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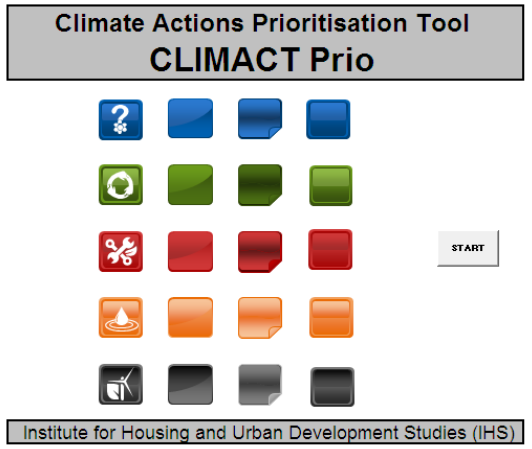
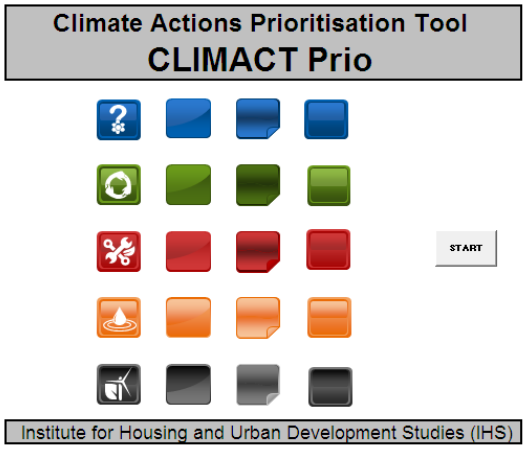


How to prioritize climate change adaptation actions
CLIMACT Prio Tool

Urban Management Tools for Climate Change (UMTCC8), June 2017

Learning Objectives



- Understand and analyze city's present and future vulnerability profile
- Identify adaptation actions in various sectors/areas
- Prioritize adaptation actions

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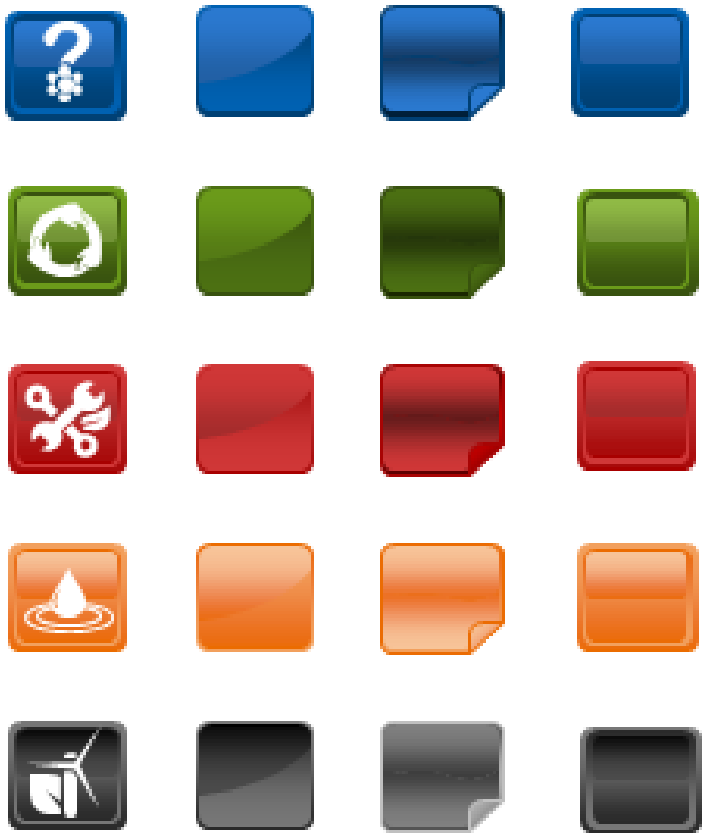
Climate Actions Prioritisation Tool

CLIMACT Prio



START

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Climate Actions Prioritisation Tool
CLIMACT Prio

START

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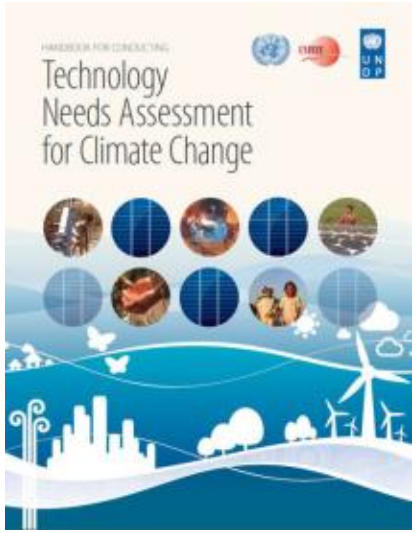
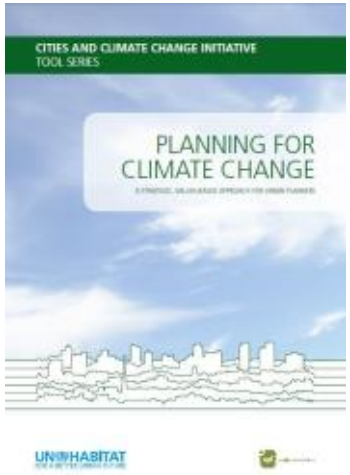
Prioritization
or
“From wish list...to short list”

Relevant for

- Planning for Climate Change – (UN Habitat)
- Technology Needs Assessments (UNDP)
- MCA 4 climate (UNEP)

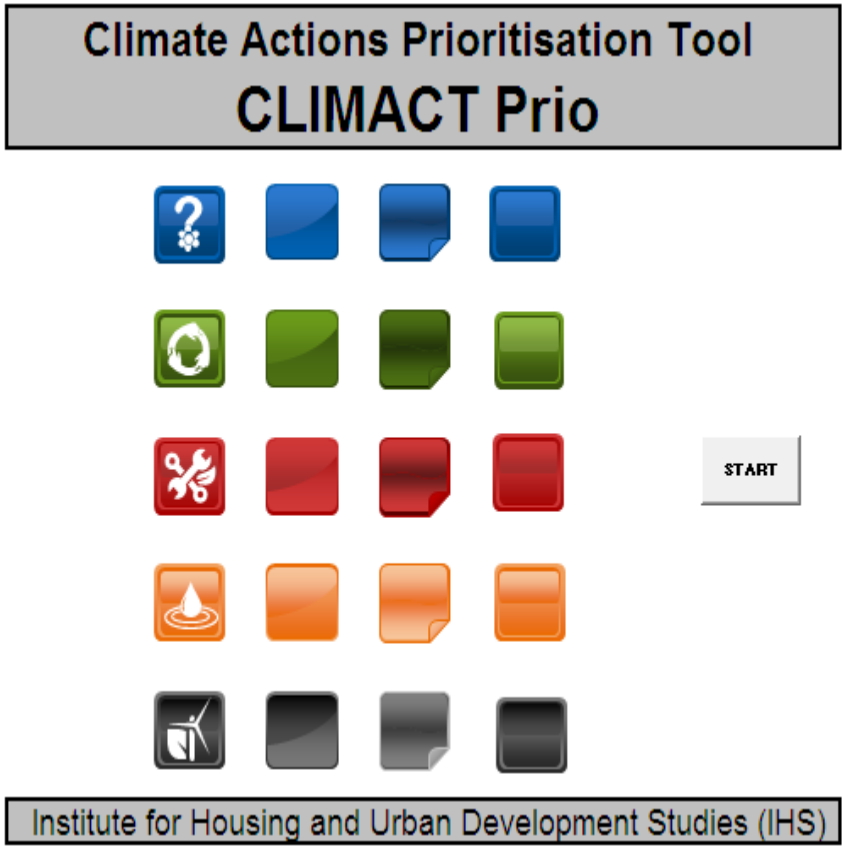




MCA4climate
UNEP

Applications

- **Research** and **advisory**
- **Capacity building** and **Training** of professionals in Climate Change (e.g. UMTCC, IUTC – UN Habitat, ICLEI)
- **Education** – Masters course, postgraduate course



Participatory integrated assessment of flood protection measures for climate adaptation in Dhaka

ANIKA NASRA HAQUE, STELIOS GRAFAKOS AND MARIJK HUIJSMAN

Anika Nasra Haque is an architect and climate change expert by training and at present is a Lecturer in Environmental Planning and Urban Design at the School of Architecture, American International University – Bangladesh. She is associated with climate adaptation projects for the least developed countries as an independent consultant and her work focuses particularly on urban adaptation to climate change.

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Stelios Grafakos is an environmental economist currently working at the Institute for Housing and Urban Development Studies (IHS), Erasmus University Rotterdam, the Netherlands. He lectures, researches and is a scientific advisor in the field of climate mitigation and adaptation policy analysis and assessment, the integrated evaluation of energy systems, and environmental economics in urban areas. The main part of his work focuses on the development

ABSTRACT Dhaka is one of the largest megacities in the world and its population is growing rapidly. Due to its location on a deltaic plain, the city is extremely prone to detrimental flooding, and risks associated with this are expected to increase further in the coming years due to global climate change impacts as well as the high rate of urbanization the city is facing. The lowest-lying part of Dhaka, namely Dhaka East, is facing the most severe risk of flooding. Traditionally, excess water in this part of the city was efficiently stored in water ponds and gradually drained into rivers through connected canals. However, the alarming increase in Dhaka's population is causing encroachment of these water retention areas because of land scarcity. The city's natural drainage is not functioning well and the area is still not protected from flooding, which causes major threats to its inhabitants. This situation increases the urgency to adapt effectively to current flooding caused by climate variability and also to the impacts of future climate change. Although the government is planning several adaptive measures to protect the area from floods, a systematic framework to analyze and assess them is lacking. The objective of this paper is to develop an integrated framework for the assessment and prioritization of various (current and potential) adaptation measures aimed at protecting vulnerable areas from flooding. The study identifies, analyzes, assesses and prioritizes adaptive initiatives and measures to address flood risks in the eastern fringe area, and the adaptation assessment is conducted within the framework of multi-criteria analysis (MCA) methodology. MCA facilitates the participation of stakeholders and hence allows normative judgements, while incorporating technical expertise in the adaptation assessment. Based on the assessment, adaptive measures are prioritized to indicate which actions should be implemented first. Such a participatory integrated assessment of adaptation options is currently lacking in the decision-making process in the city of Dhaka and could greatly help reach informed and structured decisions in the development of adaptation strategies for flood protection.

KEYWORDS assessment / climate adaptation / Dhaka / flood protection / multi-criteria analysis / options prioritization

I. INTRODUCTION

There is a global inequality between those cities causing climate change and those that are at high risk from its effects but hardly contribute to overall greenhouse gas (GHG) emissions. The latter are mostly located in developing countries and are characterized by an enormous backlog in basic infrastructure services to protect their cities and urban areas.

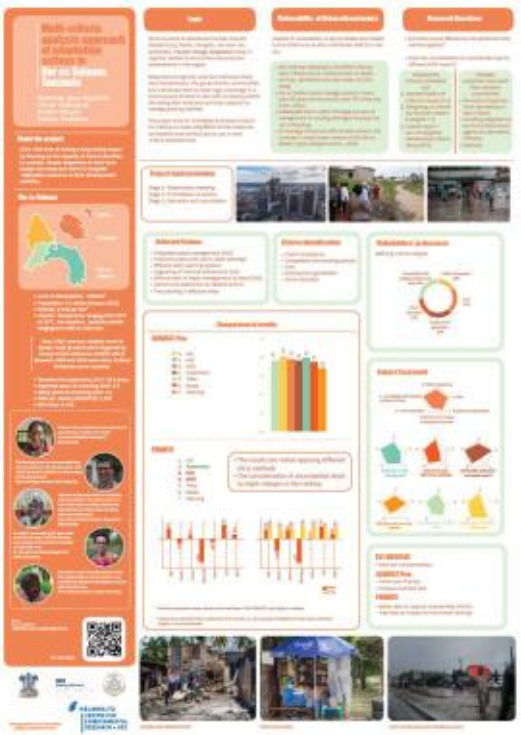
http://eau.sagepub.com/content/24/1/197

Climate Actions Prioritisation Tool

CLIMACT Prio

Institute for Housing and Urban Development Studies (IHS)

http://www.ihs.nl/urban_professionals/climact_prio_tool/



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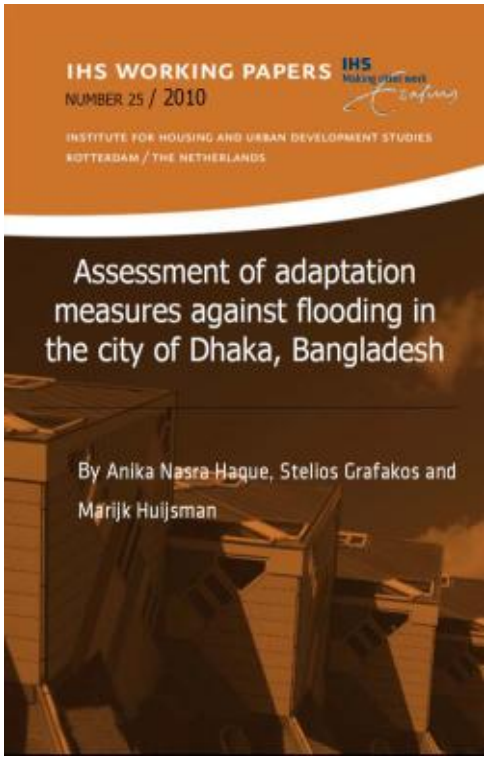

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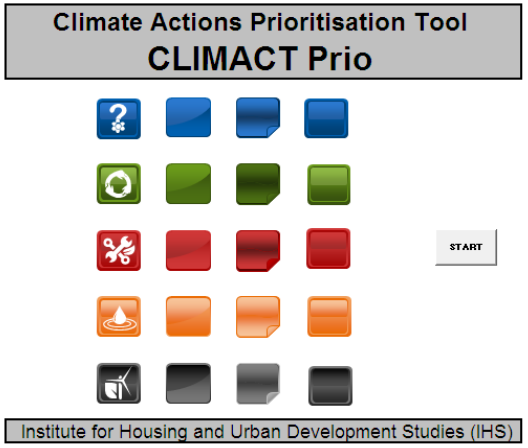

GROUP EXERCISE

How to prioritize climate change adaptation actions

Case Studies

Kampala – Uganda
Sorsogon – Philippines
Copenhagen– Denmark
DaNang - Vietnam

Adaptation (TODAY)
and Mitigation (NEXT WEEK)


UN HABITAT
FOR A BETTER URBAN FUTURE

UNITED NATIONS HUMAN SETTLEMENTS PROGRAMME UN-HABITAT
SUD-NET CITIES IN CLIMATE CHANGE INITIATIVE (CCCI)

FINAL REPORT

VULNERABILITY ASSESSMENT OF CLIMATE CHANGE IN KAMPALA AND UGANDA

Consultant Team

SUBMITTED TO: URBAN ENVIRONMENT & PLANNING BRANCH

10TH JULY 2011


INTERIM REPORT

FORMULATION OF A CITY DEVELOPMENT STRATEGY FOR SRI LANKAN CITIES TO RESPONSE CLIMATE CHANGE
NEGOMBO & BATTICALOA MUNICIPAL COUNCIL AREAS

PART II
VULNERABILITY ASSESSMENT ON CLIMATE CHANGE SCENARIOS
Negombo Municipal Council Area

Submitted by..
Project Consultancy Unit,
Faculty of Architecture,
University of Moratuwa

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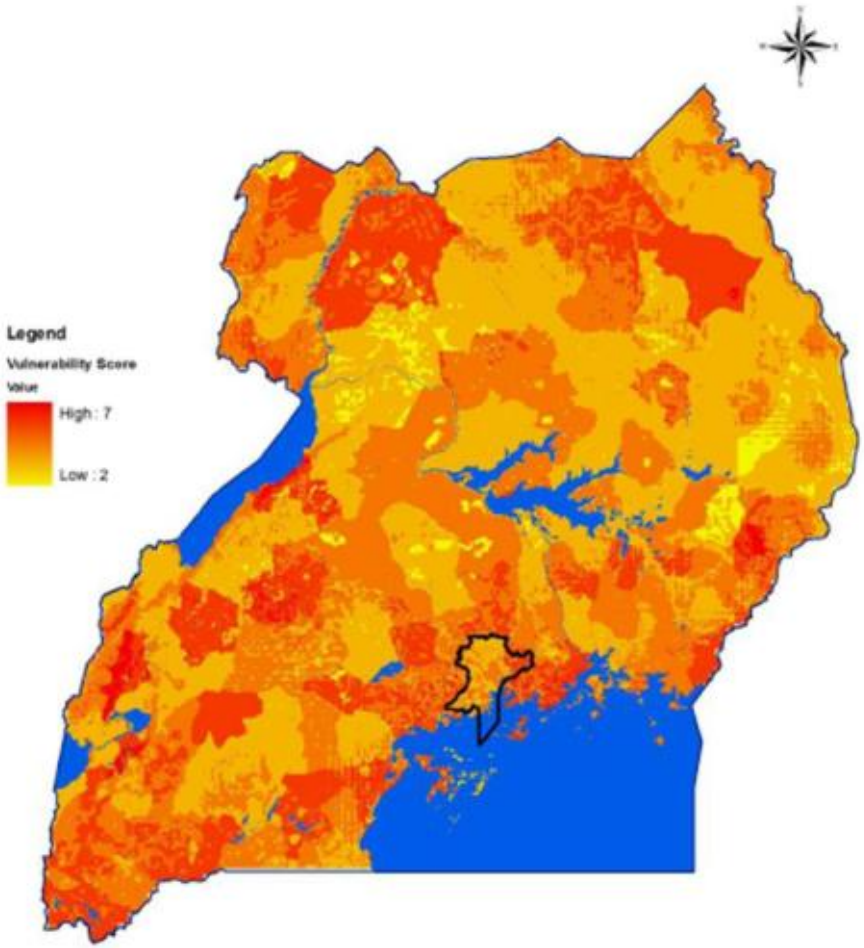
Step 0 – Identify city's vulnerability profile



- Identify the city's vulnerable sectors or assets based on given cities vulnerability assessments
- Identify sectors/assets with highest priority for action

Step 1a – List possible adaptation actions (1 hour)

STEP 1a: List of Adaptation Actions

1) Identify adaptation actions/technologies that could contribute both to the reduction of vulnerability and achievement of other city's development objectives.

2) Indicate the typology (structural, non-structural), the relevant sector and a time frame for implementation.

No	Adaptation actions	Type	Sector	Time frame
1	Retrofitting of drainage system	Structural	Infrastructure	Long term
2	Raised road	structural	Infrastructure	Medium term
3	Embankment	structural	Flood management	Medium term
4	Flood wall	structural	Flood management	Medium term
5	Protection of water retention areas	structural	Water management	Short term
6	Canal Improvement	structural	Water management	Medium term

Develop an initial list of alternative adaptation actions based on sectors/assets showing the highest vulnerability (max 15 actions)

ClimateTechWiki
A CLEAN TECHNOLOGY PLATFORM

Technology Options

You can search for information on technologies by name, by sector, and by the service that they provide. **'Ethanol Cook Stoves'** can for example be found in the alphabetical list under **'NAME'**, under **'Energy supply and consumption'** in **'SECTOR'**, and under **'Cooking'** in **'SERVICE'**.

The sector categorization for **mitigation** technologies is based on **2006 IPCC Guidelines**. For **adaptation** technologies, sectors or categories have been derived from FCCC/SB/2009/2 (Annex II).

Mitigation

browse
- By Name -

browse
- By Sector -

browse
- By Service -

Adaptation

browse
Flood warnings

browse
Coastal zones / marine ecosystems

INTERESTING READS

- Ocean energy: Wave energy
- Biodiesel
- Electronic Road Pricing

Step 1b – Feasibility Assessment (1 and 1/2 hours)

Step 1b: Feasibility Assessment - Initial Screening of Adaptation Actions

	Feasibility criteria					Impact Criteria	
Adaptation Actions	Stakeholder Acceptability	Technical Feasibility	Ease of Implementation	Financial feasibility	Mainstreaming Potential	Effectivenes	Multi-sectoral/objective
Retrofitting of drainage system	Low	Low	Low	Low	Low	Low	Low
Raised road	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Embankment	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Flood wall	Very High	Very High	Very High	Very High	Very High	Very High	Very High
Protection of water retention areas	Very High	Very High	Very High	Very High	Very High	Very High	Very High
Canal Improvement	Very High	Medium	Very High	Very High	Very High	Very High	Very High

Evaluate each alternative adaptation option identified in step 1a against each of the seven feasibility and impact criteria. Identify those actions that rank the lowest.

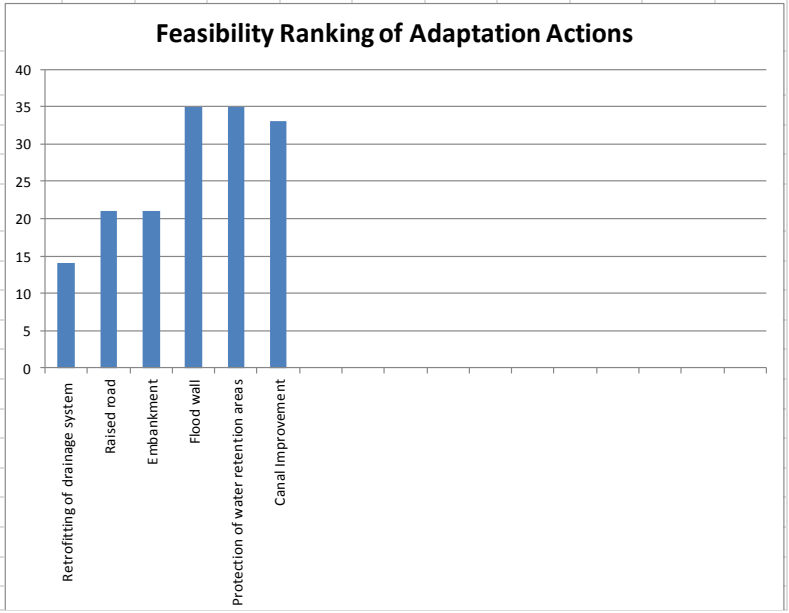
Feasibility and Impact Assessment Criteria

	Criteria	High	Medium	Low
Feasibility Criteria	Stakeholder acceptability: Would local residents accept it?	Majority of residents in area	Limited majority	Low support
	Technical feasibility: Will necessary design, implementation and maintenance support be available for the option?	Design available	Resources to develop design, implement and maintain	No available resources to develop, design, implement and maintain
	Ease of implementation: Can it be implemented at the local government level, or does it depend upon state/provincial or national support?	City can implement this without external support	City can implement this with some support	City cannot implement this without external support
	Financial viability: Is it a financially realistic option? Does the city have funding or potential access to funding to cover the costs?	Financially realistic with available funding	More limited funding opportunities	Expensive and limited funding opportunities
	Mainstreaming potential: Could it be integrated with existing local government planning and policy development?	Yes, easily and fully through many plans and strategies	Yes, partly but with more time and through more limited plans and strategies	Relatively limited potential, would require additional activities
Impact Criteria	Effectiveness: How well would it work on reducing vulnerability (in relation to the other actions)?	Vulnerability will be reduced to a large extent (in relation to the other actions)	Vulnerability will be reduced to a moderate extent (in relation to the other actions)	Vulnerability will be reduced to a limited extent (in relation to the other actions)
	Multi-sectoral and multi-objective: Would it address objectives in other sectors?	Yes, significant cross over with other sectors and objectives	Some cross over with other sectors and objectives	Little cross over with other sectors and limited impact on other objectives

Step 1c – Feasibility Ranking

Step 1c: Feasibility Ranking of Adaptation Actions

Adaptation Actions	Feasibility criteria: Stakeholder Acceptability	Technical Feasibility	Ease of Implementation	Financial feasibility	Mainstreaming Potential	Impact Criteria: Effectivenes	Multi-sectoral/objective	Total	Ranking	Feasibility Index
Retrofitting of drainage system	2	2	2	2	2	2	2	14	6	0,4
Raised road	3	3	3	3	3	3	3	21	4	0,6
Embankment	3	3	3	3	3	3	3	21	4	0,6
Flood wall	5	5	5	5	5	5	5	35	1	1,0
Protection of water retention areas	5	5	5	5	5	5	5	35	1	1,0
Canal Improvement	5	3	5	5	5	5	5	33	3	0,9
	5	3	5	5	5	5	5			
	5	3	3	3	3	3	3			
	5	3	3	3	3	3	3			
	3	3	3	3	3	3	3			
	3	3	3	3	3	3	3			
	3	3	3	3	3	3	3			
	3	3	3	3	3	3	3			
	3	3	3	3	3	3	3			
	4	4	4	4	4	4	4			



Observe how all the scores for each alternative adaptation action add up, as well as the overall ranking of the adaptation actions and the feasibility index. Screen out options that rank the lowest.

Step 2 – Selection of 6 to 7 adaptation actions

STEP 2 Adaptation Actions

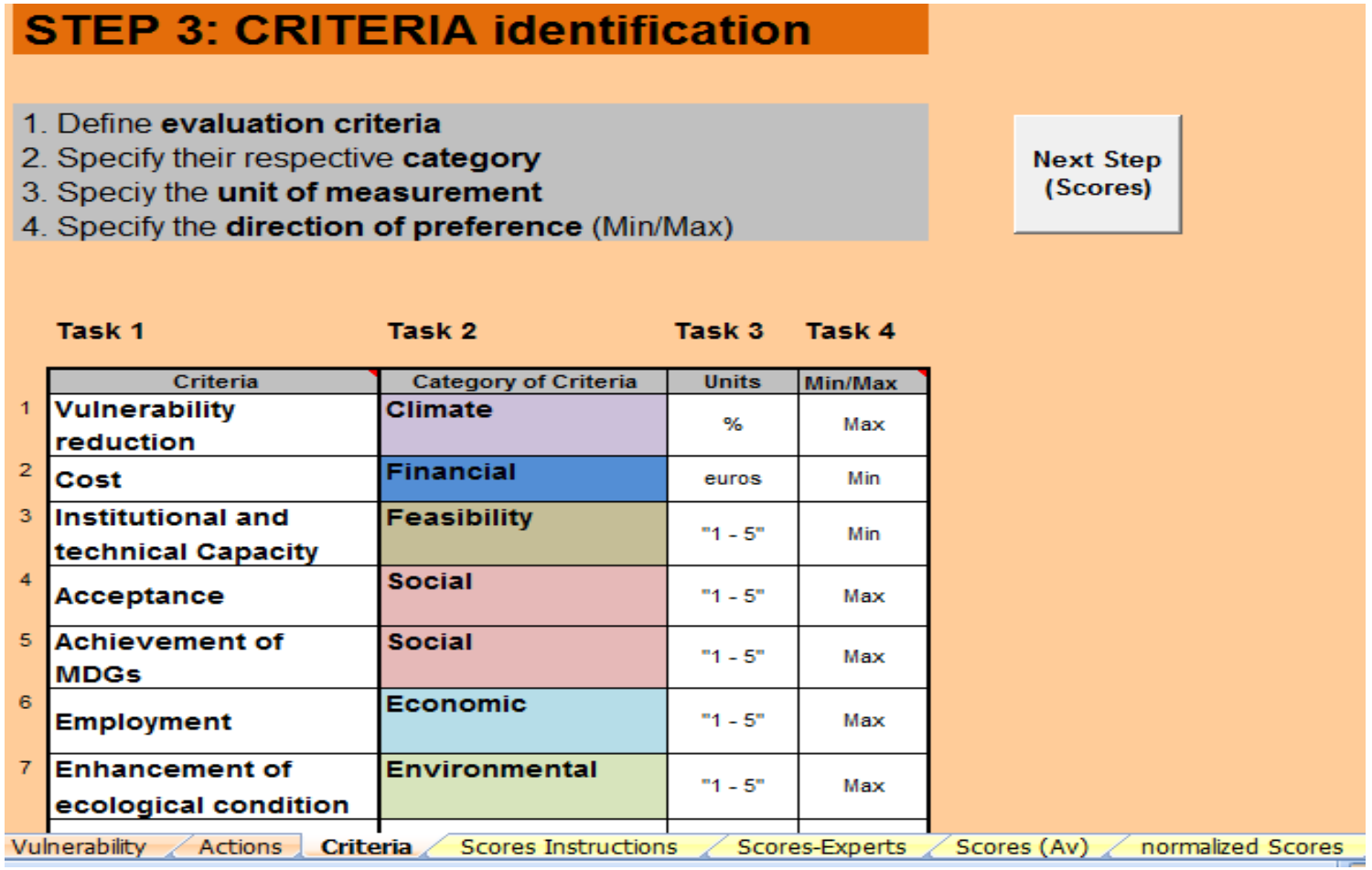
1) Check the rankings of the adaptation actions in the feasibility assessme
2) Choose a maximum of 6 to 7 adaptation actions for further assessmen

Go to the next step (Criteria)

No	Adaptation actions	Type	Sector	Time frame	Description	Source
1	Construction, retrofitting of drainage system	Structural	Infrastructure	Long term		
2	Raised road	structural	Infrastructure	Medium term		
3	Embankment	structural	Flood management	Medium term		
4	Flood wall	structural	Flood management	Medium term		
5	Protection of water retention areas	structural	Water management	Short term		
6	Canal Improvement	structural	Water management	Medium term		

Based on the feasibility assessment results select 6 to 7 adaptation actions to carry on for the rest of the exercise. *For each action, fill in the feasibility part of the Climate Action template provided.*

Step 3 – Identification of max 5 - 6 evaluation criteria (45 mins)



STEP 3: CRITERIA identification

1. Define **evaluation criteria**
2. Specify their respective **category**
3. Speciy the **unit of measurement**
4. Specify the **direction of preference** (Min/Max)

Next Step (Scores)

	Task 1	Task 2	Task 3	Task 4
	Criteria	Category of Criteria	Units	Min/Max
1	Vulnerability reduction	Climate	%	Max
2	Cost	Financial	euros	Min
3	Institutional and technical Capacity	Feasibility	"1 - 5"	Min
4	Acceptance	Social	"1 - 5"	Max
5	Achievement of MDGs	Social	"1 - 5"	Max
6	Employment	Economic	"1 - 5"	Max
7	Enhancement of ecological condition	Environmental	"1 - 5"	Max

Vulnerability | Actions | Criteria | Scores Instructions | Scores-Experts | Scores (Av) | normalized Scores

The criteria selected can be of a diverse nature and should relate to broader local governments' priorities and objectives (max 6 criteria).

Evaluation Criteria need to be:

SMART

S pecific, sensitive, solid
M easurable
A chievable, applicable, acceptable
R elevant, reliable, realistic
T ime bound

But also

- Sensitive to change
- Clear and understandable
- Cost - effective
- Based on accessible data
- Systemic

Step 4 – Scoring of actions (Impact Assessment Matrix) (1 1/2 hours)

STEP 4: SCORING - Impact Assessment Matrix

Next Step (Normalized Scores)

Indicate the scores for each alternative on every criterion

Options/Criteria	Vulnerabilit y reduction	Cost	Institutional and Technical Capacity	Acceptance	Achievement of MDGs	Employment	
Scale units	"1-10"	"1-10"	"1-5"	"1-5"	"1-10"	"1-10"	
	Max	Min	Min	Max	Max	Max	
Construction, retrofitting of drainage system	5	5	2	2	5	5	
Raised road	6	6	3	3	8	3	
Embankment	7	7	4	4	3	7	
Flood wall	5	8	5	5	6	4	
Protection of water retention areas	3	3	1	1	1	3	
Canal Improvement	4	4	2	2	4	4	

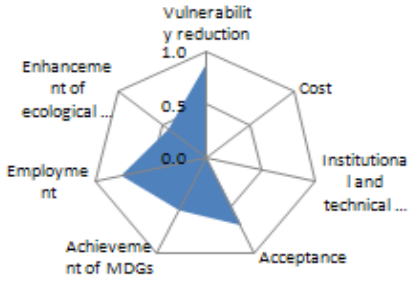
For each selected action compile the adaptation option template

Learn more about their advantages and disadvantages, costs and benefits and financing options by researching experiences from other cities, best practices, scientific studies published in academic journals, government reports and official institutions' blogs

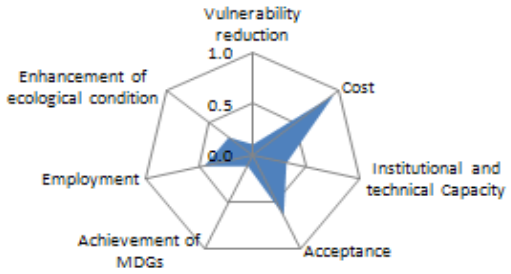
GENERAL INFORMATION				Photo
Name of climate action/ measure:				
Description:				
Advantages:				
Disadvantages:				
Feasibility:				
BENEFITS/IMPACTS	Identify the benefits/impacts of the climate action across different types and levels.			
	Individual level	City level	Global level	
Economic costs:				
Economic benefits:				
Other economic benefits/impacts:				
Climate mitigation benefits/impacts				
Climate adaptation benefits/impacts:				
Environmental benefits/impacts:				
Social benefits/impacts:				
Other sustainability benefits / impacts:				
FINANCING	Provide cases/evidences on how this climate action/measure is financed (e.g. carbon markets, green bonds)			
APPLICATIONS	Provide examples of cities in in which this climate action/measure was implemented in the following contexts:			
Developed countries				
Developing countries				
SOURCES/REFERENCES				

Standardization

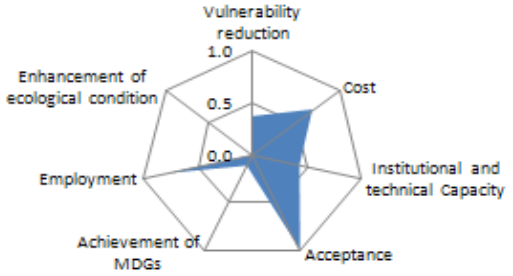
Construction, retrofitting of drainage system



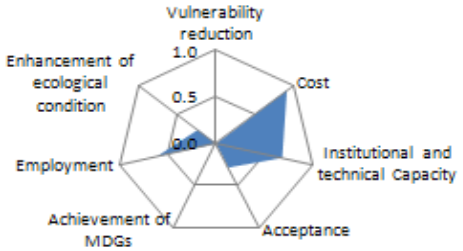
Raised road



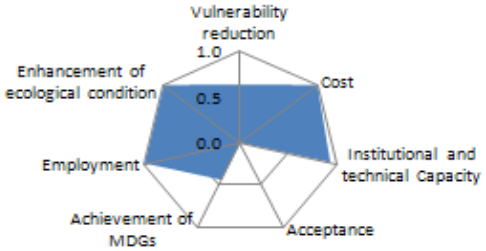
Embankment



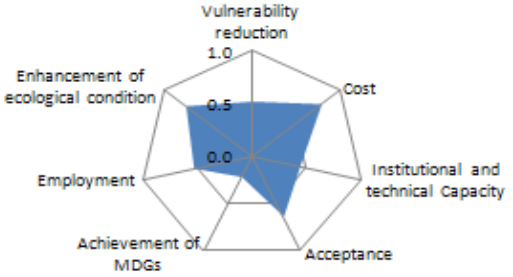
Flood wall



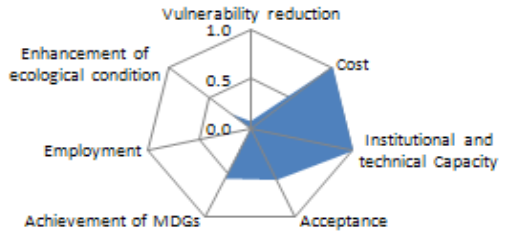
Protection of water retention areas



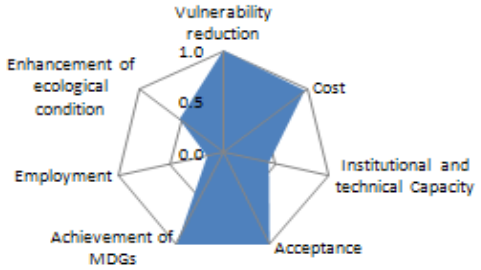
Canal Improvement



Enhancing emergency



Early warning system



Next Step (Weights)

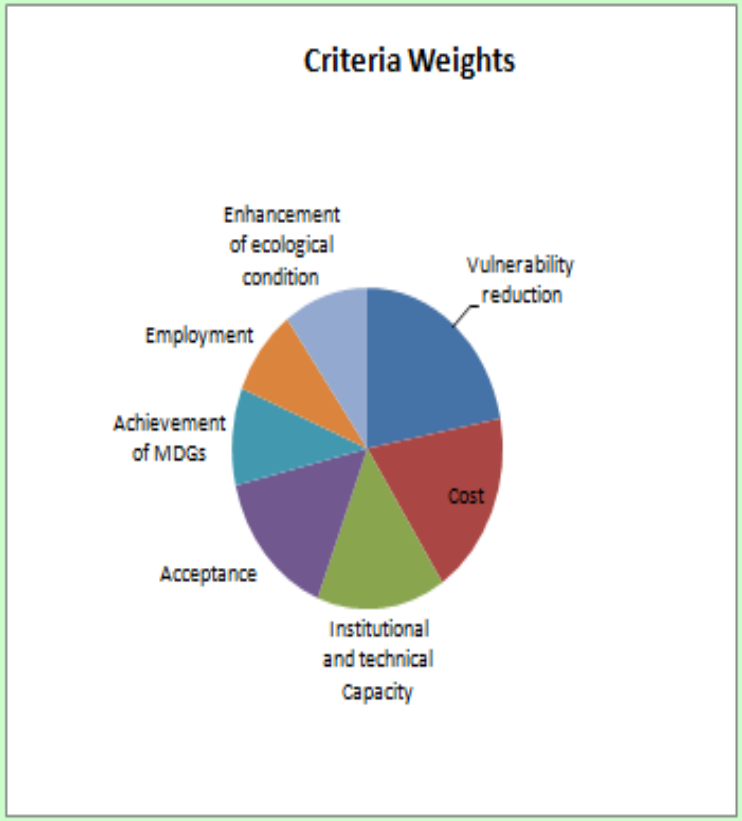
Step 5 – Weighting of criteria (45 mins)

STEP 5: Criteria WEIGHTING

1. Indicate the level of importance of criteria verbally from "very low" to "very hig
2. Assign a value denoting relative importance of criteria

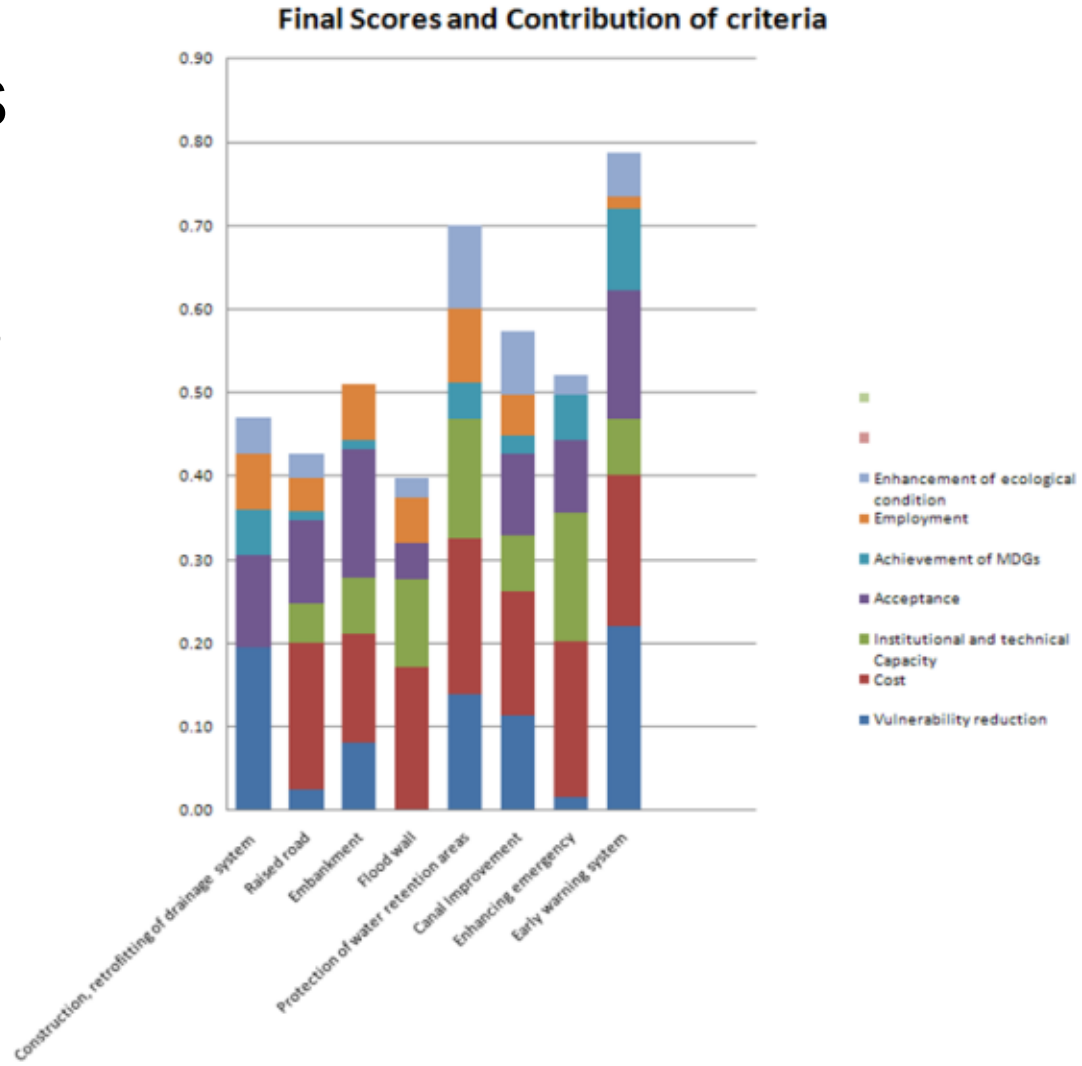
Go to the next step (Weighted Scores)

					Task 1	Task 2		
Category of Criteria	Criteria	Impact Range	Units	Rank	Importance	Values	Weights	Degree of Convergen
Climate	Vulnerability reduction	19,3	%	1	Very High	100	22,0%	1,0%
Financial	Cost	63,7	euros	2	Moderate	85	18,7%	0,7%
Feasibility	Institutional and technical Capacity	2,3	"1 - 5"	3	High	70	15,3%	2,4%
Social	Acceptance	2,0	"1 - 5"	3	Moderate	70	15,3%	2,4%
Social	Achievement of MDGs	1,3	"1 - 5"	6	Moderate	45	9,8%	4,2%
Economic	Employment	1,9	"1 - 5"	7	Low	40	8,8%	0,4%
Environmental	Enhancement of ecological condition	3,0	"1 - 5"	5	Low	45	10,1%	8,2%



Step 6: Prioritization of actions (15 min)

- Observe the results (ranking)
- Interpret the results
- Explain the results



Additional Instructions

- **Brainstorm as a group** (use paper provided) at each step of the prioritization process and **THEN** fill in the spreadsheet
- **Appoint 1 time manager and 1 spreadsheet user** (to insert data)
- Adaptation actions: **brainstorm** on both structural and non structural options (soft and green as well)
- Measurement units: use 1-5 or 1-10
- Refer to the actions scoring sheet: from 1 (worst performance) to 5 (best performance/lowest costly action)
- Refer to the criteria sheet: if the **criteria is cost/feasibility you want to minimize it!** (i.e. highest costs equal to worst performance)

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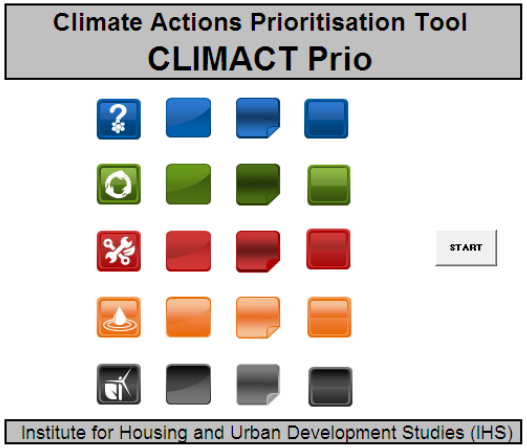
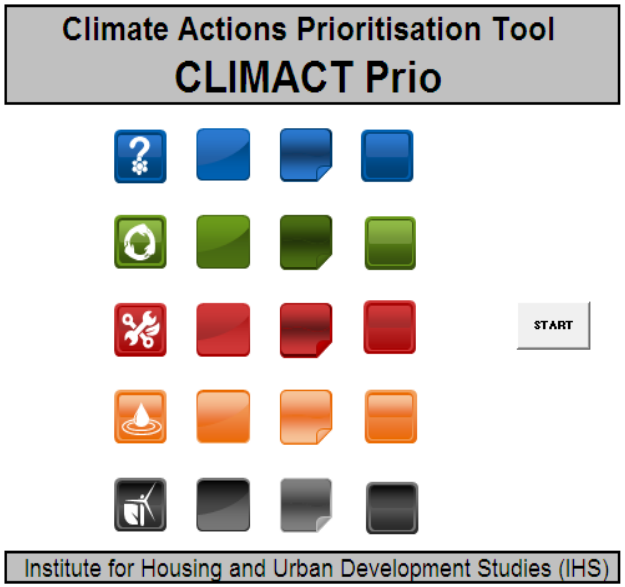
GOOD LUCK



Strengths of CLIMACT Prio

- Process oriented
- Simple and user friendly
- Flexible
- Transparent
- Stimulates data gathering
- Encourgages communication and Learning
- Systematic screening



Challenges to CLIMACT Prio

- Degree of subjectivity
- Selection of weights
- Bringing together different stakeholders may be challenging
- Data intensive