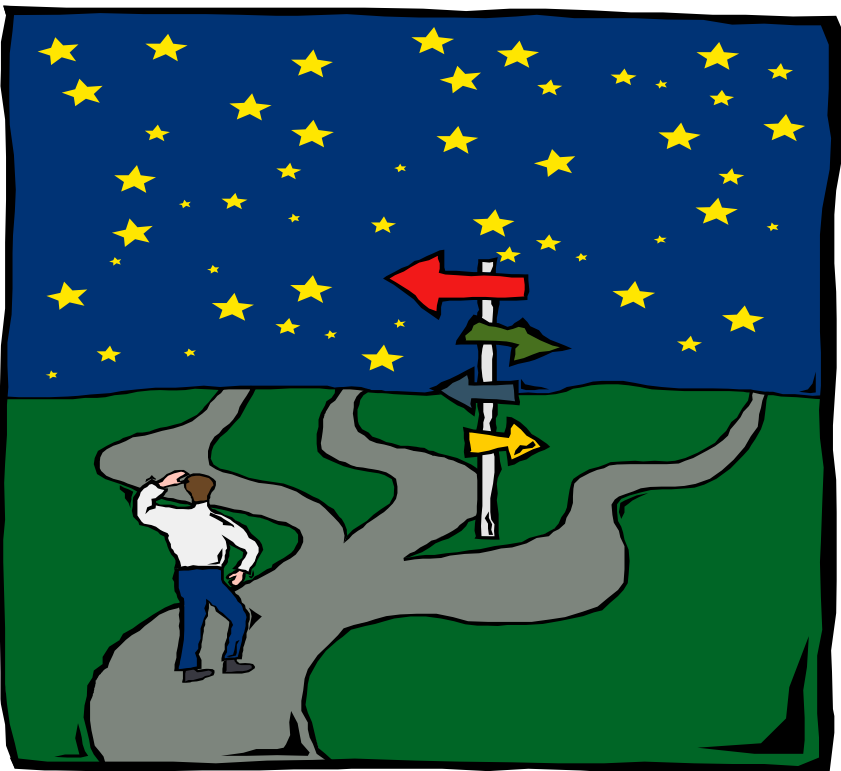


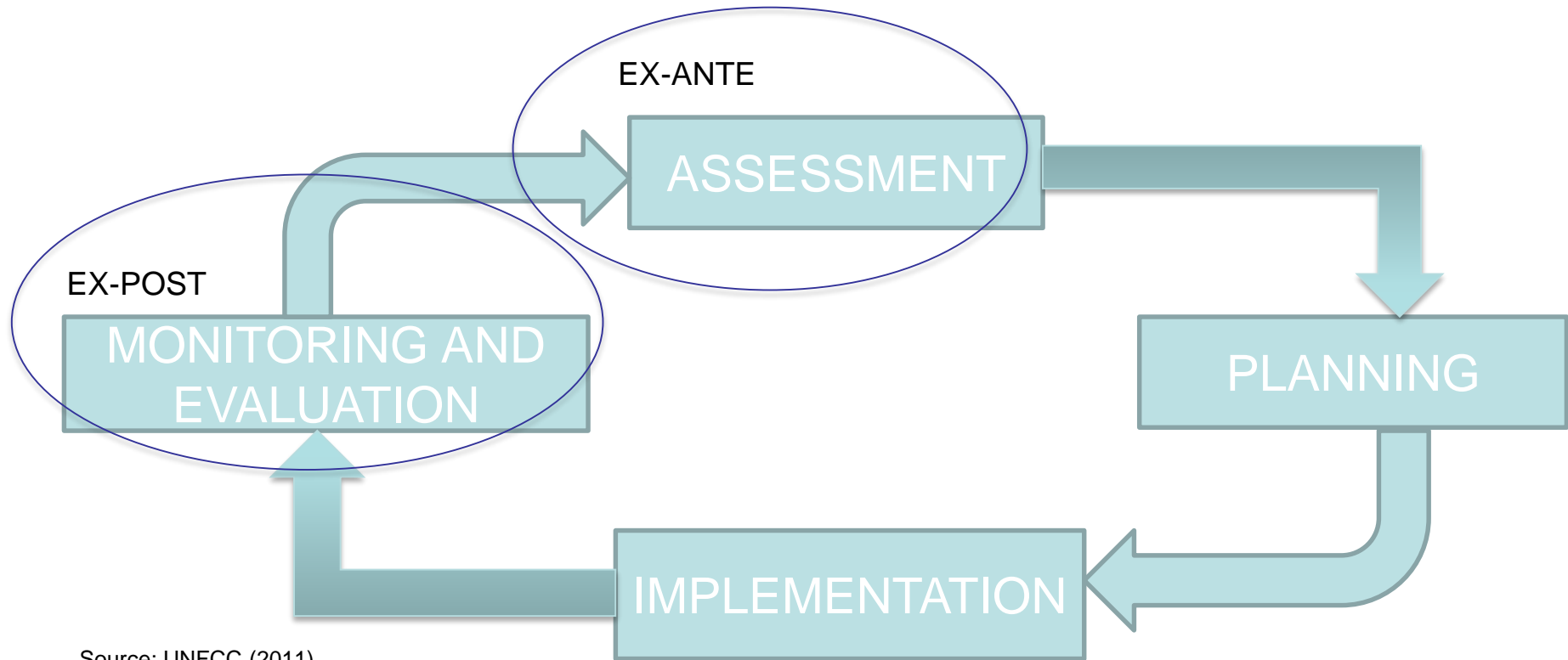
Decision Support and Assessment Tools for Climate Change

UMTCC 8

Stelios Grafakos



Climate change action planning process and its key components



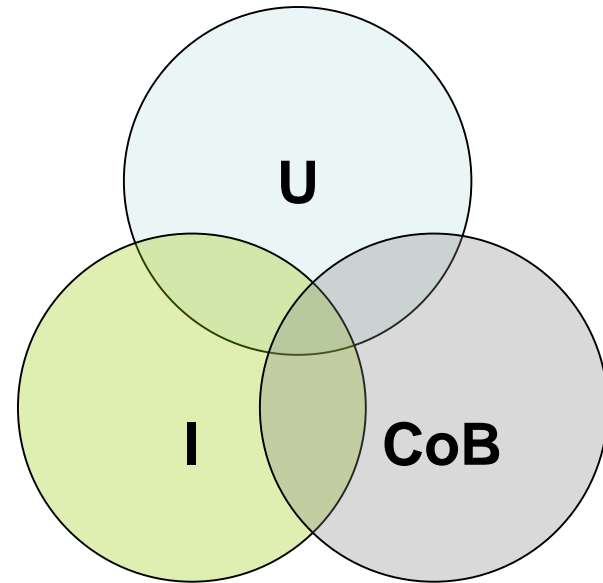
Source: UNFCCC (2011)

Climate Change Planning Cycle



Adaptation assessment challenges and characteristics

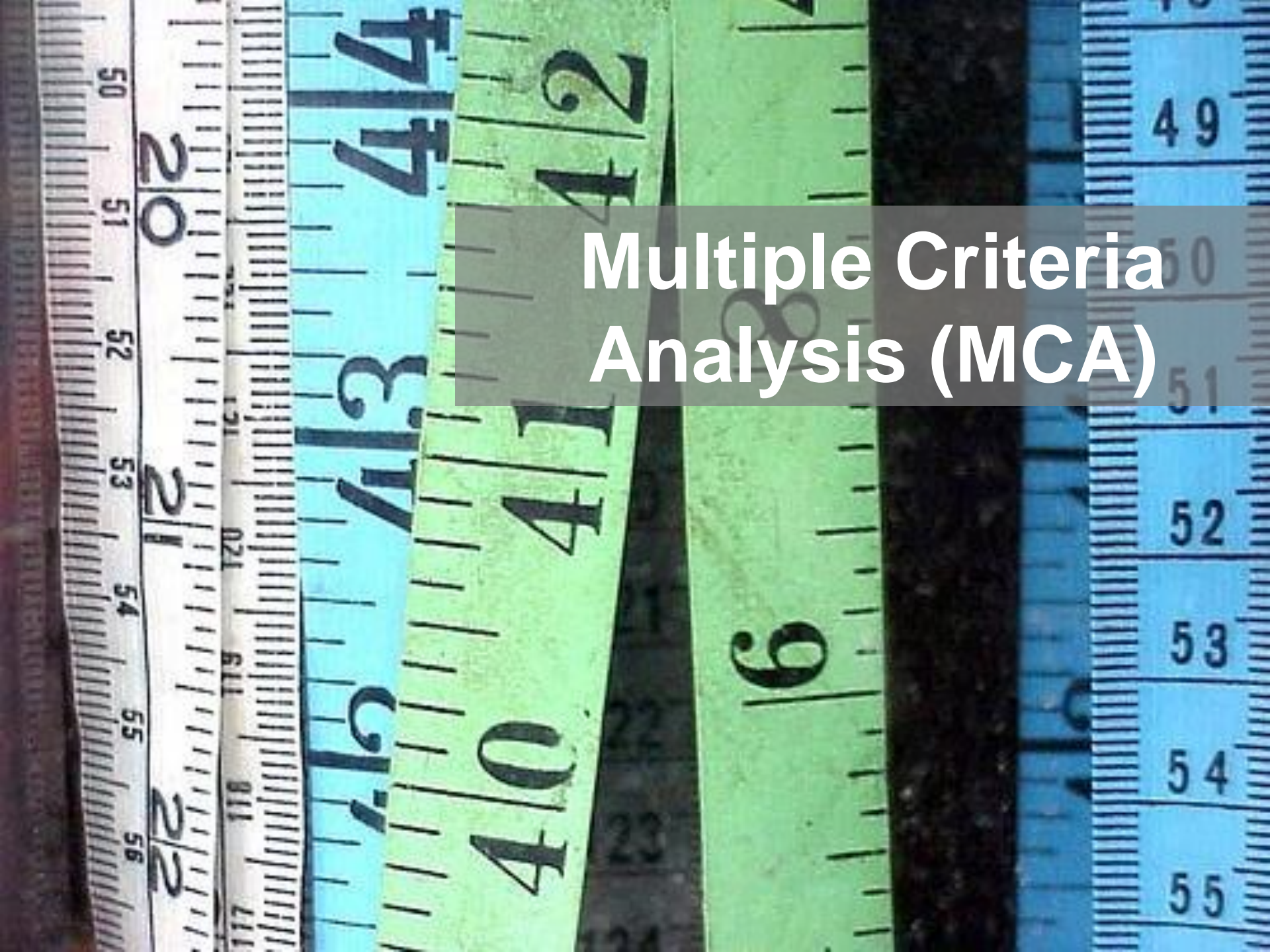
- Uncertainty
- Co-Benefits
- Inclusion
 - Equity



Decision Support and Assessment Tools for Climate Change

- Cost Benefit Analysis (CBA)
- Cost Effectiveness Analysis (CEA)
- Multiple Criteria Analysis (MCA)





Multiple Criteria Analysis (MCA)

Structural elements of MCA

- Multiple Alternatives (at least two)
- Multiple – and often conflicting- Criteria
- Policy makers or multiple stakeholders -

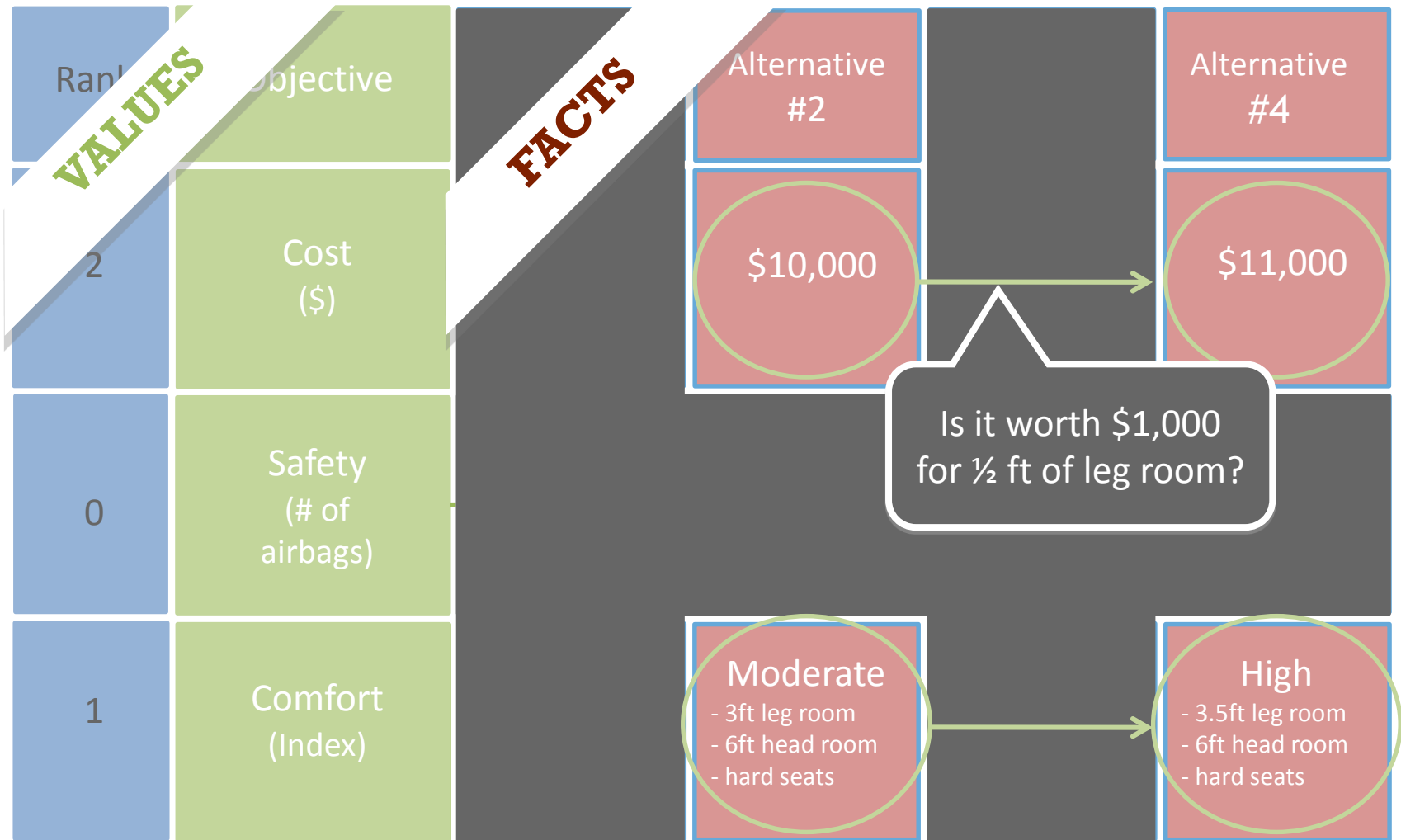


MCA: Climate related issues

- NAPAs and NAMAs
- TNAs
- Adaptation benefits
- Assessment of climate abatement technologies



This is the Framework



Objectives & decision-making

OBJECTIVES	Indicator	Action 1	Action 2	Action 3
ENVIRONMENT				
ECONOMIC				
SOCIAL				

- Establishes
- Ask: What
- Separates issues from
- Categorize (Environment, Economic & Social)
- Predictive
- Specific
- Understandable
- Practical (available resources)

What is Multiple Criteria Analysis?

Aids the assessment of different policies, measures, or options

Uses a set of evaluation criteria

Integrates the perspectives of different stakeholders

MCA Case Study



MCA:

Main steps

Define Alternatives



Define criteria/objectives



Quantify impacts or
assign scores



Normalize scores



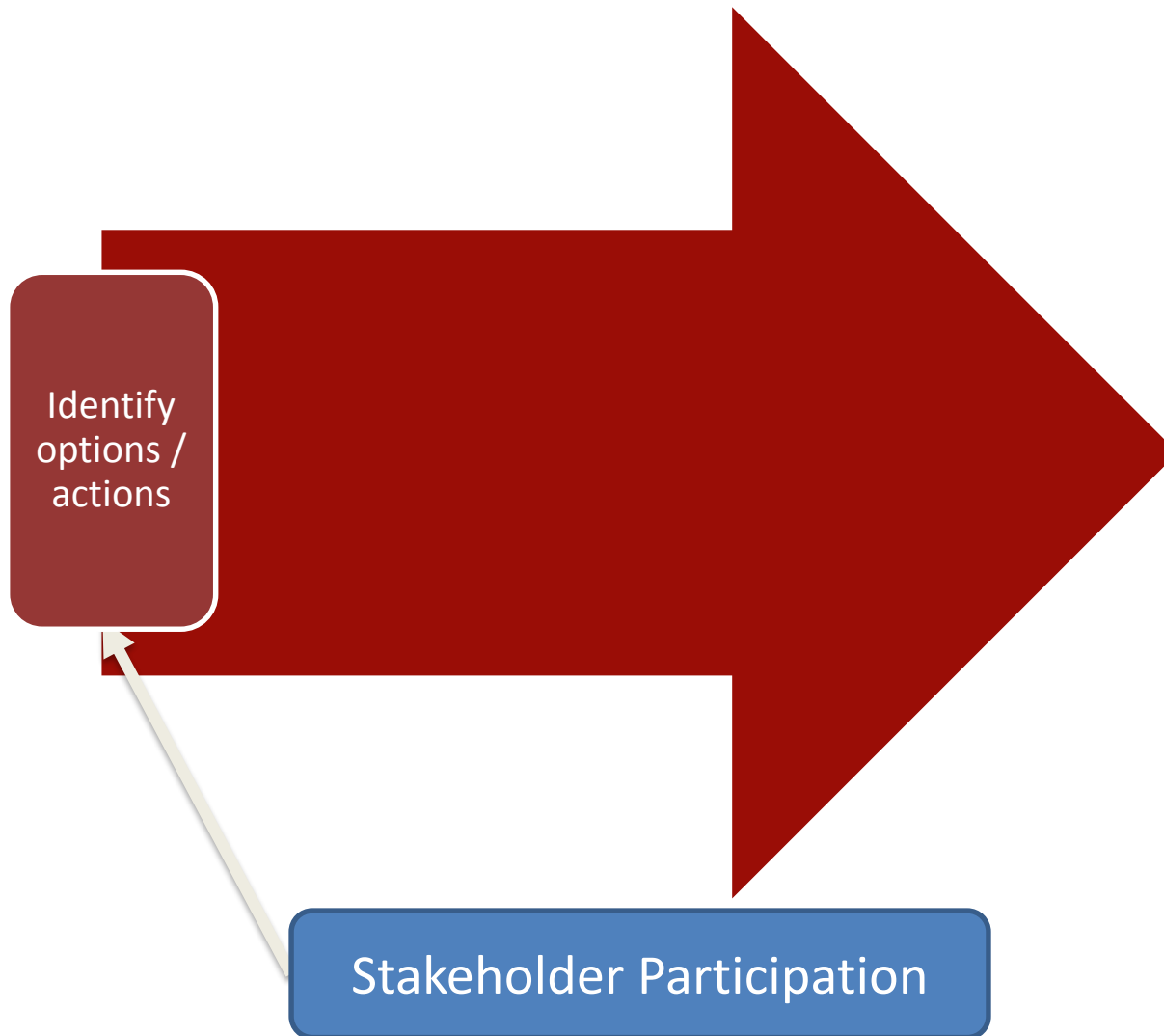
Weight evaluation criteria



Rank options



MCA Main Steps

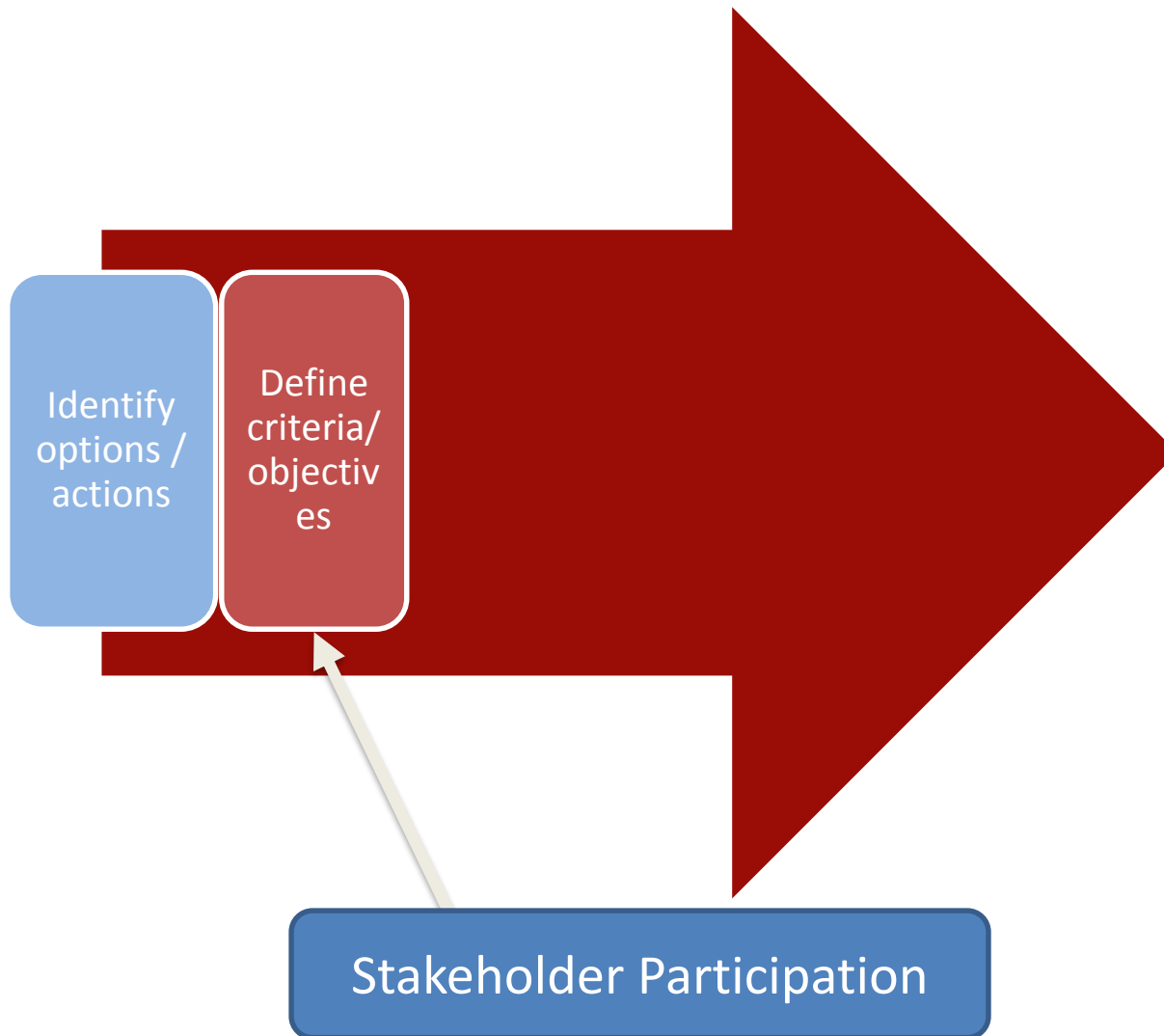


MCA: Identification of Actions



- Flood wall
- Flood wall with green area
- Green area (for water retention)

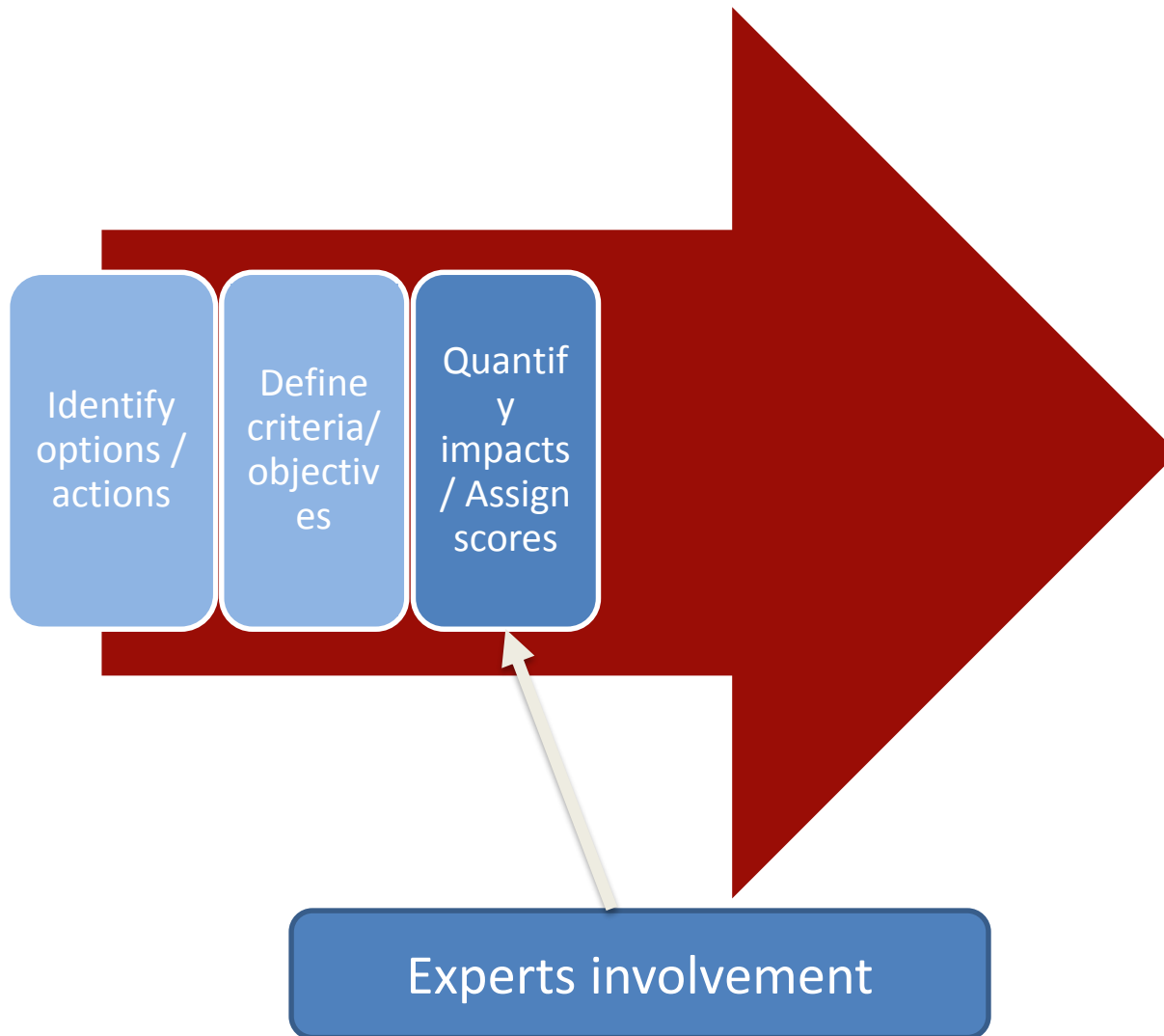
MCA Main Steps



MCA: Define Criteria and Indicators

Criteria	Indicators	Flood wall	Flood wall with green area	Green area
Cost	Total cost (million \$)			
Effectiveness	Risk reduction (---/+++)			
Flexibility	Level of adaptiveness (1-5)			
Co-benefits	Green public space (km2)			
Implementation	Ease of implementation (---/+++)			

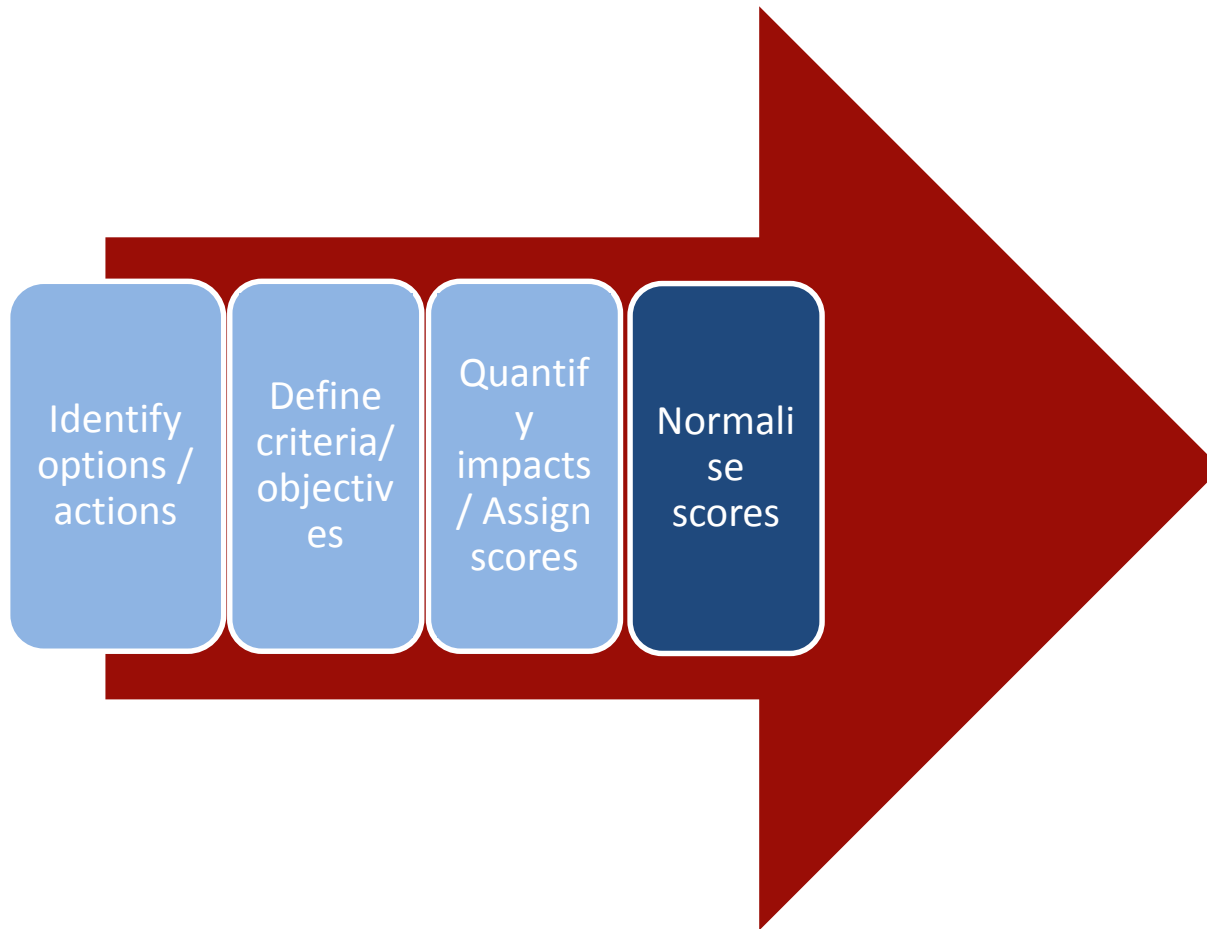
MCA Main Steps



MCA: Scoring

Criteria	Indicators	Flood wall	Flood wall with green area	Green area
Cost	Total cost (million \$)	40	25	20
Effectiveness	Risk reduction (---/+++)	+++	++	+
Flexibility	Level of adaptiveness (1-5)	2	3	4
Co-benefits	Green public space (km2)	1	7,5	10
Implementation	Ease of implementation (---/+++)	-	--	---

MCA Main Steps



MCA: Scoring

Criteria	Indicators	Flood wall	Flood wall with green area	Green area
Cost	Total cost (million \$)	40	25	20
Effectiveness	Risk reduction (---/+++)	+++	++	+
Flexibility	Level of adaptiveness (1-5)	2	3	4
Co-benefits	Green public space (km2)	1	7,5	10
Implementation	Ease of implementation (---/+++)	-	--	---

MCA: Normalise scores

Criteria	Indicators	Flood wall	Flood wall with green area	Green area
Cost	Total cost (million \$)	40	25	20



$$x = \frac{\max - 25}{\max - \min} = \frac{40 - 25}{40 - 20} = 0,75$$

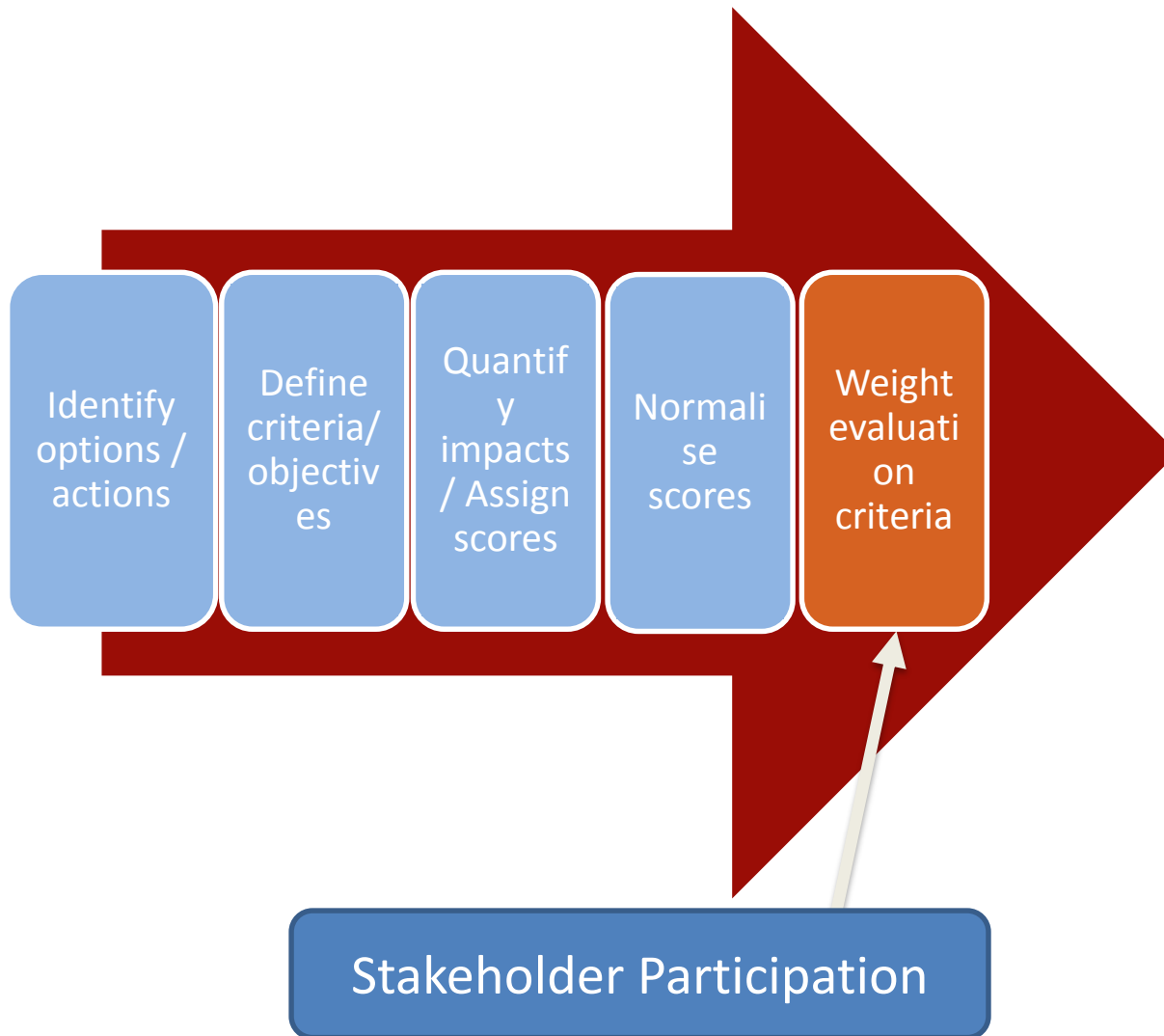
Criteria	Indicators	Flood wall	Flood wall with green area	Green area
Cost	Total cost (million \$)	0	0,75	1

Normalised Scores

Criteria	Flood wall	Flood wall with green area	Green area
Cost	0	0.75	1
Effectiveness	1	0.67	0.33
Flexibility	0	0.5	1
Co-benefits	0	1	0.5
Implementation	0.67	0.33	0



MCA Main Steps



Methods for Evaluation Criteria Weighting

Pairwise comparisons

**Assigning 100 points among
the criteria (direct)**



MCA: Weighting of Evaluation Criteria

Rank	Criteria	Weight
1	Cost	0.36
	Effectiveness	0.36
2	Implementation	0.16
3	Flexibility	0.06
	Co-benefits	0.06
		1.00



Weighted Summation

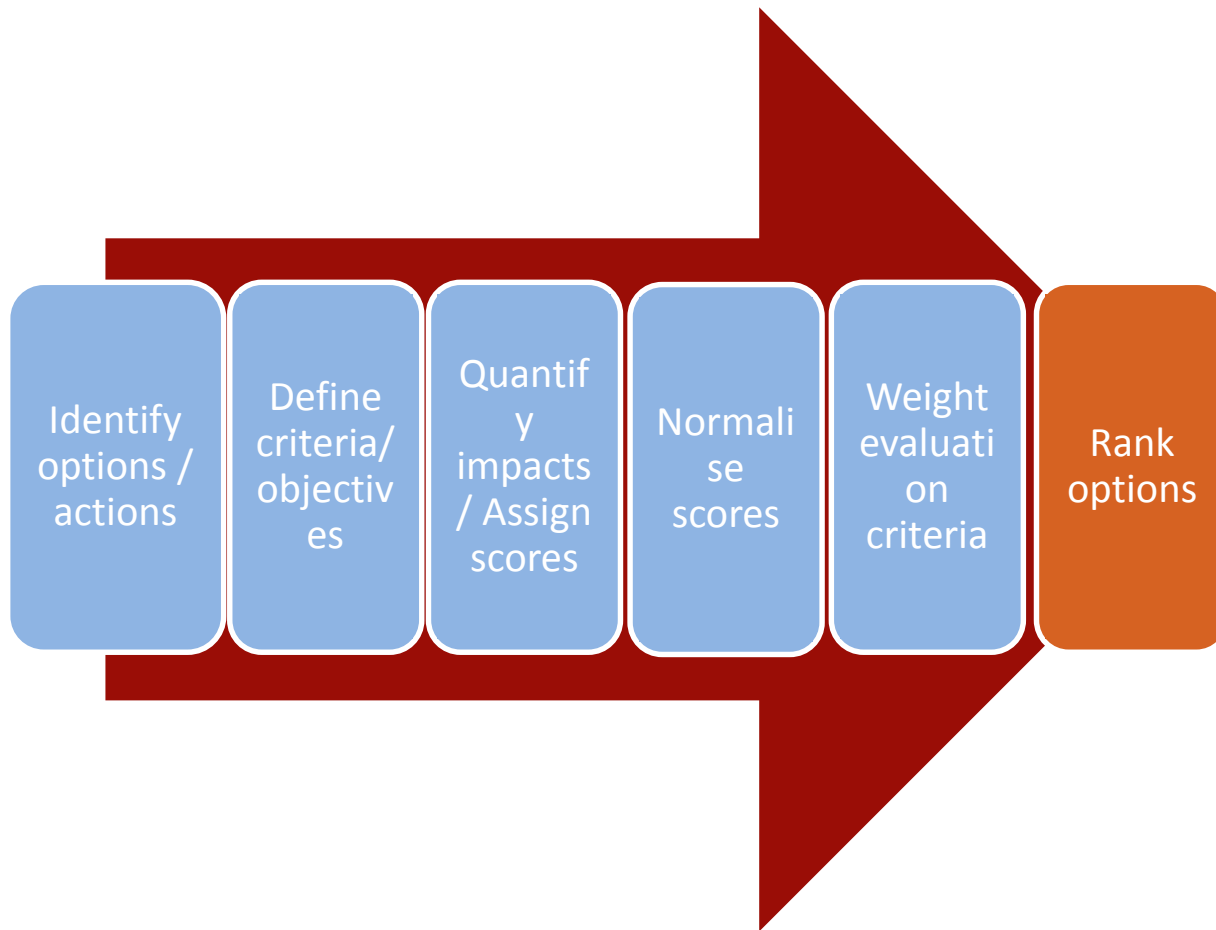
Weight of
the criterion



Weighted
Sum

Normalized
Score

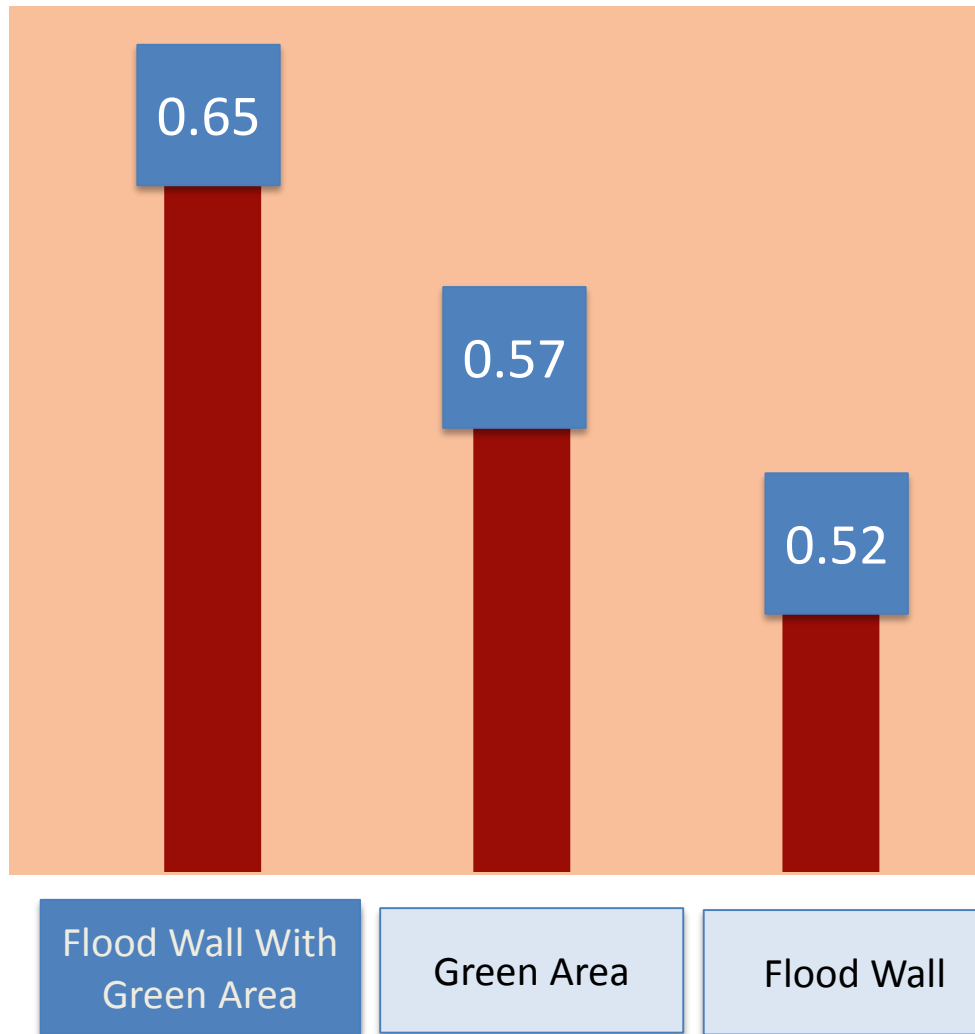
MCA Main Steps



MCA: Ranking of Actions

Criteria	Green Area		
	Weight of the criterion	Normalized score	Weigh of the criterion x Normalized Score
Cost	0.36	1	0.36
Effectiveness	0.36	0.33	0.12
Implementati on	0.16	0	0
Flexibility	0.06	1	0.06
Co-benefits	0.06	0.5	0.03
		Weighted Sum	0.57

Ranking of Actions



Weighting of criteria

- How more important is x criterion than the y criterion? (pairwise)
- Assign 100 points to criteria based on their relative importance (direct)



Dealing with uncertainty

- Different type of uncertainties
- Sensitivity analysis
- Scenario analysis
- Adaptive Management

Opportunities

- Allows multiple **perspectives – views**
- Incorporates different **measurement scales**
- Provides transparency and **structure**
- Triggers **discussion** between stakeholders
- Knowledge generation

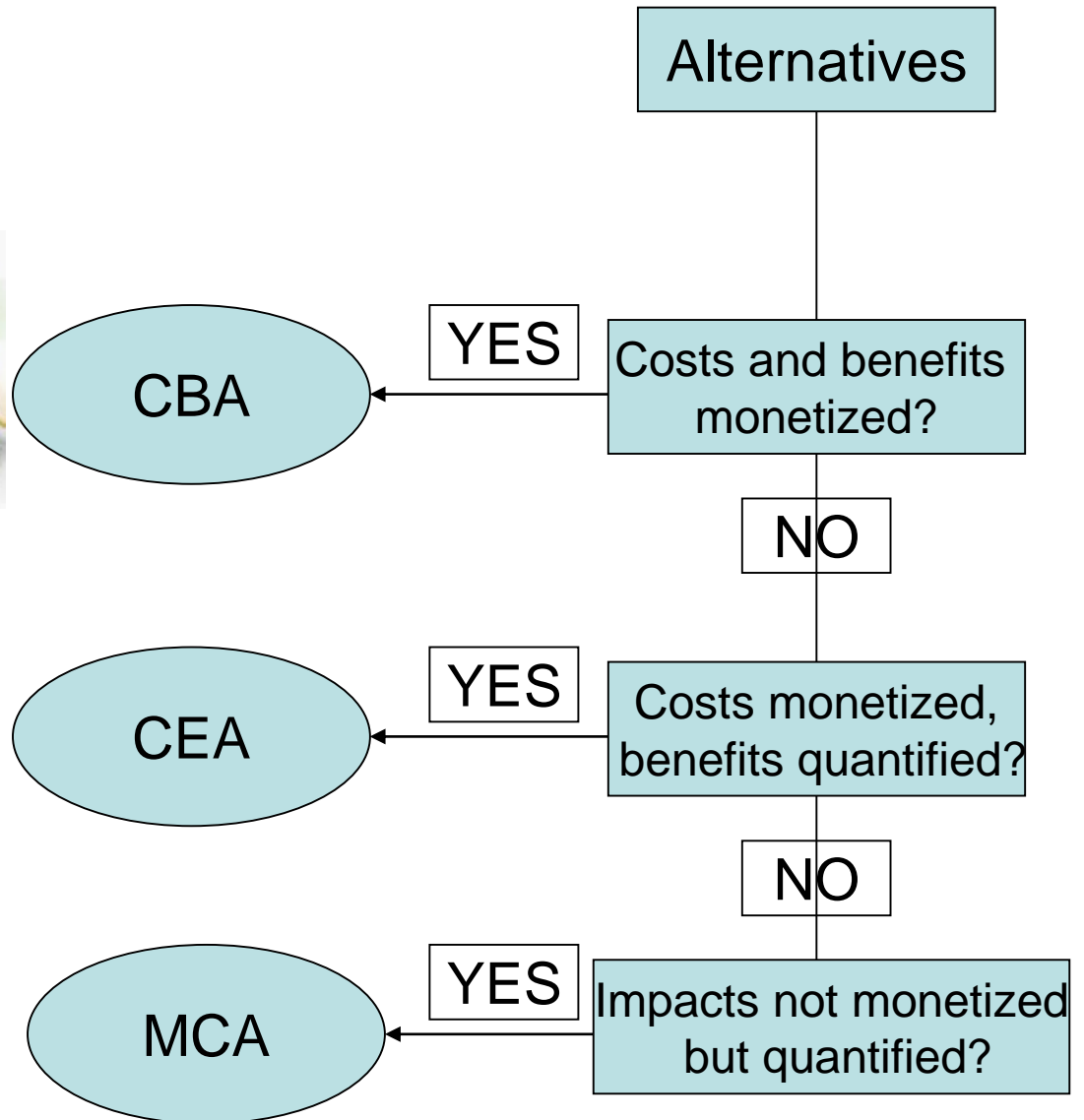


Challenges

- High degree of **subjectivity**
- Difficult to reach **consensus** on weights of criteria
- Risk of **double counting**



Choice?



Comparison of Tools Requirements

Tools	Technical Capacity	Data Needs	Time	Cost \$	Participant Requirements
CBA	★★★★	★★★★	★★★★	★★★★	★★
CEA	★★★★	★★★★	★★★★	★★★★	★
MCA	★★★★	★★★	★★★★	★★★★	★★★

Source: UN-HABITAT

★ = Low Requirements ; ★★ = Medium Requirements
 ★★★ = High Requirements; ★★★★ = Very High Requirements



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MCA4climate Report

Adaptation and Mitigation Theme Reports

Case Studies

Applying the Framework - Guiding Principles

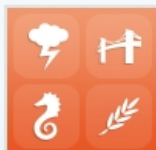
Briefing Notes

Background Information

Multi-Criteria Analysis for climate change.

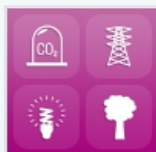
Download Report

Adaptation and Mitigation Theme Reports



Adaptation

Click here to download detailed reports from each of our eight MCA4climate adaptation theme experts looking in more detail at key adaptation topics including health, coastal zone management and extreme weather events.



Mitigation

Click here to download detailed reports from our four MCA4climate mitigation theme experts. These papers look in more detail at key issues in mitigation and cover energy efficiency, fuel mix, carbon capture and storage and land use.

Back to list

Mitigation

- Energy Efficiency
- Fuel Mix
- Land Use Management
- Carbon Capture and Storage

Adaptation

- Coastal Zone Management
- Human Health
- Agriculture
- Infrastructure
- Water
- Terrestrial Ecosystems
- Marine Ecosystems
- Extreme Weather Events

Case Studies

- Mumbai
- Sana'a Basin
- South Africa

PLANNING FOR CLIMATE CHANGE

A STRATEGIC, VALUES-BASED APPROACH FOR URBAN PLANNERS

Technology Needs Assessment for Climate Change

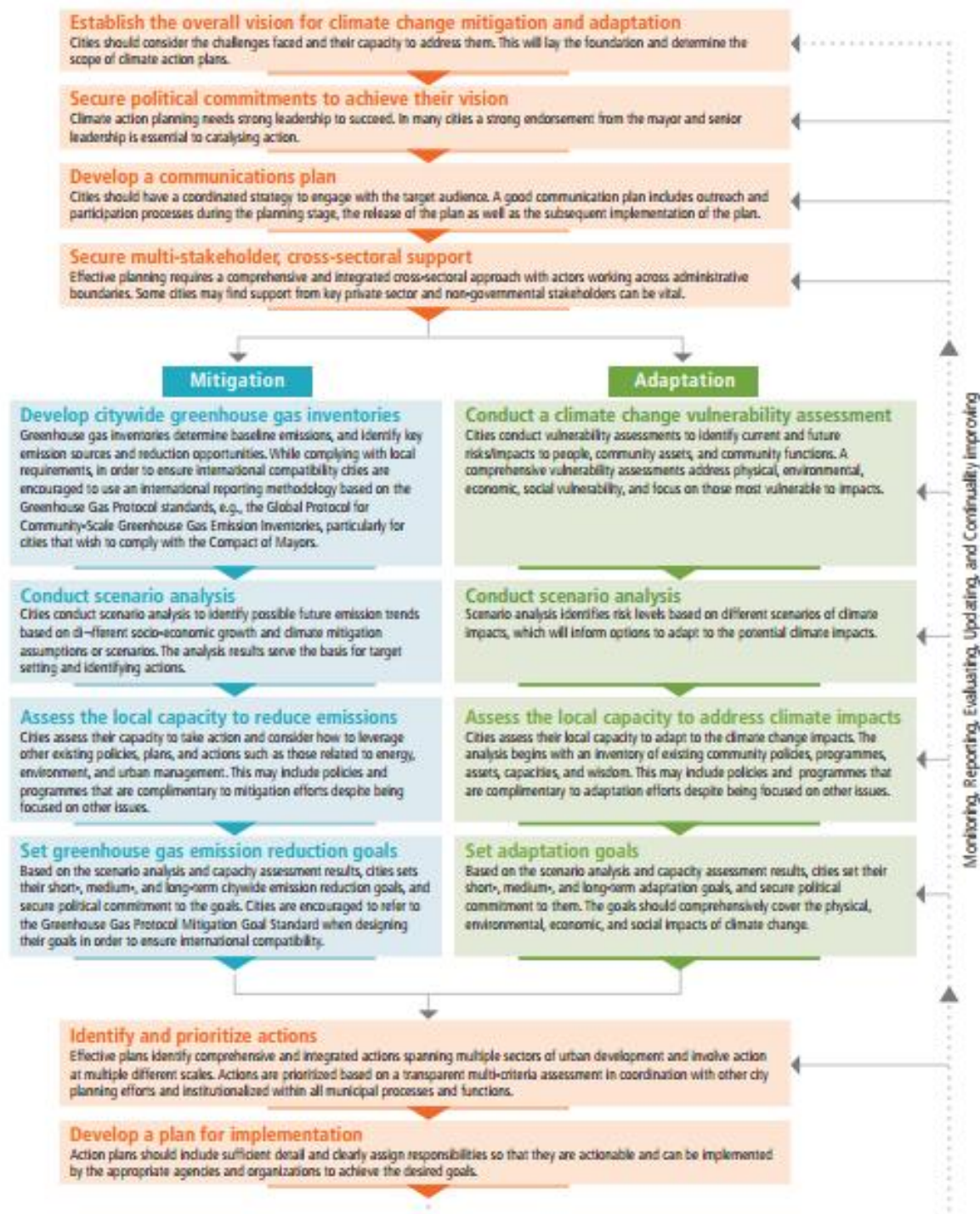




Guiding
Principles for **City**
Climate
Action
Planning

Version 1.0

UN **HABITAT**
FOR A BETTER URBAN FUTURE

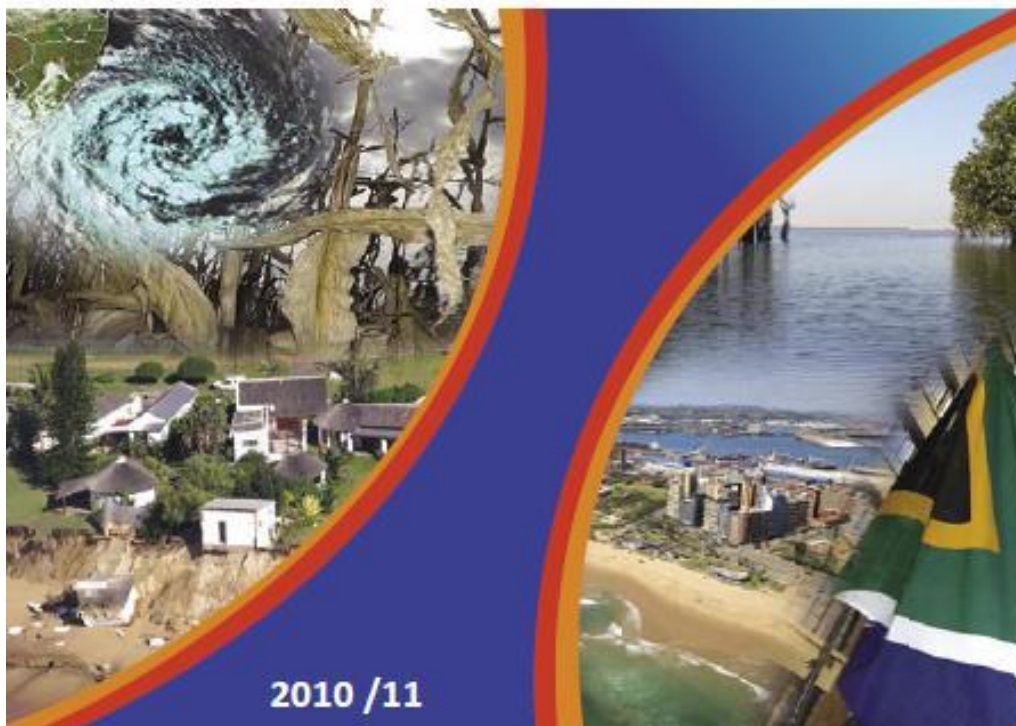




Durban's Municipal Climate Protection Programme:

CLIMATE CHANGE ADAPTATION PLANNING

FOR A RESILIENT CITY



2010 /11

Impact on risk	The level of climate change risk that the intervention will reduce.
Ancillary Benefits	How beneficial is it to undertake this intervention regardless of climate change impacts, as the intervention promotes sustainable development.
Reversible or Flexible	Climate change science is not perfect and hence interventions that can be reversed or adjusted based on the latest science are better than those that cannot.
Impact on emissions	How does the intervention affect the amount of greenhouse gases in the atmosphere?
Allows complementary options	Are there complementary options in association with the intervention? Does the intervention reduce, retain or enhance the set of options available for responding to climate change.
Ease of implementation	Indicates the likelihood of the intervention being successfully implemented.
Institutional complexity	This criterion also indicates the likelihood of the intervention being implemented. If the intervention requires complex municipal processes and procedures and many departments working together, its likelihood of success is lessened.
Cost: benefit	A broad judgement of whether the intervention has 'high cost: low benefit' or 'high benefit: low cost.'
Risk of 'maladaptation'	Ill-considered implementation of an intervention is considered 'maladaptation' as it may have unintended adverse impacts.

Table 4 Multi-Criteria Assessment of the Adaptation Plan Interventions*

Ref	Adaptation Category	Sub-category	Impact	Intervention	Impact on risk 3 = Risk reduced 2 = None 1 = Risk increased	Ancillary benefits 3 = Yes 2 = No	Reversible/Flexible? 3 = Yes 2 = Neutral 1 = No	Impact on emissions 3 = Reduced 2 = None 1 = Increased	Allows complementary interventions 3 = Yes 2 = Neutral 1 = No	Ease of implementation 3 = Easy 2 = Neutral 1 = Difficult	Institutional complexity 3 = Simple 2 = Neutral 1 = Complex	Cost: Benefit 3 = Low cost/high benefit 2 = Neutral 1 = High cost/low benefit	Risk of maladaptation 3 = Low 2 = Medium 1 = High	Merit (sum of criteria)	Urgency 1 = Medium 2 = High 3 = Very High	Priority (Merit x Urgency) H = >45 M = 22 - 45 L = <22	
1	Water	Infrastructure Protection (New)	Flooding	Detailed analysis of latest rainfall/run-off projections and modelling of systems to be finalised.	2	3	3	2	3	3	3	3	3	25	3	75	H
2	Water	Infrastructure Protection (New)	Flooding	Revise rainfall data in line with latest projections (as of 30 September 2009) and review every 5 years.	2	3	3	2	3	3	3	3	3	25	3	75	H
9	Water	Infrastructure Protection (Existing)	Flooding	Protect and restore riparian vegetation so as to protect integrity of river banks and retain biological buffers against flooding.	3	3	3	3	3	2	2	3	3	25	3	75	H
5	Water	Infrastructure Protection (New)	Flooding	Develop Master Drainage Plans for all river catchments within eThekwinl Municipal boundaries.	3	2	3	2	3	3	2	3	3	24	3	72	H
6	Water	Infrastructure Protection (New)	Sea Level Rise	Revise coastal set back lines.	3	3	3	2	3	3	1	3	3	24	3	72	H
11	Health	Disaster Management	All	Improve the ability of Health Care Systems to respond effectively during emergencies.	3	3	3	2	3	1	2	3	3	23	3	69	H
M2	Disaster	Disaster Management	All	Implement Disaster Risk Management Framework.	2	3	2	2	3	3	1	3	3	22	3	66	H
M3	Disaster	Disaster Management	All	Undertake a detailed assessment of all risks in Durban.	2	3	3	2	3	2	1	3	3	22	3	66	H
8	Water	Infrastructure Protection (New)	Sea Level Rise	Prepare Coastal Management Plans for entire Durban coastline.	3	3	3	2	3	1	1	3	2	21	3	63	H
17	Water	Water Security	Water Availability	Incorporate requirement that Umgeni Water consider the impact of climate change on rainfall and run-off into eThekwinl Municipality's water purchase agreement.	2	3	3	2	3	1	1	3	3	21	3	63	H
18	Water	Water Demand Management	Water Availability	Develop an overarching Water Use Strategy which captures existing interventions being undertaken within the Municipality, identifies additional interventions, creates clear priorities and an Implementation plan for responding to the challenges of a current water shortage impacted on by climate change and its further impact on water security.	3	3	2	2	3	2	1	3	2	21	3	63	H
M1	Disaster	Disaster Management	All	Secure additional resources for Disaster Management Unit.	3	3	2	2	2	1	2	1	3	19	3	57	H
M4	Disaster	Disaster Management	All	Revise Contingency Plans for key risk areas.	3	3	2	2	2	1	1	3	2	19	3	57	H
M5	Disaster	Disaster Management	All	Disaster Management Summit - to raise awareness of Disaster Management function and unit responsibilities - refer to hosting a successful FIFA 2010 World Cup™ and managing climate change risk.	3	3	3	1	3	1	1	3	1	19	3	57	H



GREENEST CITY 2020
Climate Adaptation

CLIMATE CHANGE ADAPTATION STRATEGY

Table 1: Adaptation action evaluation criteria

Category	Criteria	1 (low)	2 (medium)	3 (high)
Sustainability	Mitigation co-benefits	Result in increased GHG emissions	Would not affect GHG emissions	Would reduce greenhouse gas emissions
	Equity	Benefits to few people	Benefits to many people	Significant benefits to many people
	Implementation Cost	Cost is high relative to cost of inaction	Cost is moderate relative to cost of inaction	Cost is low relative to cost of inaction
Effectiveness	Robustness	Effective for a narrow range of plausible future scenarios	Effective across many plausible future scenarios	Effective across a wide range of plausible future scenarios
Risk and Uncertainty	Urgency	Risks are likely to occur in the longer term	Impacts are likely in the near to mid term	Impacts are already occurring
Opportunity	Ancillary benefits	Will contribute little if not at all to other City goals and programs	Will contribute somewhat to other City goals and programs	Will contribute significantly to other City goals and programs
	No Regret	Will have little or no benefit if climate change impacts do not occur	Will have some benefits regardless of actual climate change impacts	Will result in significant benefits regardless of actual climate change impacts
	Window of Opportunity	There is no window currently	A window of opportunity could be created	A window of opportunity exists to implement
Implementation	Funding Sources	External funding sources are required but have not been identified	External funding sources are required and likely to be secured	Funding is available externally or internally
	Institutional	Implementation requires coordi-	Implementation requires external	Implementation is within local

Climate Actions Prioritisation Tool

CLIMACT Prio



START



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

ANIKA NASRA HAQUE, STELIOS GRAKAKOS
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.

Address: Department of Architecture, Campus -7, American International University – Bangladesh, House 23, Road 17, Kemal Atatürk Avenue, Banani, Dhaka 1213, Bangladesh; e-mail: anikanasra@gmail.com

Stelios Grakakos 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

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

1. 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

What is MCA?

“It is a transparent **process** which seeks to take explicit into account **multiple criteria** in helping individuals or groups to evaluate **different actions** and explore decision problems that matters”





Thank You

Sources & Literature

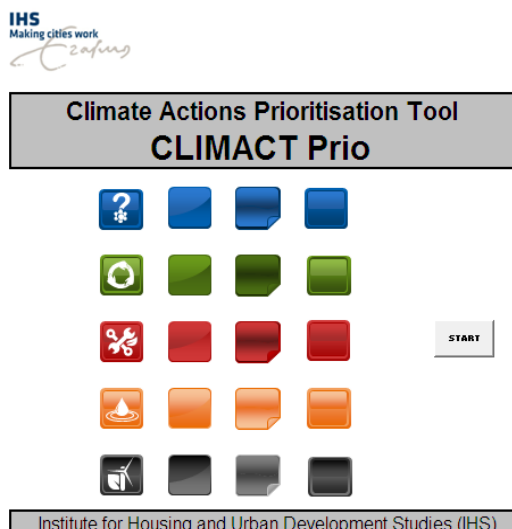
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CLIMACT Prio: a decision support tool for CLIMate ACTions Prioritization

UMTCC 5, 17th of June 2014,
Stelios Grafakos,

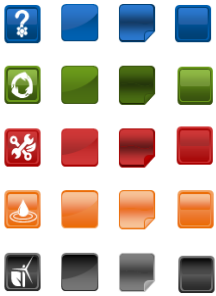


Climate Actions Prioritisation Tool

CLIMACT Prio



START



START

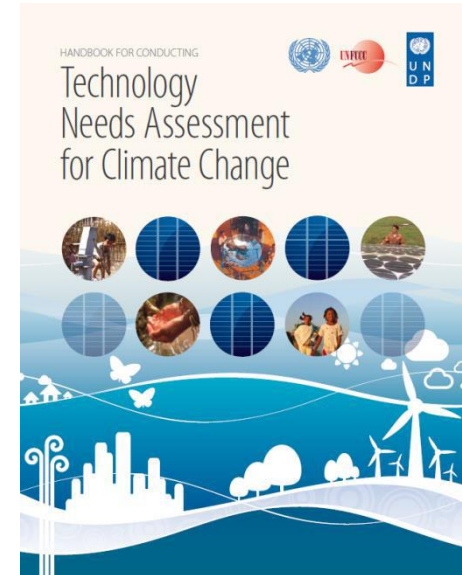
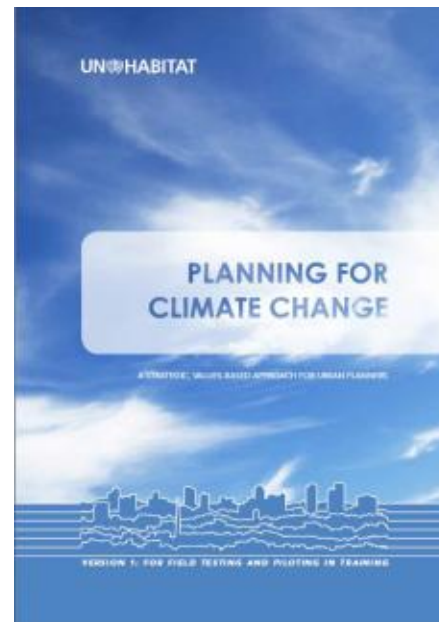
Prioritization or

“From wish list...to short list”



Relevant for

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



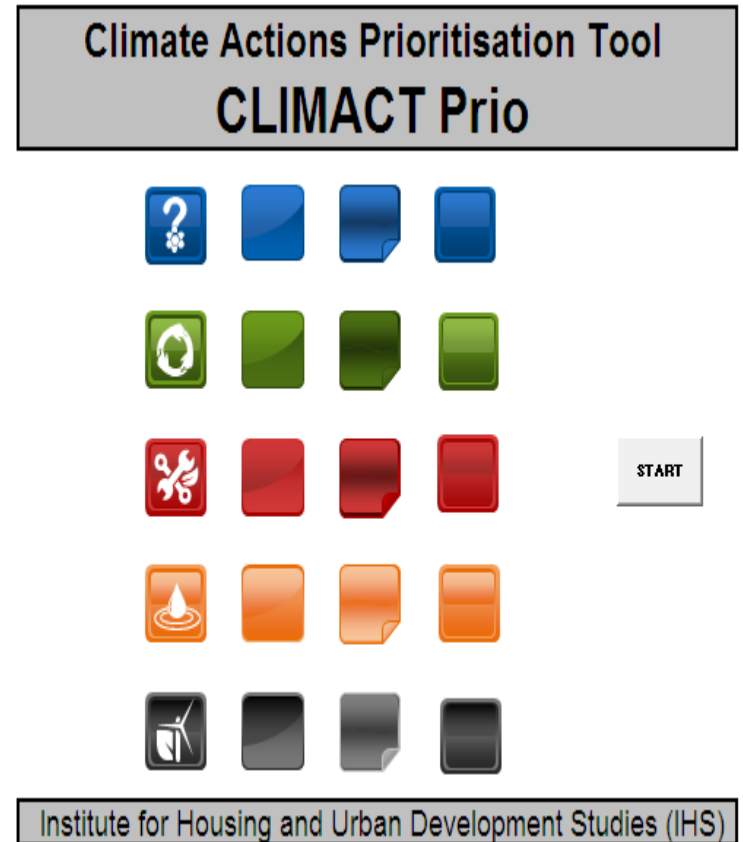
What?

- Prioritization Decision Support Tool
- Process oriented
- Integrated
- Participatory
- Discussion - learning tool
- Excel based



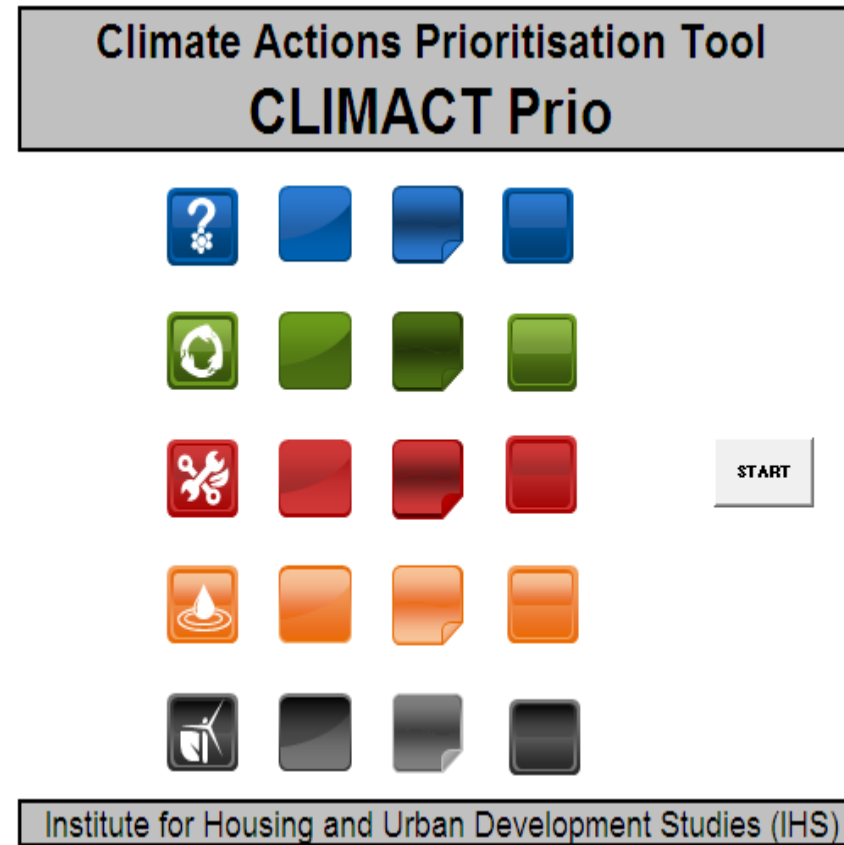
Who?

- Municipalities,
- Urban planners and managers,
- Donor agencies
- Local communities



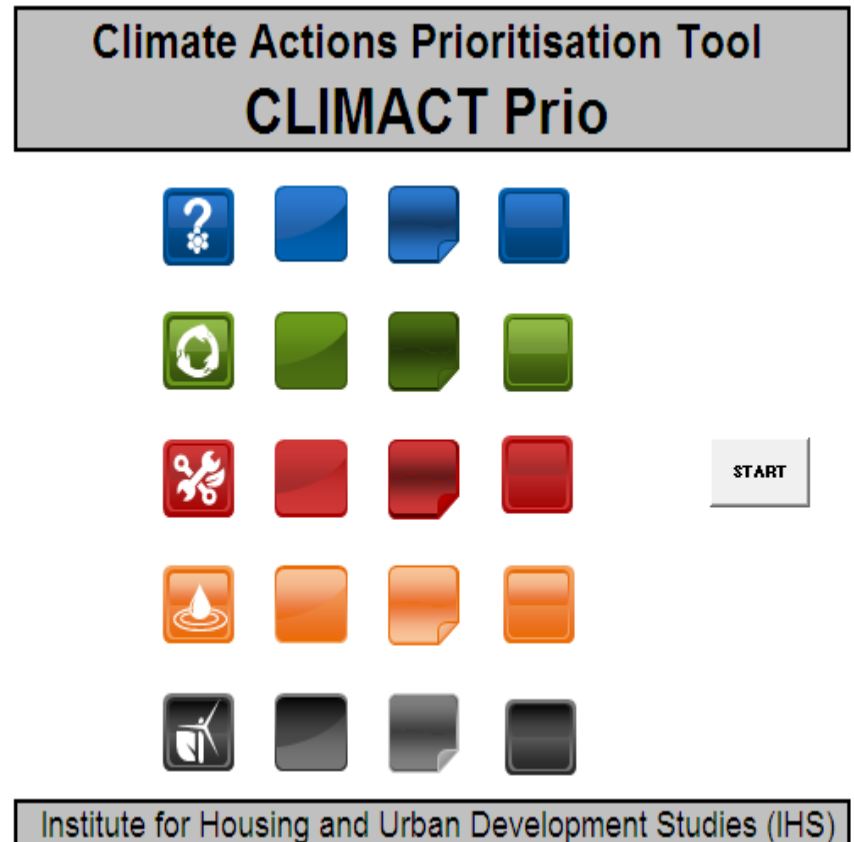
Where? Applications

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



CLIMACT Prio: Objectives

- Support decisions
- Enhance Stakeholders' engagement
- Facilitate Learning and Stimulate Knowledge generation
- Data gathering
- Perform a Multi Criteria Assessment (MCA)



Climate Actions Prioritization Framework

```
graph TD; A[Climate Actions Prioritization Framework] --> B[Multi criteria analysis]; B --> C[Stakeholders' assessment]; B --> D[Experts' judgment]; C --> E[Selection of criteria]; C --> F[Weighting criteria]; D --> G[Scoring];
```

The diagram illustrates a hierarchical framework for prioritizing climate actions. It begins with a top-level box labeled 'Climate Actions Prioritization Framework'. An arrow points down to a box labeled 'Multi criteria analysis'. From 'Multi criteria analysis', two arrows branch out to 'Stakeholders' assessment' and 'Experts' judgment'. From 'Stakeholders' assessment', two arrows branch out to 'Selection of criteria' and 'Weighting criteria'. From 'Experts' judgment', one arrow points down to 'Scoring'. The boxes for 'Stakeholders' assessment' and 'Experts' judgment' are highlighted in a darker green color, while the others are in a lighter green color.

Multi criteria analysis

Stakeholders' assessment

Experts' judgment

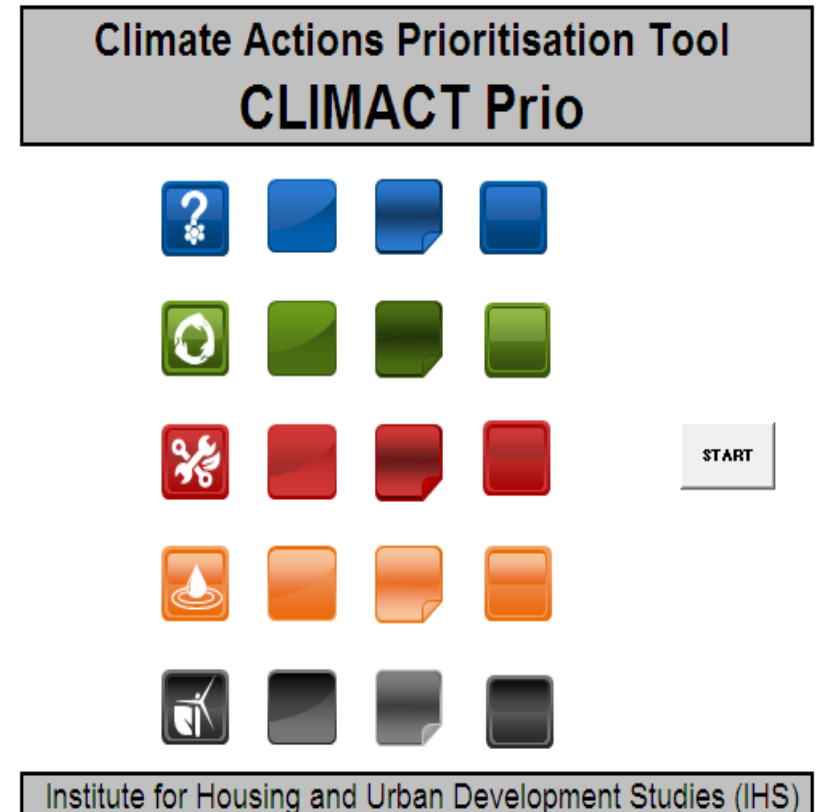
Selection of criteria

Weighting criteria

Scoring

CLIMACT Prio: Steps

- 1) Identify CC related sectors
- 2) Identify actions
- 3) Define evaluation criteria
- 4) Score of actions
- 5) Weight of criteria
- 6) Obtain results
- 7) Sensitivity Analysis





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ANIKA NASRA HAQUE, STELIOS GRAKAKOS
AND MARIJK HUIJSMAN

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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.

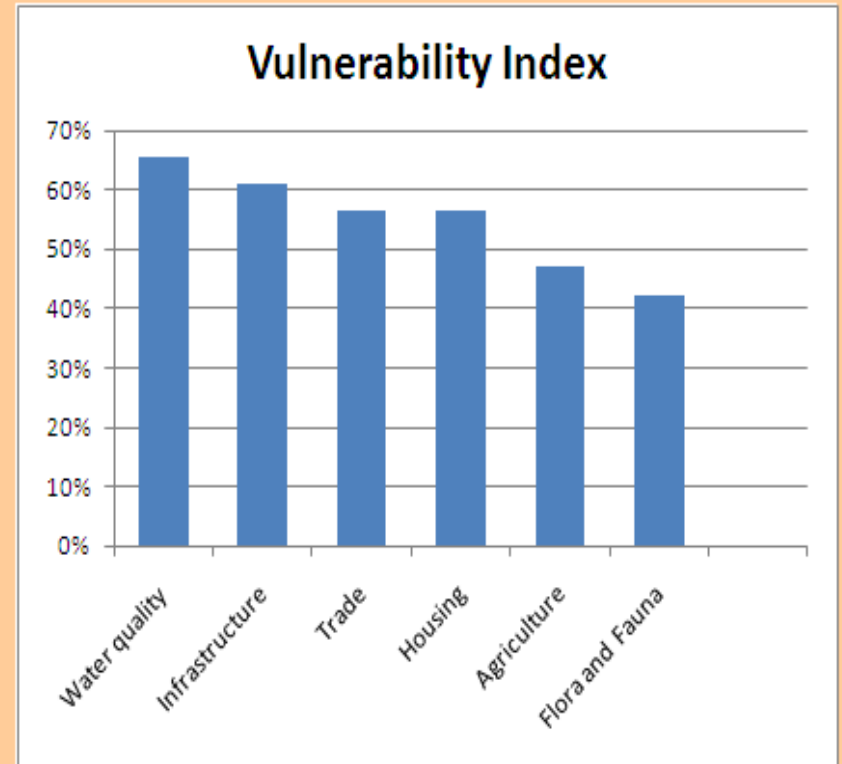
KEYWORDS assessment / climate adaptation / Dhaka / flood protection / multi-criteria analysis / options prioritization

1. 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

Identify the sectors with high Vulnerability

Go to the next step

[illegible]

STEP 2: Adaptation Actions

Go to the next step
(Criteria)

- 1) Specify actions, their type and sector
- 2) Provide time frame, brief description and source

Introduction
Step1: Vulnerability
Step 2: Actions
Step 3: Criteria
Step 4: Scores
Step 5: Weights
Step 6: Results
Step 7: Sensitivity

No	Adaptation actions	Type	Focus	Time frame	Description	Source
1	Construction, retrofitting of drainage system	structural	Infrastructure	Long term		
2	Raised road	structural	Transport	Medium term		
3	Embankment	structural	Flood management	Medium term		
4	Flood wall	structural	Flood management	Medium term		
5	Protection of water retention areas	non-structural	Water management	Short term		
6	Canal Improvement	non-structural	Water management	Medium term		
7	Enhancing emergency	non-structural	Disaster	Short term		
8	Upgrading early warning system	non-structural	Disaster management	Short term		
8	զնշման հիմնարկի ցանկ առաջին	non-structural	management	short term		
5	հիմնարկի ցանկ երկր	non-structural	management	short term		

STEP 3: CRITERIA identification

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

Next Step
(Scores)

		Task 1	Task 2	Task 3	Task 4
Introduction Step1: Vulnerability Step 2: Actions Step 3: Criteria Step 4: Scores Step 5: Weights Step 6: Results Step 7: Sensitivity	1	Criteria	Category of Criteria	Units	Min/Max
		Vulnerability reduction	Climate	%	Max
	2	Cost	Economic	euros	Min
	3	Institutional and technical capacity	Feasibility	"1 - 5"	Min
	4	Public and political acceptance	Social	"1 - 5"	Max
	5	Achievement of MDG	Social	"1 - 5"	Max
	6	Employment generation	Economic	"1 - 5"	Max
	7	Enhancement of ecological condition	Environmental	"1 - 5"	Max

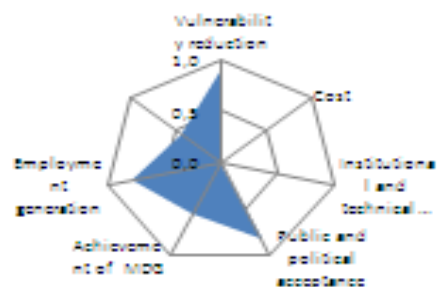
STEP 4: SCORING - Impact Assessment Matrix

Indicate the scores for each alternative on every criterion

Next Step
(Normalized Scores)

Options/Criteria	Vulnerability reduction	Cost euros	Institutional and technical capacity "1 - 5"	Public and political acceptance "1 - 5"	Achievement of MDG "1 - 5"	Employment generation "1 - 5"	Enhancement of ecological condition "1 - 5"
Scale units	%	euros	"1 - 5"	"1 - 5"	"1 - 5"	"1 - 5"	"1 - 5"
Introduction	Construction, retrofitting of drainage system	79	64	5	4	4	3
Step1: Vulnerability	Raised road	64	4	4	4	3	2
Step 2: Actions	Embankment	69	20	4	4	3	2
	Flood wall	61	6	3	1	3	2
Step 3: Criteria	Protection of water retention areas	74	1	3	2	4	5
	Canal Improvement	71	14	4	2	4	3
Step 4: Scores	Enhancing emergency response mechanism	63	1	2	4	4	2
Step 5: Weights	Upgrading early warning	81	2	4	4	5	2
Step 6: Results							
Step 7: Sensitivity							
step 1: sensitivity							
step 8: Results							

Construction, retrofitting of drainage system



Raised road



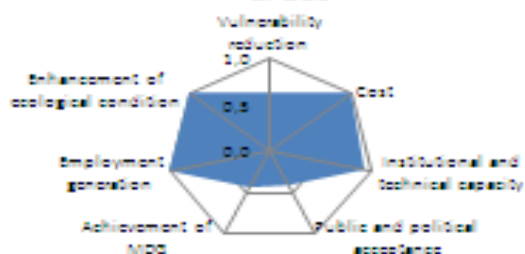
Embankment



Flood wall



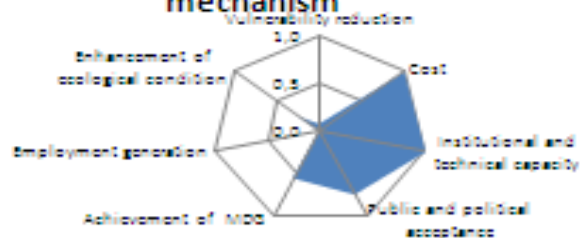
Protection of water retention areas



Canal Improvement



Enhancing emergency response mechanism



Upgrading early warning system



**Next Step
(Weight)**

STEP 5: Criteria WEIGHTING

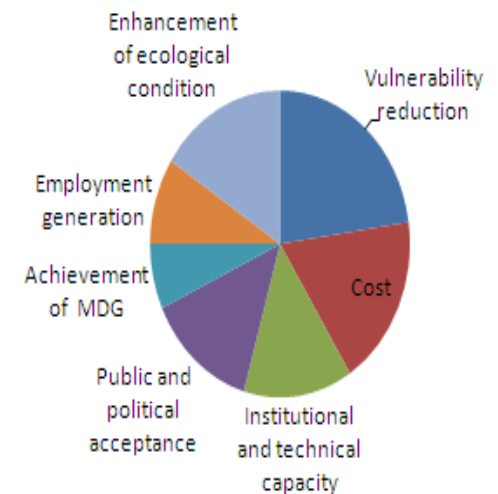
1. Indicate the level of importance of criteria verbally from "very low" to "very high"
2. Assign a value denoting relative importance of criteria

Go to
the next step
(Weighted Scores)

Introduction
Step1: Vulnerability
Step 2: Actions
Step 3: Criteria
Step 4: Scores
Step 5: Weights
Step 6: Results
Step 7: Sensitivity

[illegible]

Criteria Weights

[illegible]

STEP 6: RESULTS - Ranking

1. Press the button 'SORT Alternatives' for ranking alternatives according to assigned weights and 'Normalized Scores'

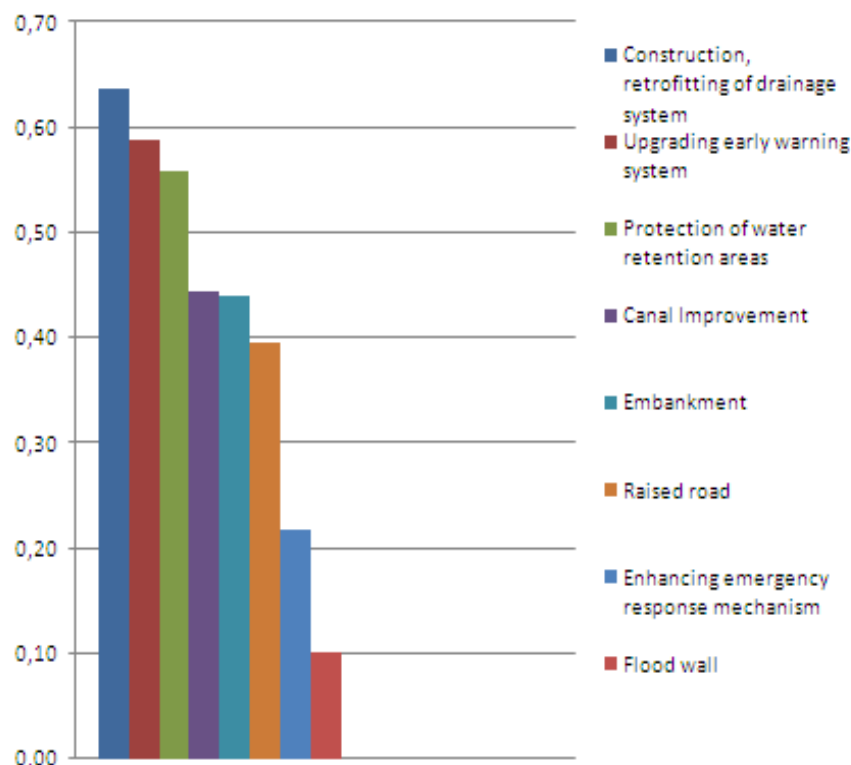
GO to
the NEXT STEP

Introduction
Step1: Vulnerability
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Options	Score	Rank
Protection of water retention areas	0,79	1
Upgrading early warning system	0,77	2
Canal Improvement	0,55	3
Enhancing emergency response mechanism	0,51	4
Construction, retrofitting of drainage system	0,49	5
Embankment	0,48	6
Raised road	0,44	7
Flood wall	0,35	8

SORT Alternatives

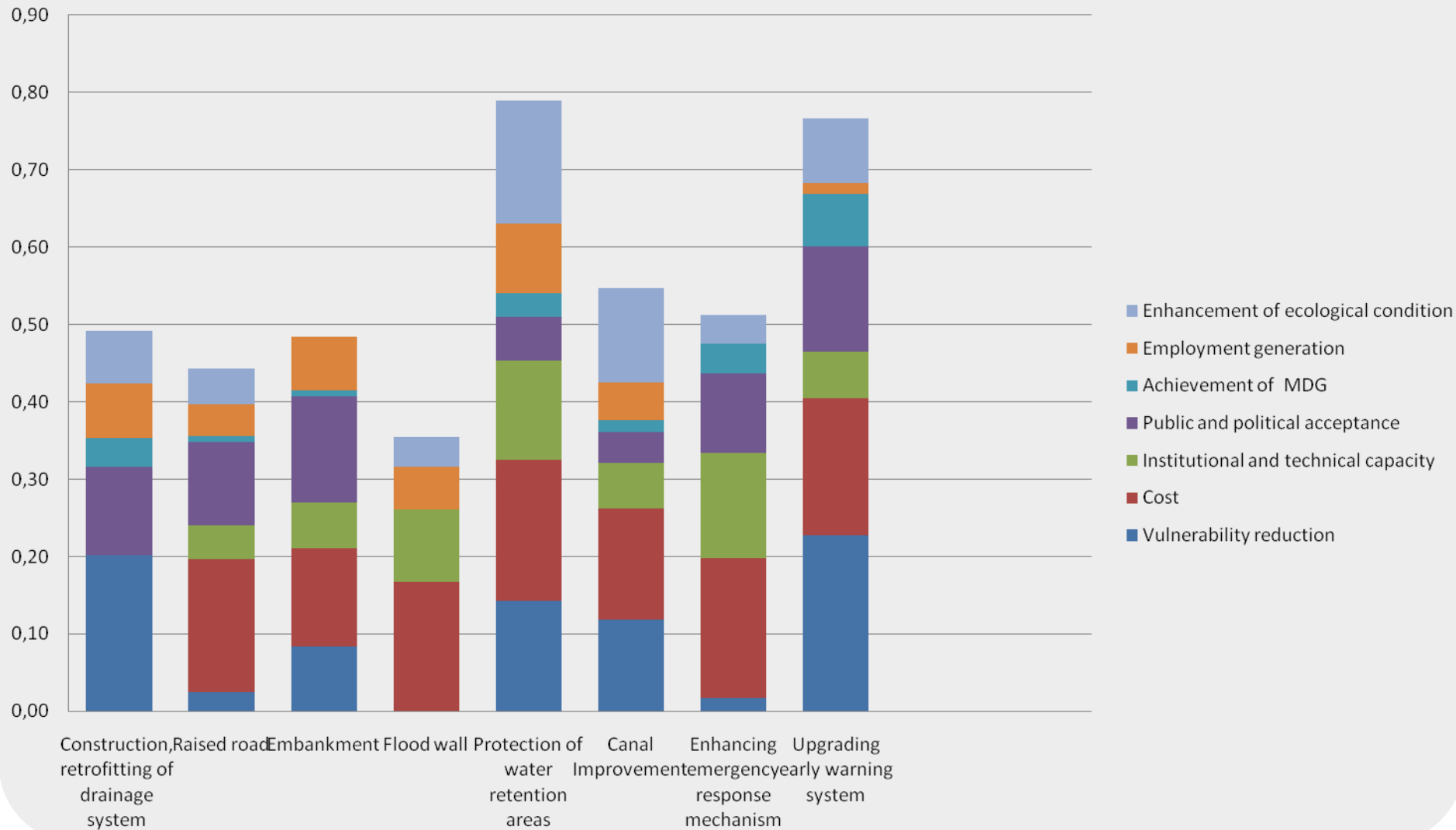
Rank of Alternatives (equal weights)



SORT Alternatives



Final Scores and Contribution of criteria





Thank You