



ACC DAR Adapting to Climate Change in Coastal Dar es Salaam

3rd International Workshop

MAINSTREAMING CLIMATE CHANGE ADAPTATION INTO URBAN DEVELOPMENT AND ENVIRONMENTAL MANAGEMENT PLANS AND PROGRAMS

RESULTS FROM THE ASSESSMENT OF FOUR PLANS AND PROGRAMS IN DAR ES SALAAM, WITH A FOCUS ON TEMEKE MUNICIPALITY



SAPIENZA
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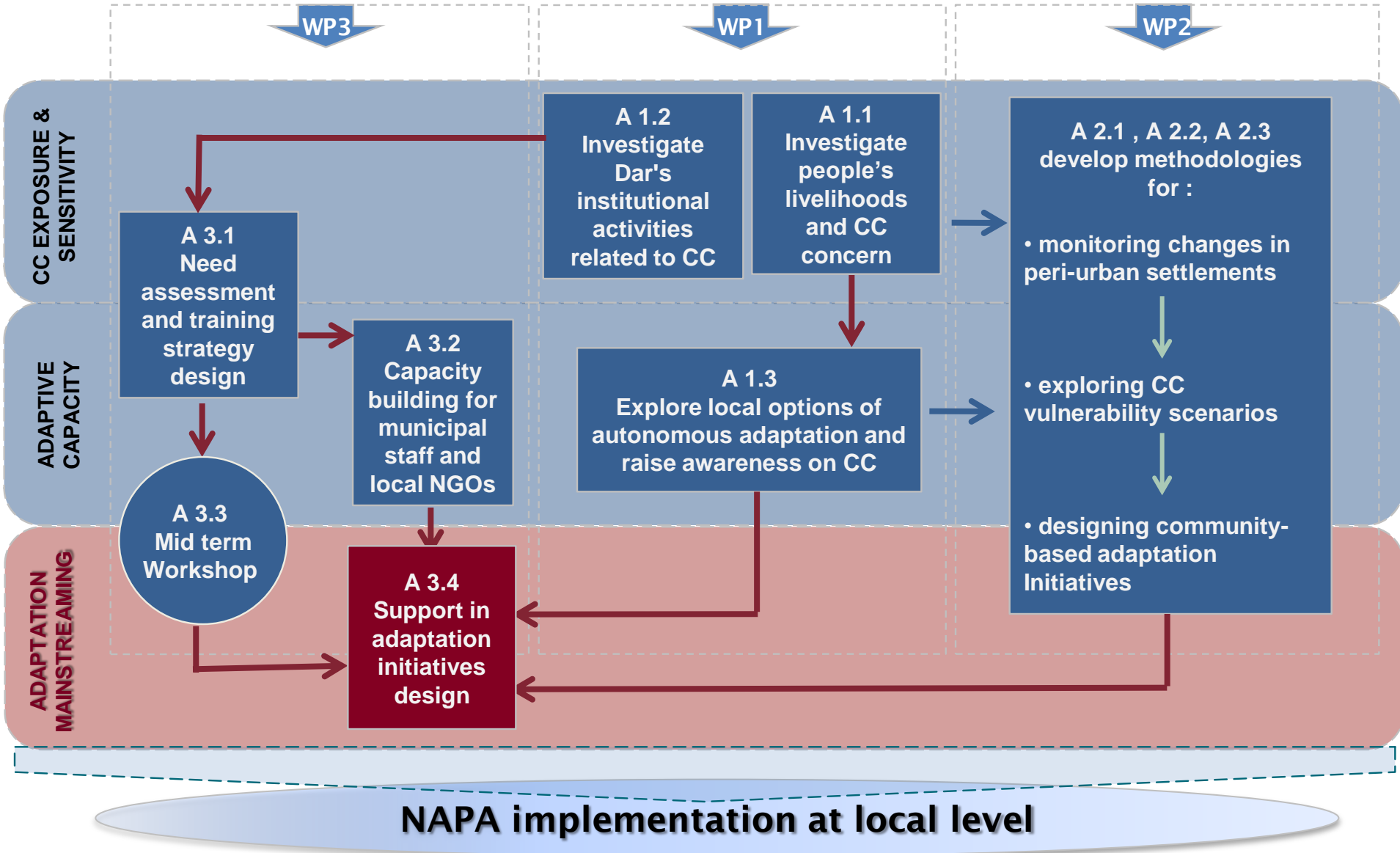


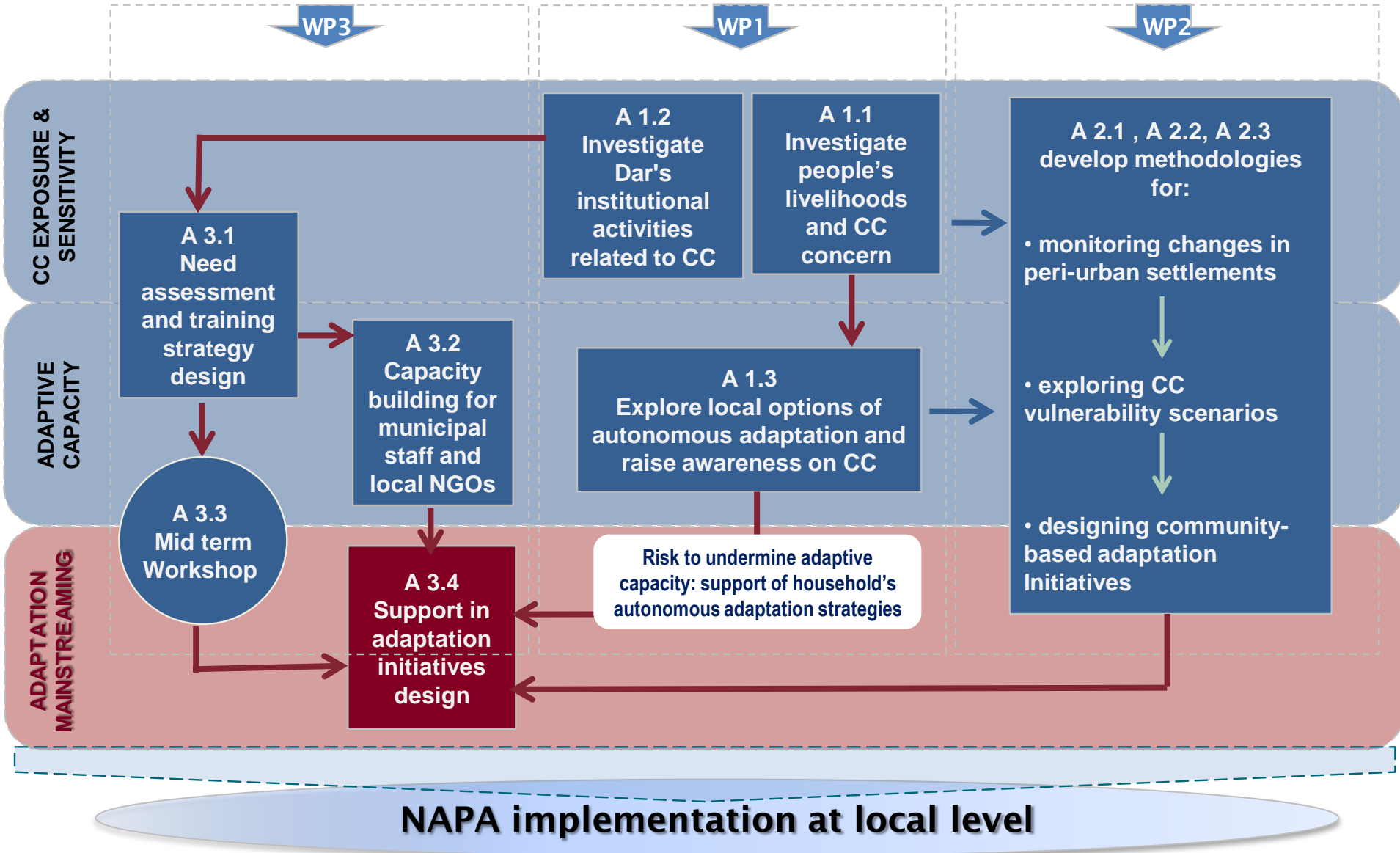
Dar es Salaam, 10 June 2014

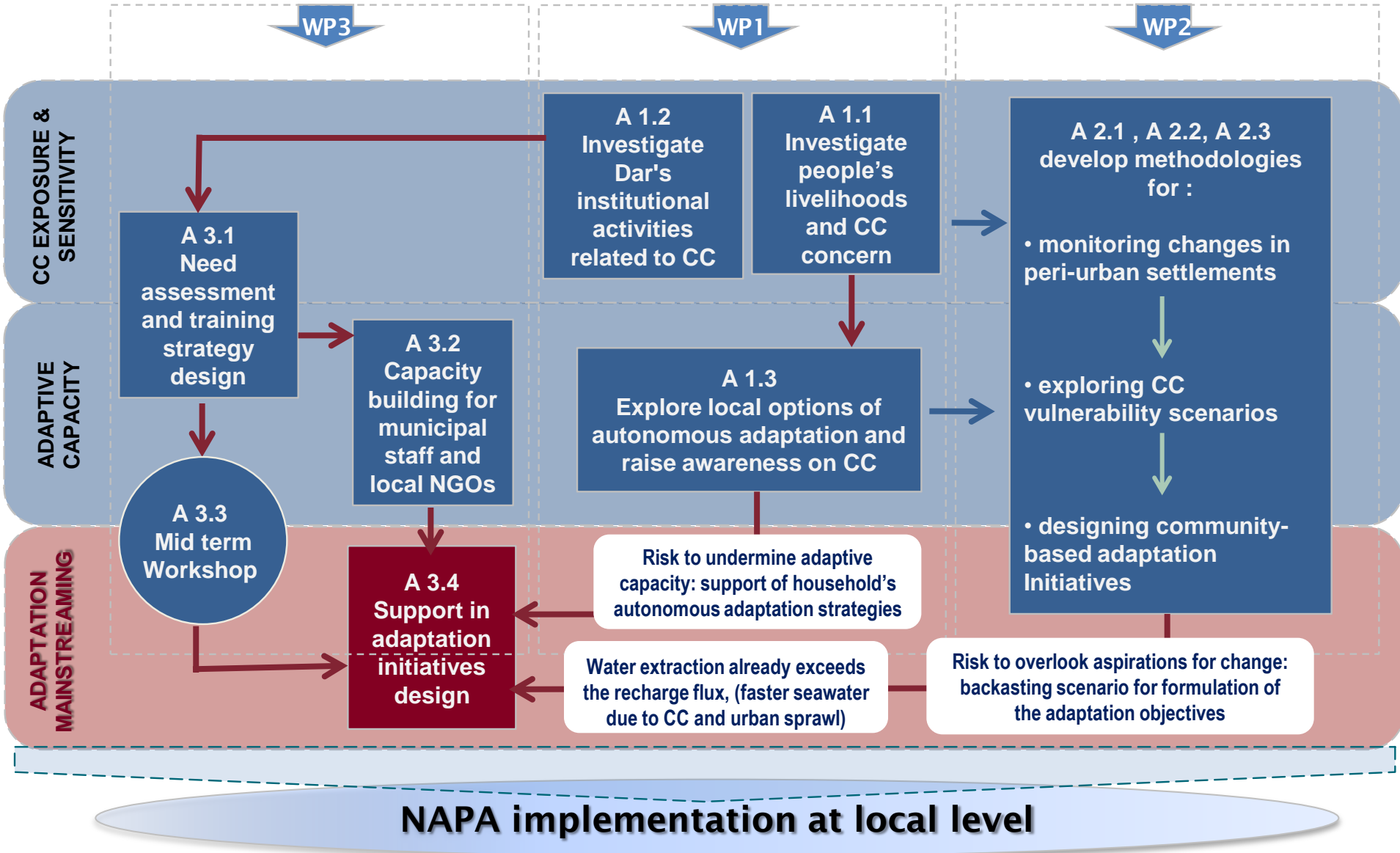
Liana RICCI

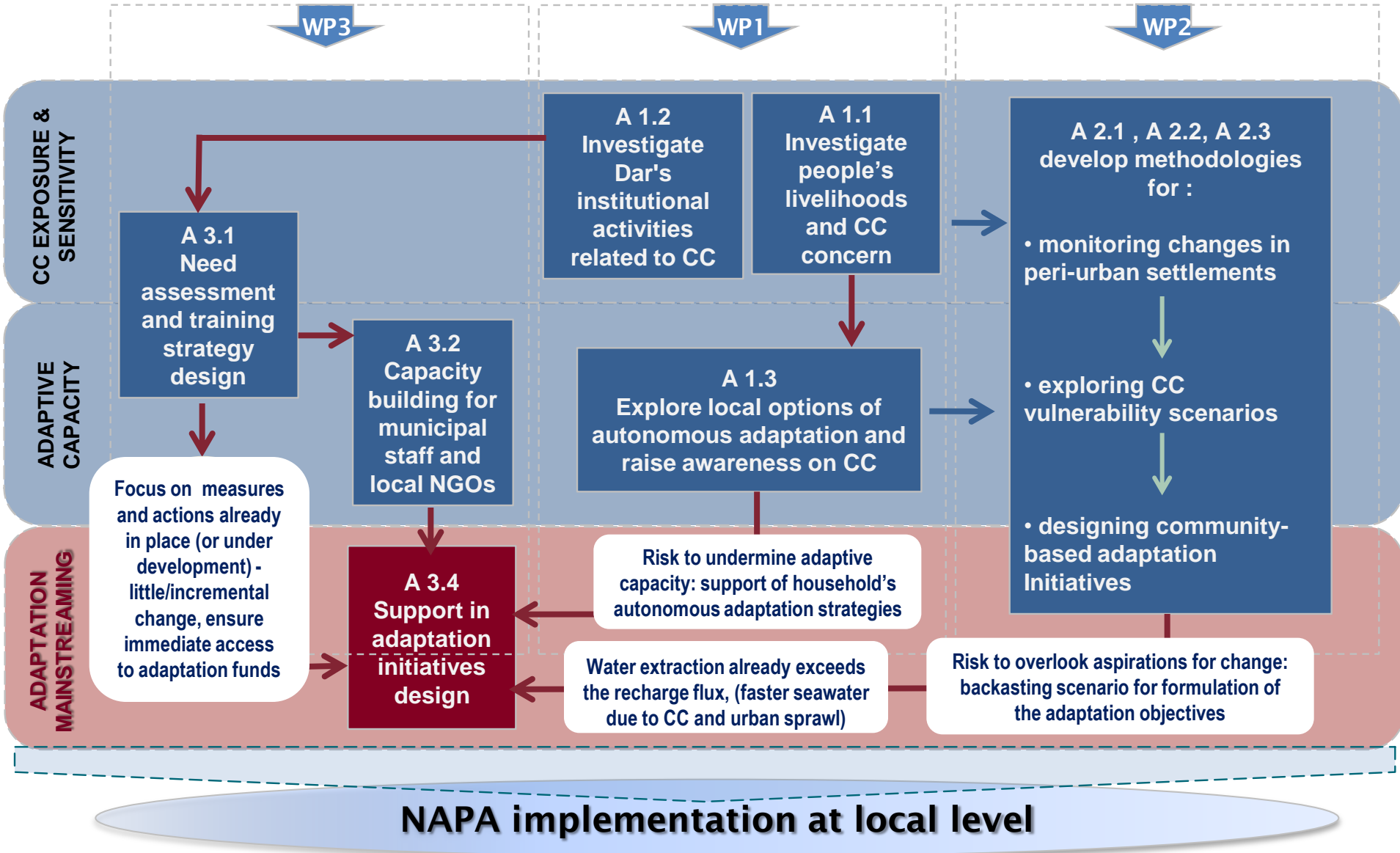
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Adaptation and Mainstreaming in ACC DAR

Adaptation

- adjustment to actual or expected climate and its effects with a focus on **water sources**
 - moderate harm or exploit beneficial opportunities in **water source** sector.
 - facilitate adjustment to expected climate and its effects.

Incremental adaptation - to maintain the essence and integrity of a system or process at a given scale.

Transformational adaptation - changes the fundamental attributes of a system in response to climate and its effects.

Mainstreaming

- rather than preparing “new” plans for CC adaptation, integrating adaptation concern into the existing UDEM plans and programmes.
- process of systematically **integrating** the adverse effect of CC over Dar es Salaam’s coastal plain (selected **Adaptation Concerns**) and the specific outcomes are the **improvement of the capacity of Dar es Salaam LGAs for supporting** the autonomous adaptation of peri-urban residents settled within the coastal plain (selected **Potentials for Autonomous Adaptation**).



Adaptation and Mainstreaming in ACC DAR

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- rather than preparing “new” plans for CC adaptation, integrating adaptation concern into the existing UDEM plans and programmes.
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Objectives

- Develop and test a methodology for the participatory **design of LGAs' adaptation initiatives**.
- Contribute to **effective integration of CC concerns and related adaptation objectives** into the plans and programs which currently shape the daily responsibilities at DSM LGAs:
 - **desing amendments to the provisions made by four UDEM planning documents** already in place, and
 - **introducing new procedures or adjusting the existing ones** in order to feed CC related information into decision-making at local level
 - **supporting autonomous adaptation strategies** already in place at household/community level while preventing maladaptation

CHANGES TO THE PLAN

Procedural
Organizational

PLAN SELECTION

SELECTION OF STRATEGIC ISSUE AND MEASURE/PROVISION

ASSESSMENT OF PLAN'S MEASURES

ADAPTATION NEEDS

RECOMMENDATIONS

Set of amendments

Relevant Actors/
Stakeholders

Threats/
Opportunities

Costs Implications

SELECTION CRITERIA

High score
Synergies
between
amendments

ASSESSMENT CRITERIA

AC1
AC2
PAA1
PAA2
PAA3
GHG
CCS

SCRUTINY CRITERIA

Effectiveness
Efficiency
Feasibility
Knowledge-based
Equity and
legitimacy

SCRUTINY OF AMENDMENTS OPTIONS

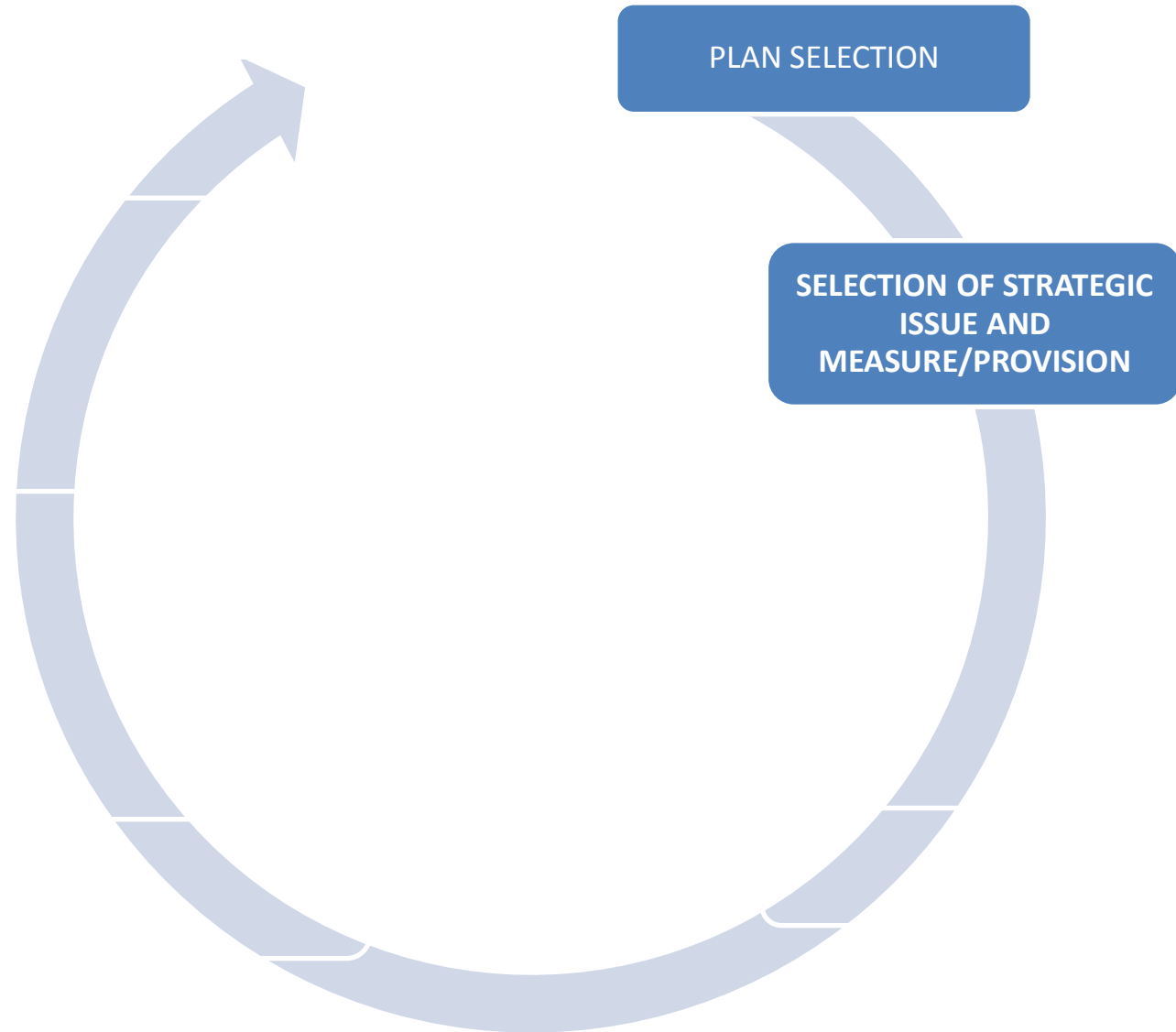
AMENDMENTS OPTIONS

Technological, Ecological
Social

Adaptation options	
Protection of environment and reserved areas in if water enhanced by 2015	
When natural water sources within the reserved areas currently provide less water to residents, the following options are proposed:	
Technological options	<ol style="list-style-type: none"> 1. Review the reserved area boundary in a way that will provide access to natural water sources for residents. 2. Provide a new infrastructure for pumping groundwater from the reserved areas to a free water point outside the reserved area. 3. Set up a monitoring system of water table to collect data needed for determining the quantity of water that residents can safely and sustainably consume given a minimum water table level or maximum river flow.
Ecological options	<ol style="list-style-type: none"> 4. Set up a solar water controller to guarantee equitable access to and distribution from natural water sources (including discretionary watering of groundwater and surface water bodies).
Social options	<ol style="list-style-type: none"> 5. Identify alternative free water sources outside the reserved area. 6. Provide a certain amount of free water for free to poor households (change in water pricing policy).
When natural water sources within the reserved areas are currently used by residents as main source of water or as complementary source to other water sources, the following options are proposed:	
Technological options	<ol style="list-style-type: none"> 7. Provide water supply to underserved residents or a, building new wells and equipment.
Notes:	<ol style="list-style-type: none"> 1. ABCDE PLUS 2. Support and encourage rainwater harvesting. 3. Support and encourage water saving devices at sites. 4. ABCDE PLUS 5. ABCDE PLUS 6. Provide community-based water supply systems for water source diversification, sustainable water storage and water management.

Adaptation Measure	Adaptation Measure	Adaptation Measure
AC1	AC2	AC3
PAA1	PAA2	PAA3
GHG	CCS	





At the municipal level

Temeke Medium Term Expenditure Framework for years 2010/2011 - 2012/2013,

- Forest conservation increased from 2100 ha to 25,000 ha by 2013
- Construction of demonstration toilets and sanitation facilities in 11 wards by June 2013

Temeke Municipal Council's Strategic Plan for Years 2010/2011 - 2012/2013

- Protection of environment and reserve areas in 4 wards enhanced by 2013
- Total of 1,500,000 trees in 175 mitaa planted by 2013

PLAN SELECTION

SELECTION OF STRATEGIC
ISSUE AND
MEASURE/PROVISION

At the city level

Strategic Water Supply Plan for Dar es Salaam

- Improve surface water sources from 276,000m³/d to 576,000m³/d ultimate capacity by 2032
- Installation of 20 deep wells with a minimum depth of 600 m in Kimbiji and Mpera

Dar es Salaam Master Plan. 2012 – 2032

- Article 6 – Areas in the Consolidation process
- Article 18 – Peri-urban areas / urban agriculture



Assessment Criteria

2 Adaptation Concerns

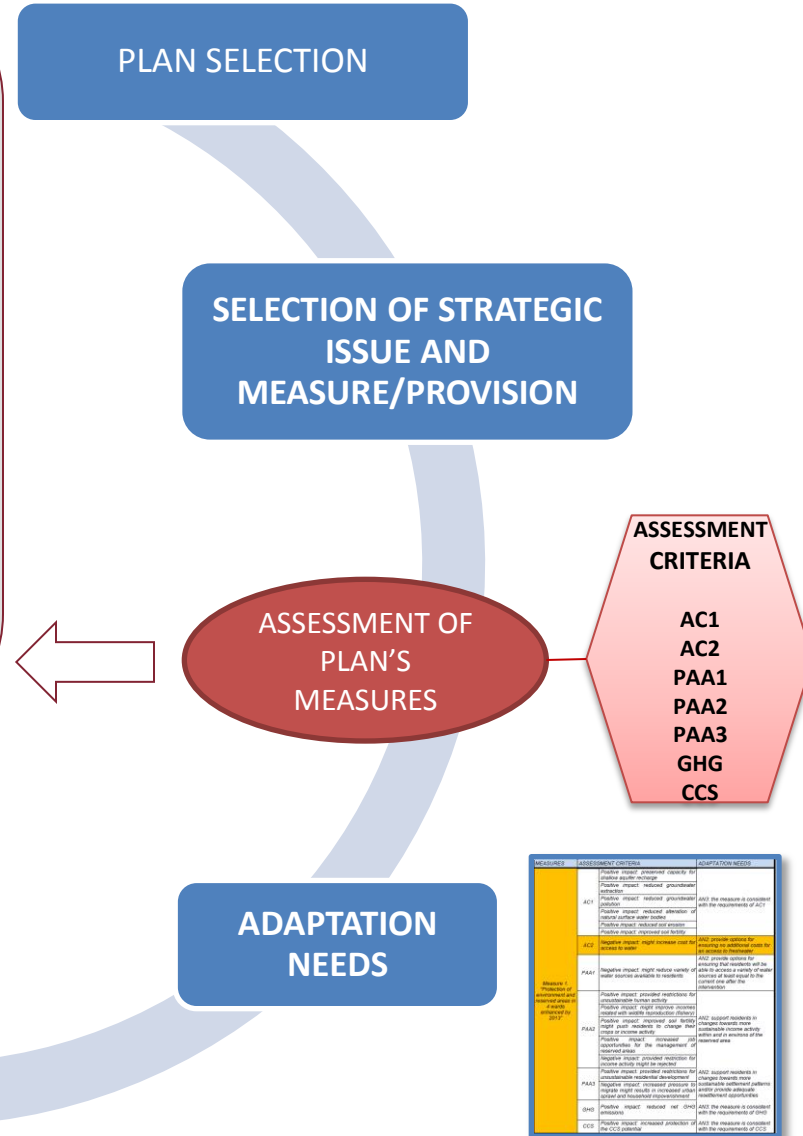
- AC1 - water resource conservation
- AC2 - improve access to fresh water

3 Potentials for Autonomous Adaptation (PAAs)

- PAA1 - water source diversification
- PAA2 - changes in income generating activities
- PAA3 - relocation or changes in actual settlement patterns

2 Mitigation related issues

- GHG - contribution to greenhouse gas emissions
- CCS - contribution to carbon capture and sequestration



Assessment Criteria

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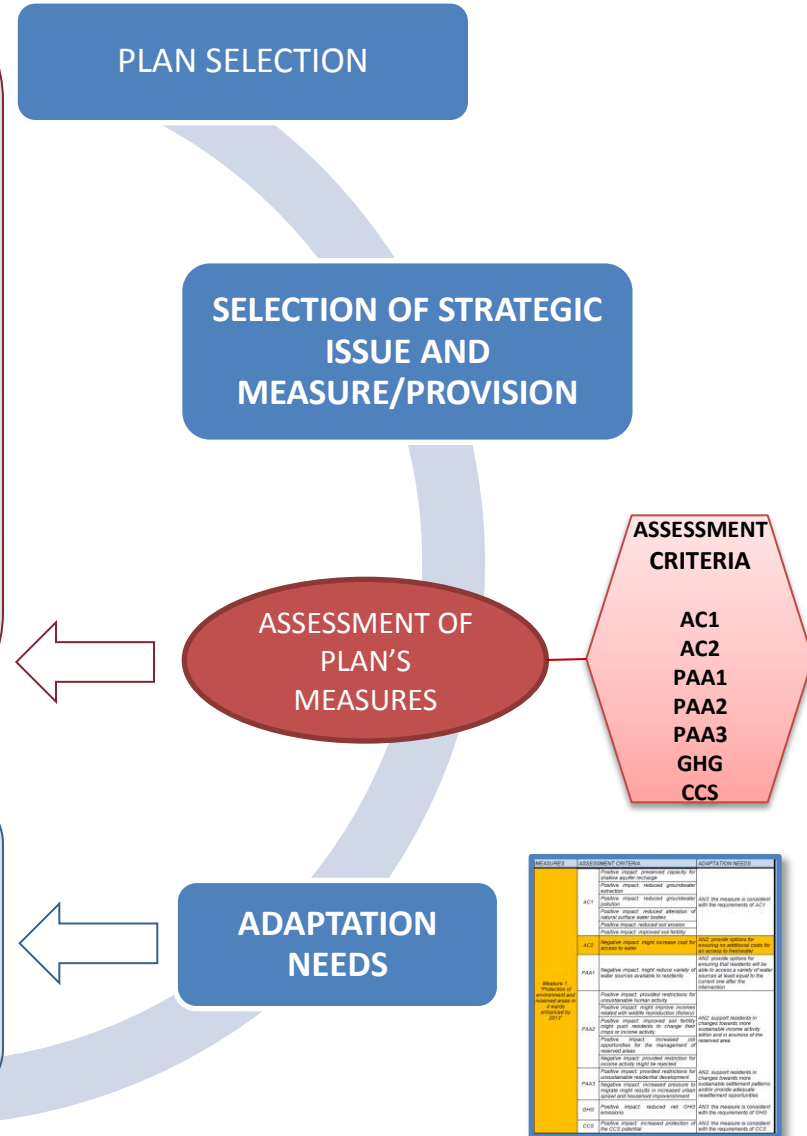
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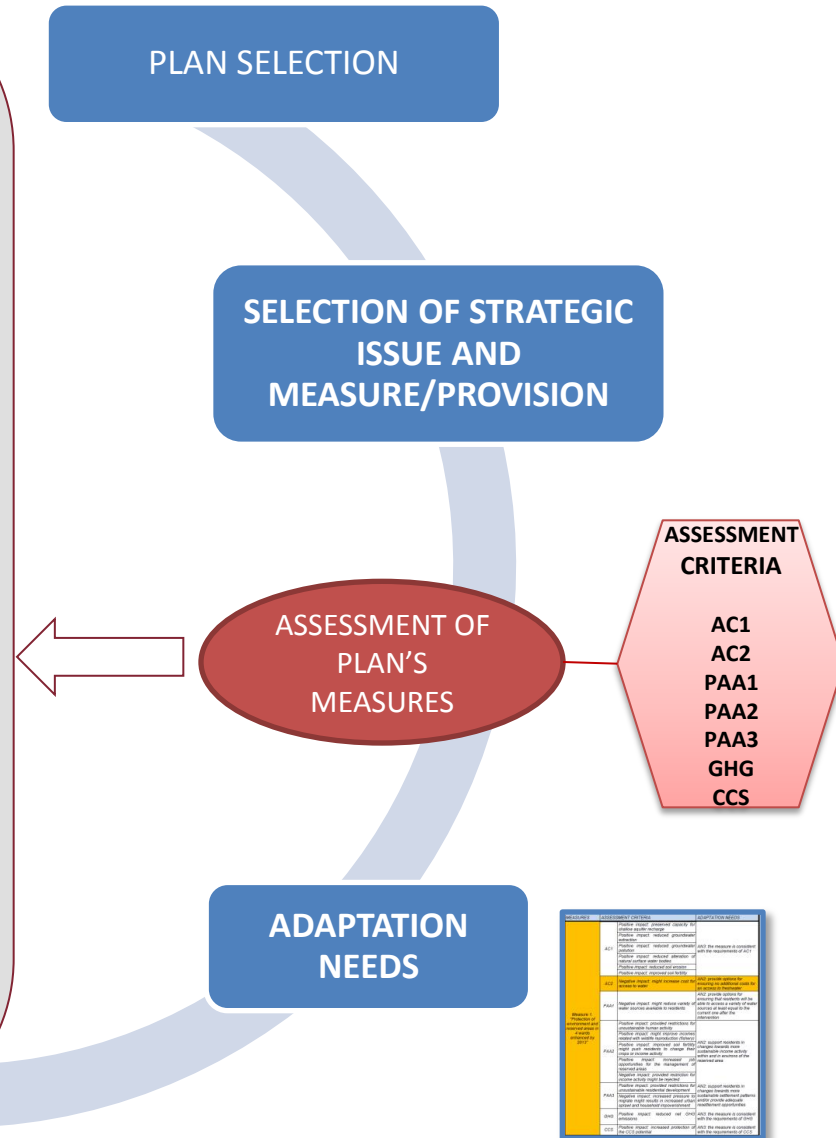
- AN1 - Need to completely revise the measure as it has only negative implications for ACs and PAAs
- AN2 - Need to strengthen or adjust the measure for better addressing the threats related to ACs and PAAs
- AN3 - No change is needed as the measure is consistent with the requirements of ACs and PAAs



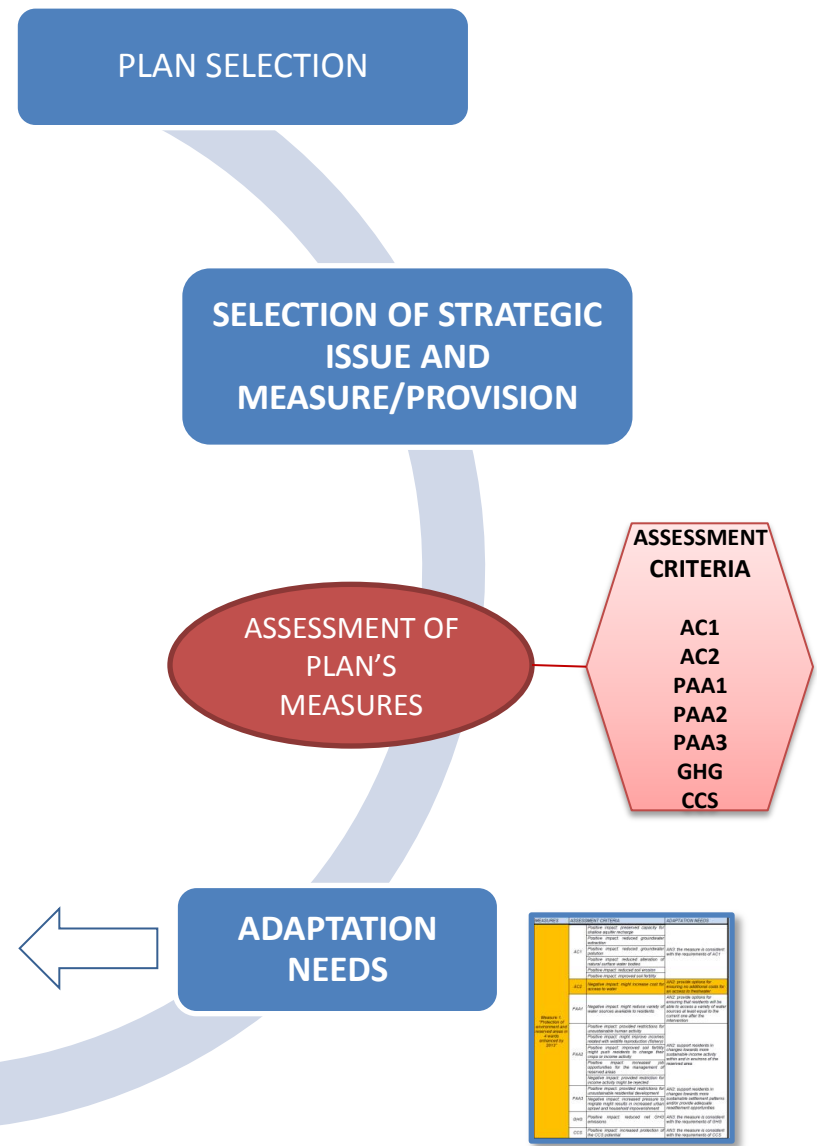
Example

"Protection of environment and reserved areas in 4 wards enhanced by 2013":

- positively impacts AC1 because it prevents building construction and deforestation thus ensuring the conditions for adequate recharge of shallow aquifer;
- negatively impacts AC2 because it **might prevent the free access to natural freshwater sources**;
- negatively impacts PAA1 because it **might reduce the variety of water sources** upon which the residents can rely;
- positively impacts PAA2 because it provides restrictions for unsustainable income activity within the reserved areas;
- positively impacts PAA3 because it prevents unsustainable residential development within the reserves areas.
- positive impacts might reduce the risk of deforestation and consequently reduce the net GHG emissions, while increasing CCS potential through additional tree planting.



Adaptation needs	Amendment options
<p>Provide options for ensuring no additional costs for an access to freshwater</p>	<p>Protection of environment and reserved areas in 4 wards enhanced by 2013</p>
	<p>When natural water sources within the reserved areas currently provide free water to residents, the following options are proposed:</p> <ol style="list-style-type: none"> 1. Review the reserved area boundary in a way that will not undermine access to natural water sources for residents 2. Provide a new infrastructure for pumping freshwater from within the reserved areas to a free water point outside the reserved areas 3. Set up a monitoring system of water bodies to collect data needed for determining the quantity of water that residents can extract while respecting conservation goals (e.g. minimum water table level or minimum river flow) 4. Set up a local water committee to guarantee equitable access to and distribution from natural water sources (including participatory monitoring of groundwater and surface water bodies) 5. Identify alternative free water sources outside the reserved areas 6. Provide a certain amount of freshwater for free to low-income households (change in water service tariff) <p><i>Technological options</i></p> <p><i>Ecological options</i></p> <p><i>Social options</i></p>



ASSESSMENT CRITERIA

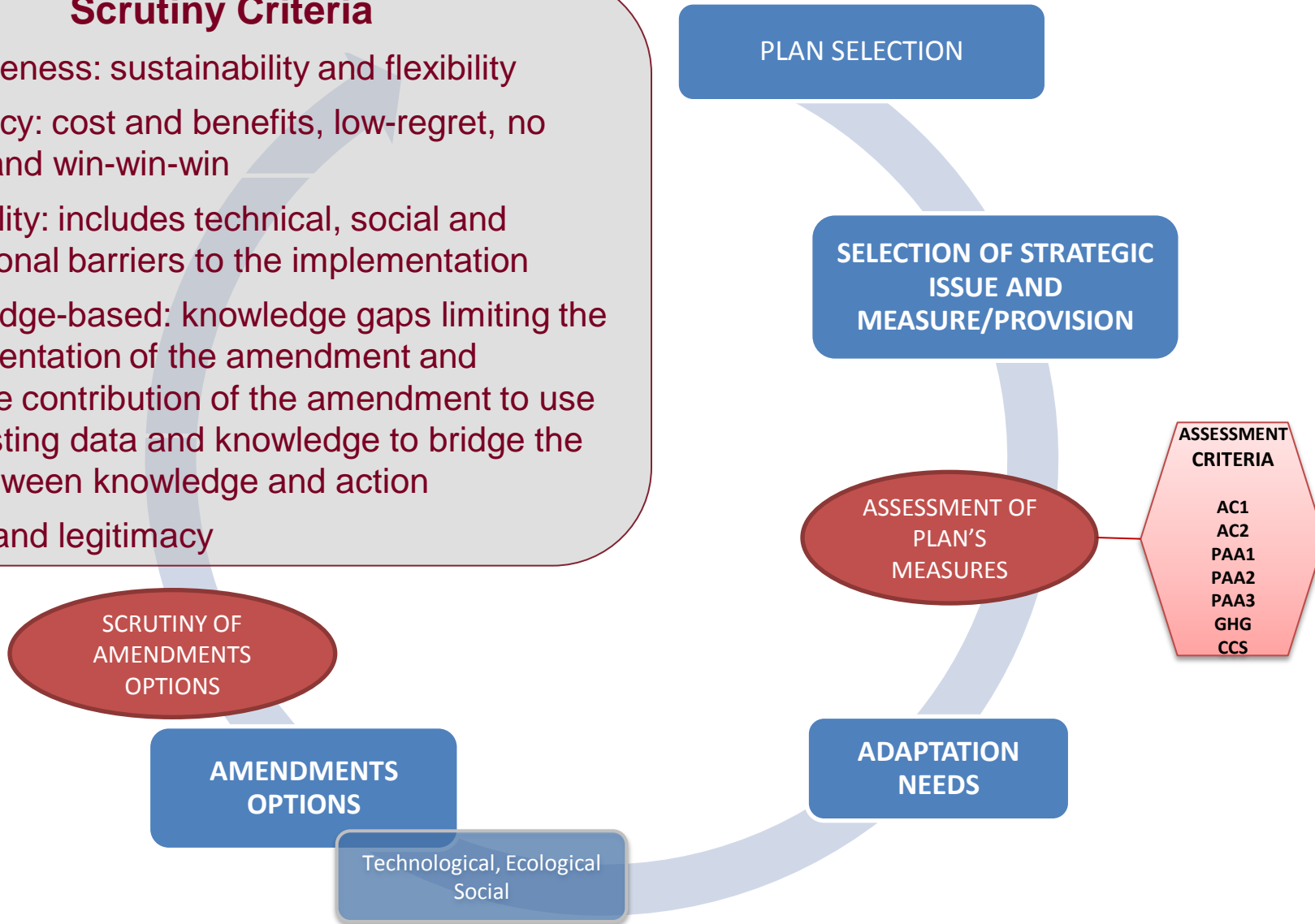
- AC1
- AC2
- PAA1
- PAA2
- PAA3
- GHG
- CCS

Adaptation Need	Amendment Option	Assessment Criteria
AC1	Review the reserved area boundary	AC1
AC2	Provide a new infrastructure for pumping freshwater	AC2
PAA1	Set up a monitoring system of water bodies	PAA1
PAA2	Set up a local water committee to guarantee equitable access	PAA2
PAA3	Identify alternative free water sources outside the reserved areas	PAA3
GHG	Provide a certain amount of freshwater for free to low-income households	GHG
CCS	Change in water service tariff	CCS



Scrutiny Criteria

- Effectiveness: sustainability and flexibility
- Efficiency: cost and benefits, low-regret, no regret and win-win-win
- Feasibility: includes technical, social and institutional barriers to the implementation
- Knowledge-based: knowledge gaps limiting the implementation of the amendment and possible contribution of the amendment to use the existing data and knowledge to bridge the gap between knowledge and action
- Equity and legitimacy



Amendment to the measure	Criteria									
	Effectiveness		Efficiency				Feasibility	Knowledge-based		Equity and legitimacy
	Sustainability	Flexibility	Costs	Low regret*	No regret	Win-win-win		Knowledge gaps	Knowledge use	
No change	High Medium Low	High Medium Low	High Medium Low	High Medium Low	High Medium Low	High Medium Low	High Medium Low	High Medium Low	High Medium Low	High Medium Low
<i>Review the reserved area boundary in a way that will not undermine access to natural water sources for residents</i>	Medium (environmental impacts)	High	Medium	Medium	High	Medium (no enviro. win)	Medium (institutional barrier)	Medium	Low	High
<i>Provide a new infrastructure for pumping freshwater from within the reserved areas to a free water point outside the reserved areas</i>	Medium (environmental impacts)	Low	High	Low	High	Medium (no enviro. win)	Medium (technical barrier)	Medium	Low	High

PLAN SELECTION

SELECTION OF STRATEGIC ISSUE AND MEASURE/PROVISION

ASSESSMENT OF PLAN'S MEASURES

- ASSESSMENT CRITERIA**
- AC1
 - AC2
 - PAA1
 - PAA2
 - PAA3
 - GHG
 - CCS

SCRUTINY OF AMENDMENTS OPTIONS

- SCRUTINY CRITERIA**
- Effectiveness
 - Efficiency
 - Feasibility
 - Knowledge-based
 - Equity and legitimacy

AMENDMENTS OPTIONS

Technological, Ecological
Social

ADAPTATION NEEDS



PLAN SELECTION

SELECTION OF STRATEGIC ISSUE AND MEASURE/PROVISION

ASSESSMENT OF PLAN'S MEASURES

ADAPTATION NEEDS

RECOMMENDATIONS

- Set of amendments
- Relevant actors/ stakeholders
- Threats/ opportunities
- Costs Implications

SELECTION CRITERIA

High score Synergies between amendments

ASSESSMENT CRITERIA

AC1
AC2
PAA1
PAA2
PAA3
GHG
CCS

Amendment	AC1	AC2	PAA1	PAA2	PAA3	GHG	CCS
Amendment 1	High	High	High	High	High	High	High
Amendment 2	High	High	High	High	High	High	High
Amendment 3	High	High	High	High	High	High	High
Amendment 4	High	High	High	High	High	High	High
Amendment 5	High	High	High	High	High	High	High

SCRUTINY OF AMENDMENTS OPTIONS

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Effectiveness
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AMENDMENTS OPTIONS

Technological, Ecological
Social

Adaptation Options

Protection of environment and reserved areas in if water enhanced by 2015

When natural water sources within the reserved areas currently provide less water to residents, the following options are proposed:

Options	Description
Technological options	1. Review the reserved area boundary in a way that will provide access to natural water sources for residents. 2. Provide a new infrastructure for pumping groundwater from within the reserved area. 3. Set up a monitoring system of public facility to collect data needed for determining the quantity of water that residents can safely and receiving groundwater from a minimum water table level or maximum river flow.
Ecological options	4. Set up a local water controller to guarantee equitable access to and distribution from natural water sources (including discretionary watering of groundwater and surface water bodies).
Social options	5. Identify alternative water sources outside the reserved area. 6. Provide a certain amount of freshwater for free to poor households (change in water service type).

When natural water sources within the reserved areas are currently used by residents as main source of water or as complementary source to other in order to improve the delivery of water services:

Options	Description
Technological options	7. Provide water supply to underserved residents or a, building new wells and equipment.
Social options	A1 ABOVE PLUS 8. Support and encourage rainwater harvesting. A2 ABOVE PLUS 9. Support community-based water supply systems for water source diversification, sustainable water storage and water management.

Adaptation Option	AC1	AC2	PAA1	PAA2	PAA3	GHG	CCS
Option 1	High	High	High	High	High	High	High
Option 2	High	High	High	High	High	High	High
Option 3	High	High	High	High	High	High	High
Option 4	High	High	High	High	High	High	High
Option 5	High	High	High	High	High	High	High



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ASSESSMENT OF PLAN'S MEASURES

ADAPTATION NEEDS

RECOMMENDATIONS

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SCRUTINY OF AMENDMENTS OPTIONS

AMENDMENTS OPTIONS

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Protection of environment and reserved areas in if water enhanced by 2015	
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Technological options	<ol style="list-style-type: none"> 1. Review the reserved area boundary in a way that will provide access to natural water sources for residents. 2. Provide a new infrastructure for pumping groundwater from within the reserved area. 3. Set up a monitoring system of public fountains to collect data needed for determining the quantity of water that residents can extract and receiving consent from the minimum water table level or nearest river flow.
Ecological options	<ol style="list-style-type: none"> 4. Set up a solar water controller to guarantee equitable access to and distribution from natural water sources (including discretionary watering of groundcover and surface water bodies).
Social options	<ol style="list-style-type: none"> 5. Identify alternative water sources outside the reserved area. 6. Provide a certain amount of free water for free to poor households (change in water pricing policy).
When natural water sources within the reserved areas are currently used by residents as main source of water or as complementary source to other in order to afford, the following options are proposed:	
Technological options	<ol style="list-style-type: none"> 7. Provide water supply to underground residents or a, building new wells and equipment.
Social options	<ol style="list-style-type: none"> 8. Support and encourage rainwater harvesting. 9. Support and encourage water reuse. 10. Support and encourage water reuse. 11. Support and encourage water reuse. 12. Support and encourage water reuse.

Adaptation Option	Adaptation Measure	Adaptation Measure
AC1	Provide water supply to underground residents or a, building new wells and equipment.	AC1
AC2	Support and encourage rainwater harvesting.	AC2
PAA1	Support and encourage water reuse.	PAA1
PAA2	Support and encourage water reuse.	PAA2
PAA3	Support and encourage water reuse.	PAA3
GHG	Support and encourage water reuse.	GHG
CCS	Support and encourage water reuse.	CCS



Recommendations

Amendments for the Enhancement of the Forest Conservation

- **Tree species** most **suitable to groundwater** availability as a priority for tree nurseries; a **monitoring** system for **existing trees** and planted seedlings; a **buffer zone** surrounding planted seeds and sprouts;
- **Awareness raising on** multiple value of **trees** (groundwater and soil conservation, etc) and **disseminating knowledge of sustainable use of timber** should be carried out;
- **Promote low-GHG emission fuel for cooking** as an alternative to charcoal;
- Proper **conservation of water catchment** upstream by ensuring that revenue collected through the sales of water to various consumers downstream are used to invest in the conservation of upper catchment (e.g. **Equitable Payment for Watershed Services**)

Recommendations

Amendments for a Sustainable Exploitation of Water Sources

- Setting-up a **participatory water level monitoring system** in the reserved areas to collect data required for an **adaptive management of streams and springs**, (*i.e. giving residents the right to withdraw water within limits dictated by common principles for water bodies conservation, such as minimum water table level or minimum river flow*)
- WUAs to **guarantee equitable access to and distribution** from natural water sources based on the monitoring results, and **to enable the community to participate in monitoring** in order to gain self-reliance in adaptive management of natural resources upon which most households depend
- WUAs to **establishing economic agreements with high water consuming companies** to keep domestic water bill low, as well as requiring ecological compensation
- **Awareness raising about groundwater** degradation, problems and solutions and to support the development of rainwater harvesting systems for non-drinking uses in redevelopment operations



Recommendations

Amendments for the consolidation process proposed in the New DSM Master plan

- Within the coastal plain, **no building permit should be issued without a prior assessment of its impact on the shallow aquifer** and the **use of boreholes should be as limited** as possible
- **Land use plans to secure the conservation of vegetated spaces** between (and within) the plots as a way to **limit soil sealing**, and provide for **the protection of river banks** which is crucial for controlling pollution caused by runoff
- **Involvement of residents in planning decision-making** is probably the best option to find adequate solution to the identification of ways **for preventing migration** from areas under consolidation **to limit urban sprawl** in peri-urban areas



Recommendations

Amendments for a transition towards sustainable farming in urban and peri-urban areas

- Pilot projects shall be developed for **innovating farming practices** with more environmentally sound techniques, including **organic** (chemical free) farming, **water saving** techniques and techniques which **minimize losses in soil carbon**
- Special **plans for the protection and development of agricultural and agriculture-related uses** near and within the urban boundaries. Such plans will consider **water availability as a limiting factor** and secure adequate space for marketing facilities
- **Awareness raising among residents** on health and economic risks associated with uncontrolled discharge or improper reuse of wastewater and solid waste risks over agricultural lands, as a way to secure quality and safety of food production together with the achievement of water conservation goals

Open Questions – Working Groups

- What amendment options are recommended as the most suitable/feasible in order to adjust the four UDEM planning documents assessed for mainstreaming under the ACCDAR project?

How they can be selected analyzing:

- Effectiveness – How similar action already ongoing are working? And why?
- Feasibility – Are there options difficult to be implemented or not feasible?
- Prioritization – Are there options to be prioritized?



THANK YOU

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