy, advocacy, regional policy, decision-making, land use planning and public participation;

6. **Technical tools for environmental assessment**: GIS-spatial technology, remote sensing, environmental modeling, environmental planning;
7. **Research and internship** – including research methodology and data analysis;
8. **Skills**: Communication, problem-solving and critical thinking, ethics;

IMPORTANT SUBJECTS

1. **Ecology and applied ecology**, such as human and urban ecology;
2. **Environmental monitoring and surveillance** – including air, quality, emission inventory, marine and coastal zone, citizen science, local wisdoms, and access to information;
3. **Green production and growth** – including cleaner production, renewable energy, green technology, infrastructure development, entrepreneur and innovation, and agriculture and food security;
4. **Behavior change**: Asian culture;
5. **Sustainable governance** – including public policy/advocacy, equity and justice, and urban administration;
6. **Seminar**: Trans/inter-disciplinary research approaches;
7. **System thinking**

ANNEX I

SESSION II: Brainstorming SDGs

SDG 11 – TEACHING

1.	URBANIZATION & SUSTAINABLE DEVELOPMENT	Urban Sustainable Development	Sustainable Urbanization	Environment and Sustainable Development	Introduction to Sustainable Development	Ecosystem & Sustainable Development	Sustainable Economic Development	Sustainable Infrastructure	Safe, Resilient & Sustainable Development (students, officials, private companies, communities)	Urban Growth and Sustainable Development
2.	URBAN CLIMATE RESILIENCE	Urbanization and Climate Resilience	Climate Change Mitigation & Adaptation	Urban Climate Resilience	Climate Science (Vulnerability Assessment & Adaptation Planning)	Housing Design (for climate disaster resilience)	Urban & Settlement	Climate Change (as a selective course)	Urban Infrastructure Management (water, energy, transportation)	Effect of Urbanization on Well-being
3.	DISASTER RISK MANAGEMENT	Disaster Risk Reduction and Management	Disaster Prevention	Early Warning System						
4.	TOOL DEVELOPMENT	GIS in Climate Change & Disaster Risk Management	Sustainable/Sustainability Tools	Resilience Methods & Activities (for research)	Theory & Results from Research (community needs based)	Environmental Modelling	GIS	Emissions Inventory/ Modelling		
5.	CLIMATE CHANGE EDUCATION	Capacity Building, Internship Training	Community Adaptation to Climate Change	Behavior Change						
6.	ENVIRONMENTAL MANAGEMENT	Water Resource Management and Climate	Energy Conservation	Solid Waste Management	River Basin Management	Urban Wetland Ecosystem Assessment	Sustainable Solid Waste Management			

7.	CLIMATE SCIENCE	Change Climatology	Hydrology	Botany & Zoology								
8.	URBAN- & SPACIAL PLANNING	Environmental Geography	Participatory Landuse Planning for Development	Regional Planning	Urban Planning	Urban Community Planning	Urban Environmental Planning & Management	Settlement & Urban Geography	Land-use Planning and Climate-Related Risk Management	Urban - Rural Linkages	Human Geography	Tourism
9.	CLIMATE POLICY & GOVERNANCE	Land and Water Governance	Community Self-Governance	Rights and Justice to Cities	Urban Governance	Human Rights and the Right to the City						

SDG 13 – TEACHING

1.	CLIMATE CHANGE AND DEVELOPMENT	Climate Change (as an integrated course in other subjects)	Climate Change & Sustainable Development	Climate Change (for all majors)	Environment and Development	Climate Change Mitigation Mechanism	Climate Change Adaptation	Climate Resilience Strategy Planning	Sustainable Development (based on Climate Change)	Climate Change (Resilience, Adaptation, Mitigation)	Climate Change and Economic Development
2.	ENVIRONMENTAL MANAGEMENT & ASSESSMENT	Environmental Management/ Assessment	Environmental Monitoring	Risk Management	Air Pollution Control	Urban Environmental Management	Marine & Coastal Management	Natural Hazard Management			
3.	TOOL DEVELOPMENT	Modelling + GIS	Climate Change Modelling	Carbon Capture & Storage							
4.	TECHNOLOGY	Low Carbon Technologies (Low Carbon Cities, Low Carbon Engineering)	Disaster Prevention & Relief (Technology)	Technology in Industry Production							
5.	ENERGY	Energy Saving	Renewable Energy	Low Carbon Footprint	Eco-green City	Green and Clean Energy	Energy for Sustainable				

			Knowledge (included into all subjects)		Technology	Development		
6. URBAN- AND LAND-USE PLANNING	Land-use planning	Sustainable Urban Planning	Rural Urbanization	Urbanization and Climate Change	Greening (Urban Design, Infrastructure, Urban Systems)			
7. CLIMATE CHANGE EDUCATION	Awareness Raising on Climate Change (students, local communities)	Society and Environmental Protection	Environmental Communication					
8. CLIMATE POLICY & GOVERNANCE	Public Policy and Climate Science	Ecological Governance	Water Governance and Climate Change					
9. CLIMATE SCIENCE	Hydrology	Meteorology	Climatology					

SDG 11 – RESEARCH

1. CLIMATE CHANGE ADAPTATION	Understanding Adaptive Capacities of Urban Communities, focusing on vulnerable sectors	Climate Change Adaptation/Resilience	Solutions for Climate Change Adaptation	Adaptation Measures	Urban Resilience	Climate change impact & policy implementation	Urban resilience to environmental and social changes	Innovative approaches for sustainable urban management
2. VULNERABILITY TO CLIMATE CHANGE	Urban Climate Vulnerability	Urban Vulnerability	Most vulnerable groups to climate change	Vulnerability assessment	Community participation in assessing climate vulnerability			
3. MODELING	Urban Climate Change Scenario Modeling	Proactive to predict flooding areas based on climate change scenario (protection)						
4. NATURAL DISASTERS	Hydrology of floods	Minimize environmental	Most common types of disasters					

			disaster					
5.	URBANIZATION - CITY	Process of Urbanization vs. Impact on Sustainability (Case Study)	Future City Planning	City Tourism	Wellbeing of Urban Dwellers	Urban Sprawls	Spatial urban & landuse management	Smart and Sustainble Cities	Urbanization Pattern
6.	POPULATION	How can we plan for 2050 in view of drastic population growth?	Rural-urban migration						
7.	REGIONAL COOPERATION	Efficient sharing and use of natural resources	Regional urban climate resilience network						
8.	ENVIRONMENTAL DEGRADATION	Biodiversity & Ecology	Water & Air Pollution	Monitoring of saline intrusion in water supply network					
9.	TOOL DEVELOPMENT	Tools to increase resilience policies and reduce vulnerability	Developing tools to predict climate change (GIS)						
10.	ASSESSMENT	EIA, SIA and HIA	Assessment on settlement strategy						
11.	RESOURCE MANAGEMENT	Allocation of resources	Land tenure rights and sustainable land-use	Inventory, planning and resource conservation					
12.	ENERGY	Biomass to bioenergy	Urban sludge to biogas	Composting of urban solid waste					
13.	GOVERNANCE	Local self-governance and SDG implementation	Community participation in urban decision-making processes	Institutional Analysis	Urban governance				

SDG 13 - RESEARCH

#	Thematic Area								
1.	DISASTER MANAGEMENT	Flood Control	Early warning systems						
2.	IMPACT OF CLIMATE CHANGE	Landownership and Urbanization & Climate Change	Impact of Climate Change on Urban/Rural Poverty	Climate change impact on urban system	Climate change and gender	Climate change impact assessment	Impact of climate extremes on community livelihoods (involving food security, health impacts, economic, natural resources)	Rural - urban linkage	
3.	CLIMATE CHANGE VULNERABILITY	Climate change vulnerability assessment	GIS mapping of vulnerable areas to climate change	Vulnerability index					
4.	CLIMATE CHANGE ADAPTATION	Exploring adaptation and mitigation measures for climate change	Climate Change Adaptation to Agricultural Species	Adaptation measures for vulnerable communities	Environmental planning to adapt with climate change	Civil awareness raising for climate change	Low carbon societies	Household adaptation strategies	REDD+ ; Climate Change Communication
5.	CLIMATE CHANGE MITIGATION	Air pollution mitigation by ecological measures							
6.	ENVIRONMENTAL CONSERVATION	Urban biodiversity and conservation	Protection of water resources						
7.	URBAN PLANNING	Spatial planning, urbanization and climate change							
8.	ENERGY	Change from fossil fuel to renewable energy (ethanol, biomass, wind/solar power)	Renewable energy						
9.	TECHNOLOGY	New technology for saline intrusion	Climate change modeling	Nano-biogenetic - rehabilitation for agriculture	GIS				
10.	GOVERNANCE	Polycentric urban governance							

SDG 11 – ACADEMIC SERVICES

1.	**TRAINING - CAPACITY DEVELOPMENT**	Short training courses on climate change related skills like i) vulnerability assesment and adaptation planning, ii) GIS mapping in climate change and disaster risk management, and iii) proposal development of climate change projects	Resilient cities	Air quality measurement training	HRD training on remote sensing and EIA, SIA and DRR	Participatory climate vulnerability assessment for policy planning	Building capacity of local government of local government in climate variability adaptation	Capacity development for CSOs on SDG application
2.	**LECTURE**	Teach residents how to develop communities' sustainable self-supply, efficiency use, and save nature and environment						
3.	**AWARENESS RAISING**	Cooperative activities with NGOs, schools, and local institutes working on sustainable ecosystem development in the cities (raising public awareness)	Enhance awareness on climate change adaptation and mitigation to communities	Sustainable community development based on climate change effect				
4.	**ACTIVITIES**	Housing rehabilitation after disasters						
5.	**NETWORKING**	Curriculum Development	Networking and collaborations (with TEI)	Set up networks and work with UCRSEA	Monitoring networks (meteorology & hydrology)	Water/air monitoring		
6.	**POLICY LEVEL**	Sharing research results with decision-making levels	Research lending policy decision making					
7.	**INSTITUTE**	Technical Institutes	Urban Sustainability Learning & Research Center					
8.	**OTHERS**	Domestic SW - mushroom cultivation	Conservation of sewage sludge into energy	Engineering subjects, GIS, remote sensing	Gap identification of climate change data	Urban design for hazardous areas (e.g. coastal, low-lying)	Importance of climate change impact assessment during land use planning	Infrastructure development
		EIA, Environmental quality assessment	Climate change, energy and environmental	Biomass energy	Environmental treatment systems design/consultations	Zoning	Urban planning	

modeling

SDG 13 – ACADEMIC SERVICES

No.	Category						
1.	**TRAINING COURSE**	Training course on 'Climate Change Adaptation'	Training/workshop on 'Climate Change Causes and Adaptation'				
2.	**CAPACITY BUILDING**	Ecological Sustainable Learning	Capacity building of local government, CSOs and communities				
3.	**DATABANK DEVELOPMENT**	To measure a gap on awareness & solution for adaptation of communities	Development of national (regional) data, including hydrological data, meterology data, climate-projection data, and land-use data	Climate Smart, climate proof housing design	GIS Mapping		
4.	**COMMUNITY COLLABORATIVE ACTIVITIES**	Develop community-based climate change resilience model	Shared Learning Dialogues (SLDs)	Community-based REDD+ readiness	Community awareness raising	Climate Change Awareness Raising	
5.	**POLICIES RECOMMENDATIONS**	Assessment & Planning, Mainstreaming climate resilience into development planning	Urban Transport Mitigation Plan	Climate Adaptation Plan	Implementing national adaptation plans at local level	Communities Climate Change Resilience Strategies/Policy	Climate Change Adaptation Recommendations
6.	**OTHERS**	Intellectual Knowledge contributions for doing preventive measures	Payment for Ecosystem Services	Agriculture Genetic Adaptation	Treatment of Wastewater by Biological Process	Renewable Energy	

ANNEX II

SESSION IV: Existing University Curriculum and Teaching Courses

QUESTION I: *What subjects or topics exist already in your faculty / department in relation to Session II?*

1. **Assessment**	SEA	EIA	Life Cycle Assessment	Environmental Risk Assessment			
2. **Environmental Economics**	Environmental Economics	Sufficiency Economy Principle					
3. **Environmental Law**	Environmental Law & Policy						
4. **Environmental Planning & Management**	Environmental Planning	Environmental Administration	Waste Management	Industrial Pollution Prevention & Cleaner Production	Waste Utilization	Solid Waste Management	Waste Water Treatment
5. **Environmental Ethics**	Environmental Ethics						
6. **Environmental Geography**	Environmental Geography (Master, Ph.D)	Integrated Human Geography					
7. **Natural resource management**	Natural resource management	Marine space planning	Coastal Management	Wetland conservation	Environment and Resources Conservation		
8. **Climate Science**	Meteorology	Climatology	Physical Geography				
9. **Climate Change Adaptation & Mitigation**	Climate Change	Climate Change Adaptation & Mitigation	Disaster prepare and risk reduction management				
10. **Tools**	GIS & Remote Sensing	Environmental Modeling	Geospatial Technology				
11. **Environmental Monitoring and surveillance**	Air pollution (engineering and management)	Air pollution control	Emission Inventory	Environmental Monitoring	Inspectors and compensation for environmental damage		
12. **Research Methods**	Research Methods						
13. **Sustainable Development**	Development Science	Sociology	Development Planning	Environment and Development	Sustainable Development for Environmental		

14. Energy	Sustainable Energy	Green Energy	Green technologies and clean energy	Environmental Technology	Education Renewable Energy	Sustainable Energy
15. Land-use and urban planning	Land-use planning (tool PAR, PRA; ArcGIS Mapping)	Urban and industrial zone management	Field training on urban land use	Urban Planning		

QUESTION II: *Which subjects or topics meet your university faculty / department needs?*

1. Environmental Planning & Management	Environmental Planning	Environmental Management	Marine and coastal zone management
2. Climate Change	Climate change (Master)	Adaptation models from climate change	
3. Urban Planning	Urban Planning	Urban & Settlement Geography	Sustainable Infrastructure
4. Sustainable Development	Principles of sustainable development	Sustainability Science	Environment & Sustainable Development
5. Green growth and production	Green growth	Cleaner Production	
6. Assessment	Investigation survey & assessment		
7. Tools	Tool for skills improvement (?)	GIS applications for climate change	Environmental Modeling
8. Ecology	Applied Ecology		
9. Communication and thinking skills	Communication skill for climate change adaptation & disaster	Enhancing critical-thinking skill	
10. Environmental Ethics	Environmental Ethics		
11. Risk management & assessment	Disaster Risk Reduction	Risk management & assessment	

QUESTION III: *Are we missing any subjects or topics to contribute to the SDGs 11 and 13?*

1. **Urban Sustainable Development Planning**	Sustainable Development Geography	Eco-city Development	Sustainable Environmental Development	Sustainable agriculture in urban dynamics	Green city - industrial zones	Green city planning
2. **Urban Climate Adaptation, Mitigation and Resilience**	Urban climate resilience & adaptation to climate change	Climate change (with contents in each subject)	Climate change adaptation in urban areas	Urban Ecosystems	Ecosystem based adaptation	Urban resilience to climate change
3. **Tools for climate change**	Use of climate tools for social science	Public participatory planning tool	Tools for climate change assessment			
4. **Climate change monitoring & surveillance**	Carbon footprint	Low carbon society	Citizen science to enhance sustainable urban governance			
5. **Sustainable Governance**	Risk governance	Policy development	Public consultation for urban vulnerable people	Environment & Health		
6. **Methodology**	Research seminar (climate change-urbanization)	Physical-social science research methodology	Research/ science to policy approaches	Community tailored student program/project		
7. **Skills**	Environmental ethics	Environmental communication				
8. **Environmental Economics**	Environmental statistics	Climate change economics				
9. **Cases studies (regional, cross-border)**	Regional issues	Cross-border studies (environment)				
10. **Rural-urban processes**	Rural-urban resource exploitation/ access	Rural-urban interface within global/regional transformations				

ANNEX III

BRAINSTORMING II: Important & Very Important Subjects

IMPORTANT SUBJECTS

1. **TOOL DEVELOPMENT**	Geospatial application for sustainable landscape	GIS	Environmental Modeling	
2. **ENVIRONMENTAL ASSESSMENT**	Environmental Impact Assessment	Risk Assessment	Technological Assessment	
3. **ENVIRONMENTAL MONITORING & SURVEILLANCE**	Emissions Inventory	Environmental Monitoring	Marine & Coastal Zone Management	Air Quality Management
4. **ECOLOGY & APPLIED ECOLOGY**	Ecology	Human Ecology	Urban Ecology Management	
5. **TRANS- & INTER-DISCIPLINARY RESEARCH APPROACHES**	Inter-disciplinary research methodology	Research Methods	Applied Research Projects	Trans-disciplinary Research Application / Applied Sustainability Research Projects
6. **GREEN PRODUCTION & GROWTH**	Cleaner Production	Infrastructure Development	Green Technologies	Renewable Energy
7. **ENVIRONMENTAL ETHICS**	Critical Thinking	Equity & Justice		
8. **ENVIRONMENT & HEALTH**	Public Health	Environmental Health		
9. **SUSTAINABLE GOVERNANCE**	Public Policy Advocacy/ Environmental Communication	Urban Governance	Sustainability Governance	Sustainability Policy & Planning
10. **BEHAVIOR CHANGE**	Sustainability Psychology (Behavior Change)	Sustainable Community (environmental, economic, community)	Behavior Economics	Behavior Change
11. **ENVIRONMENTAL ECONOMICS**	Mathematics for applying in environment	Environmental Informatics		

VERY IMPORTANT SUBJECTS

1.	**CLIMATE CHANGE AS TRANS-DISCIPLINARY**	Climate Change	Inter-disciplinary thinking towards sustainability				
2.	**SUSTAINABILITY POLICY & PLANNING**	Public Policy Advocacy	Regional/ Country Policies of Sustainability	Public Participatory Planning Tools	Environmental Law	Environmental Ethics	Gender and Sustainable Development
3.	**ENVIRONMENT AND NATURAL RESOURCE MANAGEMENT**	Natural Resource and Environmental Management	Waste Management	Water Management	Energy Management	Air and Soil Management	Environmental Administration	Disaster Management
4.	**SUSTAINABILITY THEORY & PRACTICE**	Sustainable Development Theories & Practice	Environmental Sustainability	Principles of Sustainability	Urbanization & City Planning	Urban Sustainability	
5.	**ENVIRONMENTAL MANAGEMENT APPROACHES**	Strategic Environmental Assessment	EIA, SEA, EQA	Ecological Economics	Sustainable Economic Development	Social Sustainability	
6.	**TECHNICAL TOOLS FOR ENVIRONMENTAL ASSESSMENT**	GIS, GPS	Modeling				
7.	**RESEARCH & INTERNSHIP**	Research Methodology & Data Analysis	Research Method	Internship project			
8.	**SKILLS**	Ethics	Communication Skills				

ANNEX IV

List of Participants