ADAPTATION TOOLKIT

Guidebook for Researchers and Adaptation
Practitioners Working with Local Communities

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EXECUTIVE SUMMARY

Increasing climate variability and change is presenting a number of challenges in developing countries against the backdrop of low infrastructure development, rapid urbanisation and limited financial and technical capacity. Consequently, vulnerability assessment and adaptation planning (V&A) is gaining much attention and is generating the need for research knowledge, skills and tools. The Climate Change Capacity Development project (C3D+), which is supported by the European Union and managed by United Nations Institute for Training and Research (UNITAR), has over the years promoted north-south collaborations between organisations to develop tools and enhance capacities of governments, non-governmental and community-based organisations to undertake climate change V&A. Through this initiative ENDA - Energy, Environment and Development - in collaboration with the Stockholm Environment Institute (SEI) have jointly developed a tool kit for undertaking climate change vulnerability assessment and adaptation planning. This activity began in October 2011, was concluded in December 2012 and was undertaken in three major phases:

1) Development of the toolkit: In this first phase various participatory research tools were collected from both SEI and ENDA research libraries. These were reviewed to identify their utility within the V&A process and written up to produce a first draft of the toolkit.

2) Testing and refinement of toolkit: The second phase was to test the tools in a pilot case study in Gambia. Two main research partners within Gambia were identified, namely the National Environmental Agency (NEA) and The Agency for the Development of Women and Children (ADWAC). Other local organisations working on environmental issues in Gambia were also involved in the testing. Two pilot communities in the Greater Banjul Area were selected. Researchers first participated in hands-on training to learn about the tools before commencing with the research activities. After the exercises were completed and the data collected in the pilot communities, the tools were refined based on feedback from the field.

3) Stakeholders' workshop: The third phase involved engaging researchers and adaptation practitioners working with local communities in a workshop to integrate their inputs into the toolkit. A 3-day workshop was conducted where participants were taken through each step of the toolkit in hands-on exercises. Feedback on each tool was given and tools were further refined to make them more user-friendly.

When used in combination, the tools in this toolkit help conduct a climate change vulnerability assessment and develop adaptation strategies based on current capacities. Specifically, researchers are able to: identify current capacities, skills and assets in a project site, understand climate related events in the past and coping strategies used as well as current climatic/environmental hazards that shape vulnerability; and on this basis facilitate a multi-stakeholder process for developing locally suitable adaptation strategies. Also documented in this kit are the research experiences and lessons learned during the testing and refinement process.

INTRODUCTION

Climate change vulnerability assessment and adaptation planning (V&A) is gaining attention in least developed countries where many people, infrastructures and ecosystems are exposed or highly sensitive to variability and long-term changes in the climate and have low capacity to cope, respond or recover from related impacts. This interest is creating a need for knowledge, skills and tools to support V&A. While several tools for V&A have been developed, these tools are not readily available, especially for local organisations and research individuals in these countries, and there is a need to contextualize and tailor them to local needs. The use of tailored participatory tools ensures exchange of knowledge on climate variability between researchers and local people and this contributes much to making adaptation plans and choices.

In many cases in Africa, responses of local communities to the impacts of extreme climatic events have mostly been reactive instead of proactive due to their unpreparedness. Adequate preparations for these extreme events can be informed by research at all levels. For this reason, through a joint collaboration between ENDA, SEI and local partners in Gambia, a toolkit for V&A has been co-developed, tested and refined for its use by local practitioners in developing countries. The toolkit also contains examples of tool application in Gambia. This joint initiative is supported by UNITAR through the C3D+ project.

The table below presents an outline of the tools. These tools were selected on the basis of their ability to guide researchers and practitioners in the implementation of a participatory climate vulnerability assessment that can inform adaptation choices at the community level. When used in combination, the tools in this toolkit help to examine the differentiated exposure of a social group, resource or activity in the community to impacts of increased climatic variability or extreme events, as well as the local current adaptive capacity in the community. More so, results generated through the application of these tools could inform policy makers to take adaptation decisions at the local level. Each tool in the toolkit could be used as a stand-alone tool, but we recommend using them in combination to fulfil different needs in the assessment and planning process. Ideally, these tools could be used in the sequence in which they are presented in this guide. This order allows gaining a systematic understanding of a study area, its vulnerability to climate variability and extreme events through to the identification of adaptation options. However, users may make a selection of the tools based on their study objectives. Table 1 below presents an outline of these tools and their expected outputs.

Table 1: Outline of Tools

DESCRIPTION OF TOOLS	OUTPUT
Resource mapping: This tool helps to identify or set boundaries to the area you will assess and maps out available biophysical resources and their spatial distribution. It generates discussions around issues like land tenure, resource allocation and management, use and benefits obtained from the resources, and relationships between the different resources. It provides a good basis for discussing what generates climate vulnerabilities and/or the capacity to adapt.	A map showing the study area, available resources and their geographical distribution, and identification of key factors that shape the relationships between the social actors and the biophysical resources in the site.
Capacity mapping: This tool identifies various capacities, skills and assets in community / stakeholder group / project site that could be further strengthened and built upon for future adaptation.	A graphic overview of available capacities, skills and assets on site.
Trend analysis and historical disturbance matrix: This tool helps to identify climate-related events that have affected the area in the past, either positively or negatively, as a basis for understanding current vulnerability.	A timeline and a table showing and describing past events/disturbances at the site, consequences and coping strategies.
Current vulnerability mapping: This tool helps to establish the degree and range of impacts of different climate hazards on resources, livelihoods and social groups.	A picture showing the main climatic hazards affecting the project site and who/what is affected to what degree of severity.
Climate change perceptions: This tool assesses the community's perception of climate change. It helps to bring out and make explicit what local people view as being the drivers and consequences of climate variability and change.	A narrative of varying views on the dynamics of the climate change phenomenon so that these can be further discussed, debated and compared with available scientific data.

DESCRIPTION OF TOOLS	OUTPUT
Participatory scenario building: This tool aids community members to plan for the future and make adaptation decisions based on their past experiences, current capacity and available assets, and the vision and goals they have for the future.	A consensus view on possible adaptation options drawing on historical experience and current capacity but with an explicit focus on how things might develop into the future.
The Adaptation Decision explorer (ADx): ADx is a decision support tool to screen adaptation options. Users are able to access several methods to select the most appropriate and widely preferable adaptation options for their site.	A subset of identified adaptation options that can be prioritised for implementation because they satisfy multiple criteria and preferences.

The next sections of this handbook provide a full description of each tool using the following structure: a brief overview of the tool; the specific objectives the tool is designed for; the outcomes that can be expected from using the tool; what steps or activities required to implement tool; the resources and facilities needed to use the tool; an estimation of how much time is required; and the output results generated from applying the tool.

1. RESOURCE MAPPING

1.1 BRIEF DESCRIPTION

This participatory exercise is conducted in mixed or stratified groups (e.g., separate groups of men and women or separate groups of different age or income ranges) to collectively construct an overview or map of the biophysical resources available in the project location. The exercise is interactive and requires the participation of representative stakeholders that will draw the resources on a flipchart or use alternative materials to develop the map. Participants define the visualization of the biophysical resources. Facilitation requires explaining in very clear terms the steps and purpose of the mapping exercise. Once the maps are ready, facilitation is required to encourage discussion and analysis using the maps. This activity takes about one hour.

1.2 SPECIFIC OBJECTIVES

The exercise helps to identify the boundaries of the area to be assessed or project site, the different resources in the site and their spatial distribution. It can also be used to generate group discussions around issues like land tenure, resource allocation and management, use and benefits obtained from the resources and relationships between the different resources. This in turn helps to identify how sensitive people are to different climate hazards/stressors and what they have at their disposal for adapting to new conditions.

1.3 EXPECTED OUTCOMES

- Shared understanding among the participants about the resources in the site and their geographical location
- Clear boundaries of the case study set
- Identification of key factors (i.e. institutional settings, customary rights and agreements, regulations, livelihoods, conflicts, etc.) that shape the relationships between the social actors and the biophysical resources in the site.

1.4 ACTIVITIES

Step 1: Creating a map

Figure 1: Making a community map - Gambia

In groups, construct a map illustrating the main natural and physical resources of the site. You can use a flipchart and/or other materials to represent the different resources and their spatial distribution in the map. This exercise encourages effective participation and participants are able to make as many corrections as they need to. After an agreement has been reached on a first sketch as a good representation of the project site, participant representatives can then transfer it on a clean flip chart. Figure 1 and 2 show examples of resource maps.

Step 2: Discussion

In the same groups, discuss formal land use tenure and customary rights based on the map (consider different ethnic, religious and livelihoods groups in the discussion). Some questions that you can use to guide the discussion are:

1. Who has access to which areas?

2. Who does not benefit from customary rights to access resources in the area and why? (Indicate restrictions/barriers).

3. What property rights apply in the area?

4. What resources are managed under a legal contract? By whom?

5. What regulations apply on what areas?

6. What livelihoods depend on what resources?

7. What conflicts are there on natural resources?

Figure 2: A resource map of Ebo Town community, Banjul – Gambia.

Step 3: Use and benefits analysis

Working in the same groups, discuss how participants use the resources mapped and how they benefit from them. Use the following questions as a guide:

1. What resources in the map are used to satisfy your needs (resources that benefit you)? List the resources and the satisfied needs using a table on a flipchart (Remember needs can be direct and indirect).

2. Describe the resource in terms of abundance, seasonality (if natural resources) and/ or functionality (if physical resources). Add this to the table where you listed the resources (see example below).

3. How do you use the resources? Add the different uses to the table (see example below). Use stones to define how much of each resource you allocate to the different uses (consider only direct uses, not indirect uses that can be generated by selling or trading the resources).

Table 2: Example of direct resource uses

Resources	Abundance*	Accessibility **	Seasonality/ Functionality	Direct and Indirect Benefits***				
				Eat	Sell	Construc-tion	Health care	Mobility

*Abundance: 1 very rare, 2 few, 3 some, 4 abundant, 5 very abundant
**Accessibility: 1 difficult to access, 2 relatively easy to access, 3 very easy to access
***Note: The participants list the direct and indirect benefits; the ones provided in the table above are only examples.

Figure 3: An example of a resource mapping output

1.5 RESOURCES/FACILITIES
The equipment / resources needed for this exercise are:
- Flipcharts
- Markers of different colours
- Post-it notes
- Stones (100 for each group)
- Notebooks to take notes of the discussions

1.6 EXPECTED OUTPUT
The final products of this exercise are maps and tables drawn on flipcharts, as well as a synthesis of the discussions.

2. CAPACITY AND ASSET MAPPING

2.1 BRIEF DESCRIPTION

This exercise uses a potential-oriented approach in that, instead of focusing on the problems, gaps or issues affecting the site, it focuses on the capacities and positive potential that already exist. This approach is more likely going to create a positive mind-set and empower people for their own development 'from the inside out', rather than adopting a victim mentality and relying on intervention by government, international NGOs or others. In this exercise, stakeholders look to the past for where they did well before, narrating stories of success. Then they analyse the present to map assets. Facilitation is important as to build the right environment for people to feel encouraged to share stories about their skills, capacities and assets. This activity takes about an hour and a half.

2.2 SPECIFIC OBJECTIVES

The purpose of this exercise is to build a shared understanding of the existing capacities and assets in the site as a way to build on these capacities for future adaptation. Using a potential-oriented approach instead of a problem-oriented approach creates the positive environment for the stakeholders to be empowered and committed to the design and implementation of their adaptation and development strategies, and enables communities to be more strategic, considered and targeted about requesting or accepting assistance from others.

2.3 EXPECTED OUTCOMES

- Better understanding of the capacities and skills that exist in the neighbourhood / community / project area
- Identification of assets that can serve as a basis to build adaptive capacity
- Better understanding of the formal and informal organisations in the local area, their collaborations and level of activity

2.4 ACTIVITIES

Step 1: Successful stories

In groups, ask participants to think about successful stories or events in the past and add them to a chronological line. Once they finish, facilitate a discussion around the following questions:
1. What makes it a success story?
2. For whom was it successful?
3. Who contributed to it and how?

Step 2: Formal and informal organisations

- Using post-it notes, ask participants to identify the different associations/ organisations/ institutions in the local area that play a role in the management of the resources identified in the first activity or/and in the decision-making or development planning activities at the project site.

These should include both formal and informal entities (e.g. a registered orphanage, a study group and a savings club). On a flipchart, place the organisations according to how they interact with each other and show the linkages/ interactions with arrows. The ones that interact a lot should be placed close to each other on the page, and the organisations with fewer interactions should be placed more distant from each other (see an example in figure 4)
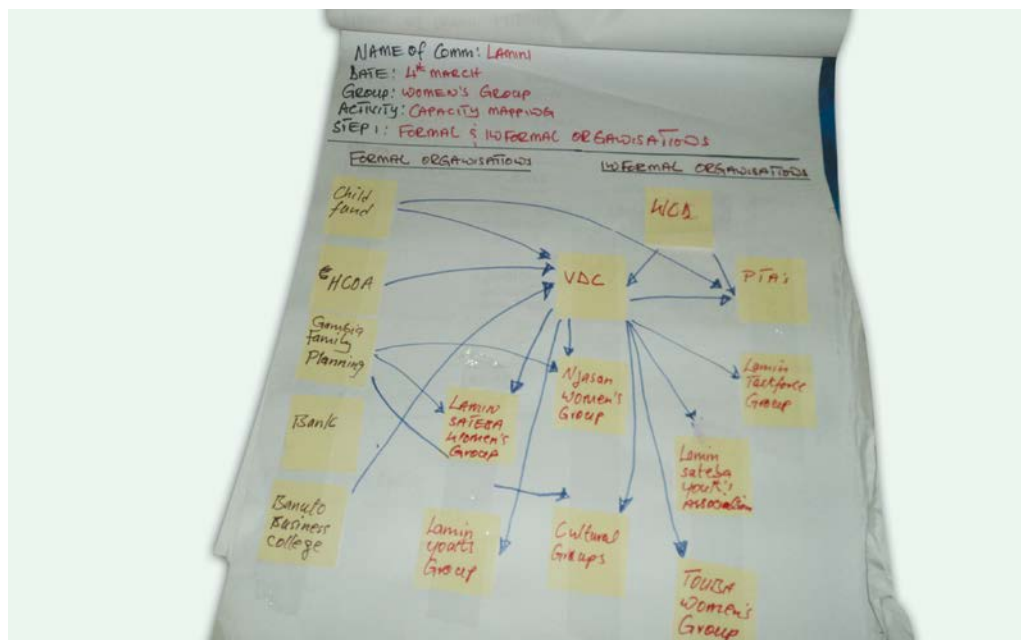
Figure 4: Example of institutional mapping (Lamin community - Gambia)

STEP 3: ASSET MAPPING

- Once the organisations are placed, ask participants to record how long they have been in operation/active in the community or project site on the same post-it notes.
- Now create a table with 3 columns and record the full names organisations, their date of operation in the area, their goals and main assets. An example of this is represented in Figure 5. You can use the Sustainable Livelihoods Framework (see Box 1 for more information) as guidance to add assets under each capital (i.e. social, human, natural, physical and financial). In the description of assets, suggest participants to account also for intangible factors such as innovation and flexibility[1].

NB: As an optional activity, the researcher may further explore outside the group activities of the organisations conducted in the past year. This would help assess how active these organisations are and synergistic/conflicting missions.

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[1] Prompting may be needed to ensure participants talk about intangible assets.

Box 1: Sustainable livelihood Framework

Human Resources: This refers to skills and knowledge, capacity, and good health important to the pursuit of lives. Examples are education, traditional knowledge, weaving skills, agricultural skills/training, skills on animal husbandry, cottage, industry skills/training, health care skills/training, veterinary skills etc.

Natural Resources: The natural resources upon which people depend for both direct and indirect benefits. Examples are trees. Land, clean air, fish, forest products for (fuel, building, income, food, medicine), land, productive oil, sea coral reefs, sand rocks, Mangrove forests, Wetland systems etc.

Financial Resources: the stocks and flows of money that allow people to achieve their livelihood objectives examples: Cash, savings, Jewelry, pensions, remittances, access to markets, credit systems, Insurance, liquid assets (livestock) loans pensions etc.

Social Resources: Highlights on formal and informal of social relationships and institutions from which people draw in pursuit of their livelihood. Examples are church groups, farmer associations, political organizations, local community-based organization, local/ national/regional NGO, regional/ national government institutions, religious groups and trade associations etc.

Physical Resources: Refers to basic infrastructure and productive capital for energy, transport, communications, water management, buildings and communications. Examples are, roads, water tanks, machines, agricultural implements, airport/ landing sites, Bicycles/ rickshaws, bridges, boats, cars/ trucks, computers, rainwater harvesting systems, roads, waste disposal systems, water delivery systems, water sanitation facilities, wells, etc.

Source: CRiSTAL users' Manual [2]

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[2] http://www.iisd.org/cristaltool/documents/cristal-manual-english-aug2010.pdf

Figure 5: An output of institutional mapping. Stakeholders' workshop -Gambia

2.5 RESOURCES/FACILITIES

The facilities needed for this exercise are:
- Flipcharts
- Markers of different colours
- Post-it notes
- Notebooks to take notes of the discussions

2.6 EXPECTED OUTPUT

The final products of this exercise are stories of success and maps drawn on flipcharts, as well as a synthesis of the discussions.

3. TREND ANALYSIS AND HISTORICAL DISTURBANCE PROFILE

3.1 BRIEF DESCRIPTION

This exercise is implemented with a group of community representatives who have lived in study the area for at least 5 years. It requires good facilitation to ask questions that help explore the disturbance dynamics in the past and coping mechanisms as a basis to understand current vulnerability. This activity may require two hours to be completed.

3.2 SPECIFIC OBJECTIVES

The objectives of this exercise are mainly to explore and identify events that have shaped the development of the site in the past (going back 3 to 4 decades) and the coping strategies that were implemented to overcome the negative impacts of these events. This will help in understanding the dynamics that influence current vulnerability.

3.3 EXPECTED OUTCOMES

- Better understanding of the issues/ events/ disturbances that have affected the site in the past decades (including climate-related disturbances)
- Identification of coping strategies that were used by different actors (individuals, households, businesses and organisations)
- Better understanding of the current vulnerability of those in the project area
- Enhance knowledge sharing by helping young people gain knowledge of historical events and build on their past (social memory)

3.4 ACTIVITIES

Step 1: Historical disturbance analysis

Discuss the events/ disturbances that have affected the site over the past decades. These events can be social, political, economic, ecological, technological changes, etc. Represent them in a historical profile or timeline. When possible, add the year for each important event. If an event lasts for a period of time, add a line to mark this period. Example of disturbance profile is shown below in figure 6.

Figure 6: An example of a historical disturbance matrix, stakeholders' workshop, Banjul-Gambia

Step 2: Resource trend analysis

Discuss and describe the changes (both quality and quantity) in key biophysical resources at the site over the past decades using the table shown below. First identify and list key resources based on outcomes of the resource mapping exercise, then discuss trends using a decade as a baseline (e.g. 1970s). You can use stones to populate the table or participants may decide to directly give percentage scores to indicate the changes of the resources in each decade in relation to the baseline. Percentages represent the amount of resource in relation to the baseline. The researcher may access

Figure 7: Making a historical disturbance profile, stakeholders workshop, Banjul- Gambia

available scientific information in order to compare local perceptions of change with observed trends; this is especially helpful where there are disagreements within the group.

Table 3: Example of table for showing trend descriptions

	1970s	1980s	1990s	2000s	2010s	2020s
Primary forest area						
Cropland						
Road						
Housing						
Water						
Population						

Once percentages are added to the table, you can use the scores to draw the trend lines of the resources over time, see for example the case of Gambia illustrated in figure 8[3]. Discuss in the group the changes for each resource, the main drivers of change and the consequences. Ask about some of the responses or reactions they had to overcome the effects of these changes (i.e. what did they do to recover from negative effects or how did they use the opportunity of positive effects). The graph is a visual way to recognize some trends that may be related, which is interesting to explore and discuss in more depth with the participants. Finally, discuss possible future scenarios for the 2020s and add a percentage to the table and the graph. In the discussion, try to capture why participants envisage the future the way they do.

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[3] The researcher may perform this activity outside the group complementing the field data with available scientific ones.
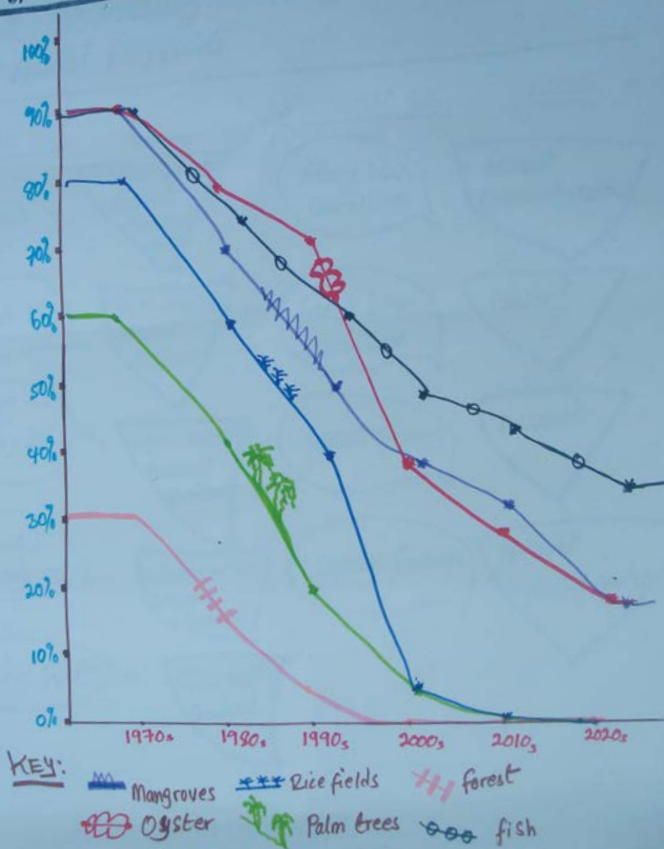
Figure 8: An example of a plotted trend analysis, Ebo Town community - Gambia

Step 3: Climate-related disturbance analysis

Focus only on the climate-related disturbances identified in the profile and list them in a separate table. If there are additional climate-related disturbances add them to the list. Describe each climate-related disturbance as shown in figure 9.

1. Is the disturbance a singular event (i.e. a shock) or a continuous event (i.e. gradual change)?
2. With what frequency does it happen?
3. Has the disturbance become more frequent, more severe and/or more widespread over time and how?

Figure 9: Example of climate related disturbance description (Lamin Community- Gambia)

Step 4: Coping strategies

1. Identify and describe the coping strategies that were used in response to the most frequent or most severe climate-related disturbances. Add these descriptions to a table

2. Encourage participants to discuss the effectiveness of these coping mechanisms and the reasons why they worked or did not work, add the explanations to the table

3. Discuss whether coping strategies used in the past were sustainable or not.

4. Explore who was involved in implementing the coping strategies and explain if these actors still play an important role today.

5. Allow participants to discuss if past coping strategies could be used in present day.

6. Take notes of reasons why some coping strategies would still work in current years while others do not. An example is shown in Figure 10.

Figure 10: Evaluation of coping strategies (Lamin Community - Gambia)

3.5 RESOURCES/FACILITIES

The facilities needed for this exercise are:
- Flipcharts
- Markers of different colours
- Post-it notes
- Stones/ pebbles for scoring
- Notebooks to take notes of the discussions

3.6 EXPECTED OUTPUT

The final products of this exercise are diagrams and tables drawn on flipcharts, as well as a synthesis of the discussions.

4. CURRENT VULNERABILITY MAPPING

4.1 BRIEF DESCRIPTION

In order to assess how climate change might impact certain livelihoods resources and social groups it is necessary to establish the level of exposure of these to relevant climate hazards that impact the area. This participatory exercise is conducted in stratified or mixed groups and helps understand current vulnerability by discussing how different climatic disturbances affect resources and social groups in the project site differently. Facilitation is needed to guide the exercises and also to encourage discussion and analysis of the results obtained. This activity may require an hour and a half to complete.

4.2 SPECIFIC OBJECTIVES

A vulnerability-exposure matrix can be used to gain a broad overview of which livelihoods/ resources/ social groups are most vulnerable to different types of climatic hazards and the degree to which livelihood activities are impacted by different climate hazards. This analysis focuses on current vulnerability and serves as a basis to explore future scenarios of vulnerability.

4.3 EXPECTED OUTCOMES
- Better understanding of current vulnerability in the site
- Shared knowledge on differentiated vulnerability
- Better understanding of the main climatic hazards affecting the site

4.4 ACTIVITIES

Step 1: List exposure units in the case study
List the main resources, and social groups in the site on post-it notes (use outputs of tools 1 and 2). These will be exposure units and will be added as the rows of the matrix below.

Step 2: List the present climatic hazards (or opportunities) that affect exposure units
List the current climatic hazards in the case study using post-it notes. The identified climate hazards are filled in the columns of the matrix below. Be careful of separating the continuum of weather and climate into distinct hazards (e.g. episodes of drought over a year or more are separated from shorter dry spells during the year).

Step 3: Vulnerability Exposure Matrix
How vulnerable is each exposure unit to each climatic hazard (i.e. how significant is the impact of the climate hazard on the exposure unit)? By ranking hazards to their level of impact one is able to prioritise the key climate hazard(s) to address. By assessing how different groups and resources are affected by climate-related disturbances differently one is able to explore differentiated vulnerability and identify the most vulnerable. To assess the level of impact hazards may have on each exposure unit you can agree on different categories. For example, you could use a scale of 1-3, 3=high impact; 2=medium impact; 1=low impact, O= no impact, N/A= non-applicable

Table 4: Example of a table for vulnerability-exposure matrix

	Droughts	Floods	Sea-level rise	Strong winds	Dryspells	Intense rainfall
Key resources						
Forest						
Cash crops						
Subsistance farmers						
Religions associations						
Road network						

Figure 11: Example of Vulnerability-Exposure matrix: Impacts of hazards on major livelihood resources (Lamin community- Greater Banjul, Gambia).

Step 4: Outcome of exposure and hazard

In most cases, the initial values provide a rough estimation. However, if the matrix is to be used analytically, it is necessary to:

- Specify what are the consequences or outcomes of the identified vulnerabilities. How large is the area affected?
- How many people or households are affected?
- Are there particular socio-economic groups (e.g. women, the elderly) who are dependent on the most vulnerable resource?
- How long is the unit exposed to a hazard and what are the implications?
- What contribution does this livelihood make to the household wellbeing?

Most commonly, an analysis of the outcomes may refine the ranking given to hazards.

Step 5: Discussion

- What does the matrix reveal about who is vulnerable?
- What are the gaps in knowledge?
- This exercise has focused on vulnerability to climate-related hazards, however there are many other factors influencing vulnerability. In your opinion is climate variability and change a major stress in your case study or are other stresses (political, social, economic, etc.) more important? But remember many of these stresses and impacts are actually inter-connected so don't be too quick to exclude any from your planning.
- When prioritising action, what happens when two livelihoods have the same score?
- Can indicators of vulnerability be developed using the matrix? Would this be generic to the matrix or specific to key livelihoods and threats?

4.5 RESOURCES/FACILITIES

The facilities needed for this exercise are:

- Flipcharts
- Markers of different colours
- Post-it notes
- Notebooks to take notes of the discussions

4.6 EXPECTED OUTPUT

The final products of this exercise are diagrams and tables drawn on flipcharts, as well as a synthesis of the discussions.

5. CLIMATE CHANGE PERCEPTIONS

5.1 BRIEF DESCRIPTION

This activity is to assess communities' perceptions of climate change identifying the influential factors as well as its related current and future consequences. This activity is organized in a form of group discussions with a total number of participants between 10 and 15. It can be organized at both the community and institutional levels.

At the community level, it is appropriate to have participants from different livelihood groups (farmers, fishermen, oyster collectors etc). Participants can be selected by community leaders and the activity may be conducted with men's and women's groups separately to identify gender differences. This tool can also be used to assess the perceptions of local government and national service providers in the community such as agricultural extension agents, meteorological service and veterinary officers. This exercise can be completed in an hour.

5.2 SPECIFIC OBJECTIVES

- This activity is to help local people explore their own understanding of climate change dynamics and those of others, identifying the multiple influential factors and consequences in the context of the site.

5.3 EXPECTED OUTCOMES

- Participants develop a shared knowledge of the dynamics of the climate change phenomenon, i.e. understand the multiple causes , local contributing factors and the consequences.[4]

5.4 ACTIVITIES

1. Discuss briefly with participants what they think climate change is and identify what it is called in their local language.
2. Allow them to sketch an object that represents climate change or write climate change (in their local language if possible) on a post-it note and paste at central point on a flip chart.
3. Allow participants to identify some factors they perceive to be the causes and influential factors of climate change. Each factor should be written on post-it notes and pasted on the same flip chart but on left-side of the central post-it note from step 2 (with the inscription of climate change).
4. Allow participants to show the linkages between the causal or influential factors with arrows.
5. Identify the consequences of climate change and write each on a post-it note and paste all on the right side of the central post-it. The color of the post-it notes for the consequences should be a different from that of the causes.
6. Again separate negative consequences from positive consequences by using different colors of the post-it notes.
7. Rearrange these consequences showing linkages between them by drawing arrows. Example of this output is shown in figure 12.

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[4] expected responses should be what participants percieve to the causes or contributing factors and not necessarily what is scientifically proven.

Figure 12: Assessing climate change perceptions in EBO town. The Gambia

Figure 13: A map of climate change perceptions
(from researchers training in The Gambia)

5.5 RESOURCES/ FACILITIES

- Post-it notes of four different colours (each for the climate change inscription, causes, positive and negative consequences)
- Pens/makers
- Large sheet of paper or a flipchart
- A note book and pen to take notes

5.6 EXPECTED OUTPUTS

- The tool produces a pictorial map of local perceptions on climate change outlining its causes and consequences and showing which of these factors are related / connected.

6. PARTICIPATORY SCENARIO BUIDLING AND BACK-CASTING

6.1 BRIEF DESCRIPTION

This tool allows participants to make adaptation plans based on their current capacities and assets (tool 2), the climate disturbances they are facing (tool 3), their current vulnerability (tool 4) and perceptions of climate change (tool 5). Participants are led through a brainstorming exercise to develop road maps/ adaptation alternatives towards the desired state of the community in the future. Participants may need an hour and a half to complete this activity.

6.2 SPECIFIC OBJECTIVES

- To enable community members to develop adaptation action plans for future (climatic) events building on their current capacities.

6.3 EXPECTED OUTCOMES

- Build a shared understanding of the community and its capacities in relation to climate hazards and other stresses.
- Build a common vision of a desired future and a shared plan to achieve this future based on current capacities and possible future changes in climate.

6.4 ACTIVITIES

1. Allow participants to discuss and agree among themselves how far they would like to plan into the future (year 2020, 2030, other).

2. Draw two diagonal lines to cross each other on a large sheet of paper dividing it to four parts.
3. Ask participants to represent the current capacities and assets on one part using the results from tool 2 as a basis.

4. Allow participants to sketch impacts of present climate hazards and other stresses on their lives on the second part (use results from tools 3 and 5 as a reference).

5. Ask participants to sketch how they perceive climate change in the future and ask them to represent this in the third part (tool 4). This step could also be informed by additional climate data and information if available (see for example what observed data and downscaled climate projections are available from the Climate Information Portal for your area: http://cip.csag.uct.ac.za).

6. Considering these challenges, ask participants to envision positive things they can do in their community in the future based on their capacities as indicated in step 3 above and considering possible future changes in climate. Represent this in fourth part of the diagonal line. This can, but does not need to, build on the existing capacities.

7. Discuss what is needed to build adaptive capacity[5] and achieve this fourth scenario. This brainstorm can result in the design of an action plan that includes all the alternatives or actions suggested to achieve this future scenario. For each alternative prepare a short description that includes: purpose, scope, time frame, and measures of success. Remember some activities (e.g. upgrading a road, establishing a co-operative) might require registration with, assistance or permission from government agencies, so make sure to identify what other role-players need to be contacted in order to implement parts of the plan.

6.5 RESOURCES/ FACILITIES
- Flipcharts
- Pens and makers
- Straight edge / ruler

6.6 EXPECTED OUTPUT
- A pictorial presentation of the current state of the community, which can easily be communicated to government authorities, donor agencies and non-governmental organizations for actions.
- A shared future scenario constructed collectively.
- Documented action plans with several adaptation options to achieve a desirable future. Example of output shown in figure 14.
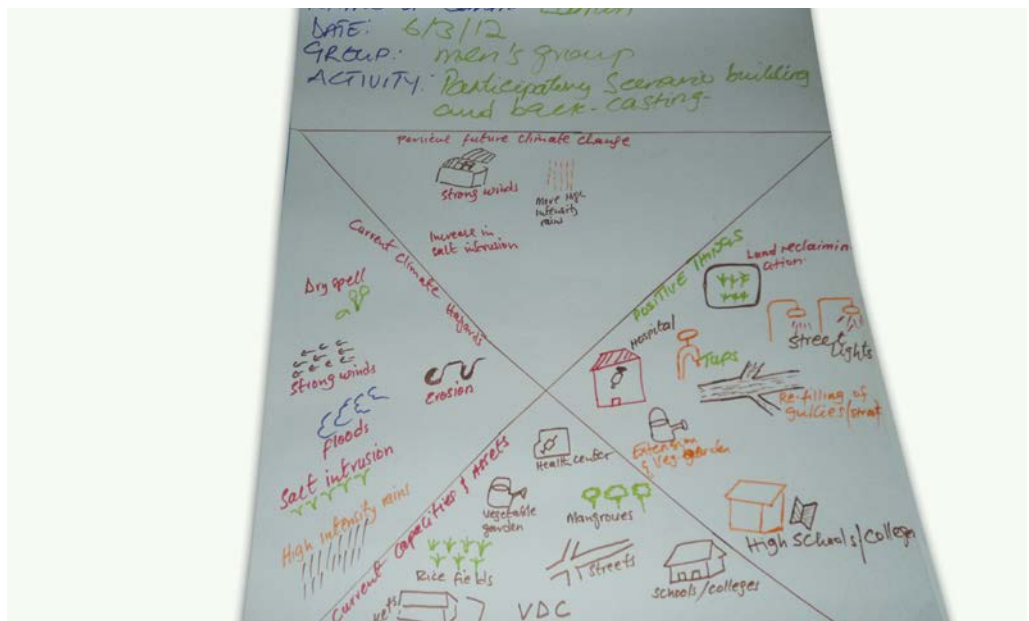

Figure 14: Example of output on participatory scenario building and back casting (Lamin Community- Gambia)

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[5] Attention is needed to ensure that, responses are actions which lead to building adaptive capacity and not just needed social amenities in the community..

7. ADAPTATION SCREENING

7.1 BRIEF DESCRIPTION

Adaptation screening to select the most appropriate and preferable options from a set of adaptation options can be challenging due to conflicting views about the problem and uncertainty about possible future outcomes. The Adaptation Decision explorer (ADx) is a computer-based tool. It was conceived as a decision support tool to screen adaptation options. The philosophy of the ADx is there is no one-size-fits-all method to analyse everything, hence it does not rely on only one approach to select the most appropriate adaptation options for a specific place or set of people. Currently, two methods are already developed under the ADx prototype, which helps to compare the results obtained from each method. The first method is a voting exercise that can be applied in groups. The second method is a type of multi-criteria assessment that can be applied individually or in groups. Running this tool with the two methods may take about 2 hours accounting for the time participants need to select adaptation options based on the results (scores). The prototype tool can be downloaded here:
http://weadapt.org/knowledge-base/adaptation-decision-making/adaptation-decision-explorer.

7.2 SPECIFIC OBJECTIVES

- Select the most appropriate and preferable adaptation options from a wide set of possible adaptation options identified with tool 6.

7.3 EXPECTED OUTCOMES

- Better understanding of the adaptation options that can be prioritised for implementation in the project area.
- Better understanding of the need to use more than one method to screen adaptation options.

7.4 ACTIVITIES

Method 1: Voting
Step 1

Once you have downloaded the tool (see link in the description above) you will see that the ADx 'shell' has two methods: 'Voting' and the 'Analytic Hierarchy Process' (AHP). These options should be left ticked (as it is by default) and the OK button should be pressed to start the first method, which is Voting as represented in the screenshot below:
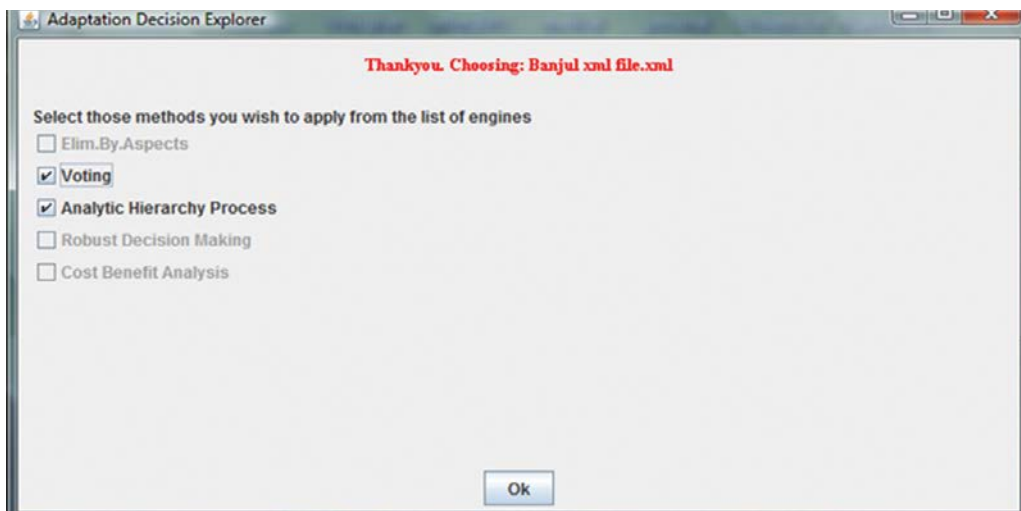
Figure 15: Two methods within the ADx shell

Step 2

The voting screen allows the user to input his/her/their preferences for what adaptation options they would like to see implemented. Votes are applied by selecting from the drop-down box (shown in the screen shot below and clicking the 'Vote' button in the top part of the screen.
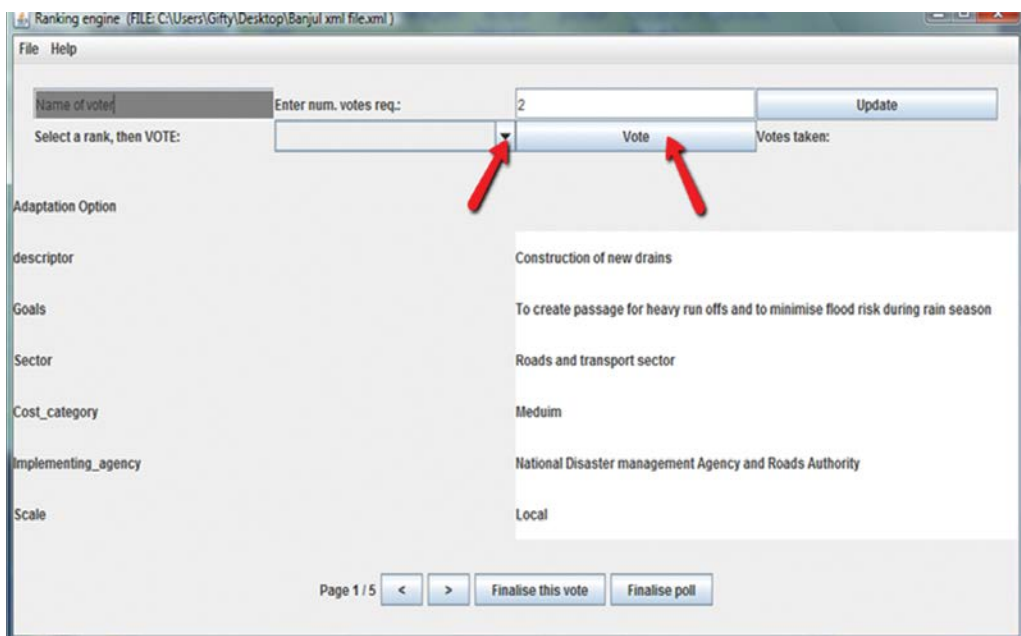
Figure 16: Voting Screen: left arrow shows the "drop-down box" and right arrow points to the "vote button".

The set of options can be assessed using the "adaptation options browser" that shows the different options and their characteristics in the central part of the screen. The browser is navigated using the arrow buttons in the bottom panel of the screen. Figure 17 is a screen shot of the "adaptation options browser"
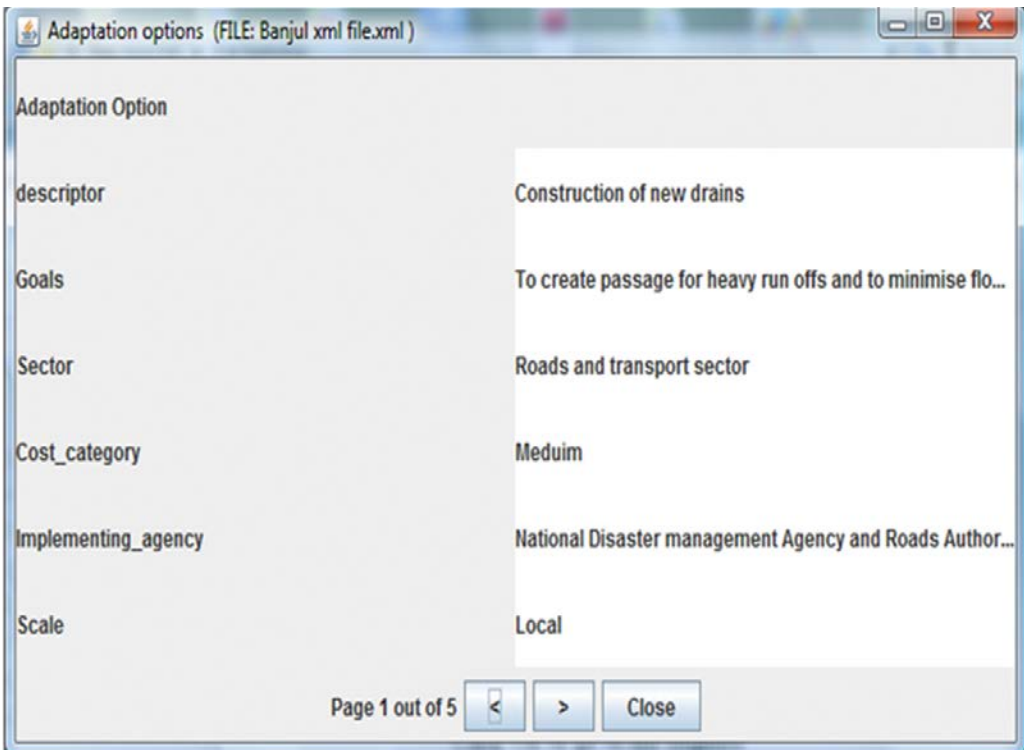
Figure 17: Screen shot of the adaptation options browser

Step 3

The name of the voter is shown in the top left corner of the voting 'card'. To make the process of browsing options and voting easier any votes already taken are listed on the top right hand side (Votes taken: see figure 18). Votes can be applied in any order and can be changed at any time by reselecting from the drop down list.

Figure 18: Voting Card- Left arrow points to name of Voter and right arrow shows votes already taken.

Step 4

Both the name of the voter and the number of votes that each voter is allowed can be changed from their default values. The 'Update' button registers the changes, as does the 'Finalise this vote' button.

Step 5

The screenshot below shows a change in the appearance of the drop down box when the parameter 'number of votes required' has been modified by the first voter.
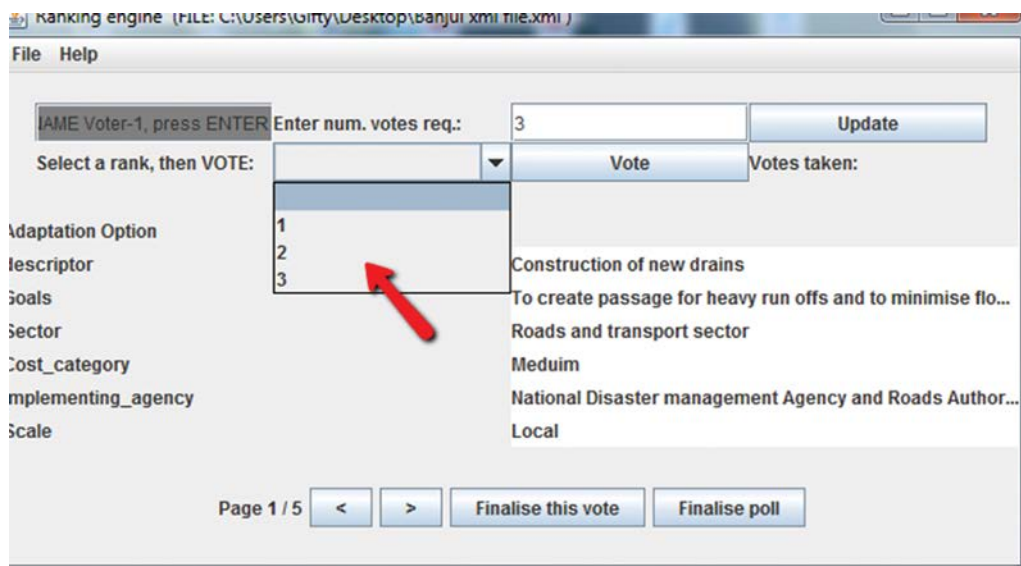
Figure 19: Change in the "drop-down box" when the number of votes required is changed

Step 6
When the current voter has finished entering information, the vote card can be finalised and registered with the voting engine by clicking 'Finalise this vote' (see figure 20).

Step 7
Each participant / group of participants follows the same sequence of steps. The screen shot below shows the final voter (voter-3) ready to register the vote card. The final voter can click directly on the 'finalise poll' button.

Figure 20: Finalise poll by clicking on the "finalise poll" button.

Step 8

The results screen gives a view of detailed information on the data held by the voting engine. This takes the form of a table including the adaptation option information read from the XML input file (the first six columns in the table) and collected and computed by the engine (the remaining four columns). The latter set includes total 'points' by combining the votes of each voter. It includes the 'score', which is the total points divided by the number of voters. It includes the 'rank', which is the highest to lowest ordering of scores – in the example below 'construction of concrete structures' is ranked first (number 1).

descriptor	Goals	Sector	Cost_category	Implementing_a..	Scale	score	rank	voter	points
Construction of new drains	To create passage for heavy run offs	Roads and transport sector	Meduim	National Disaster management Agency and	Local	2.25	3	Gifty, Andy, Nana	9
Cleaning of existing drains	To create passage for heavy run offs	Municipal Authority	Low	Banjul City Council/ community	Local	2.5	2	Gifty, Andy, Nana	10
Consruction of concrete structures	To reduce infrastructural collapse during	Private/Housing sector	High	Banjul City Council	Local	2.75	1	Gifty, Andy, Nana	11
Halt encroachment on wetlands	To protect wetlands and mangroves	Forestry/Environm sector	Low	National Environment Agency	Local and cross scale	1.75	5	Gifty, Andy, Nana	7
Provision of treated water to community	To reduce water salinity and also to control water	Water sector	High	National Water and Electricty company	Local and cross scale	2.0	4	Gifty, Andy, Nana	8

No. preferred options 3 Ok

Figure 21: The voting results screen

Step 9

There is a scroll bar on the right-hand side that allows the user to view all the options. It is convenient to order them by rank by clicking on the column name. In the case shown below, there are two options tying for second place with identical scores – as a consequence there is no third-placed option. There is a text field for 'No. preferred options' that will determine the number of options that are carried forward into a combined results screen. It is possible to change this parameter from its default value. Click the 'Ok' button to continue.

Data collected during participatory session

descriptor	Goals	Sector	Cost_category	Implementing_...	Scale	score	rank	voter	points
Construction of new drains	To create passage for heavy run offs	Roads and transport sector	Meduim	National Disaster management	Local	2.5	1	Type NAME Voter-1, press ENTER, Andy	5
Cleaning of existing drains	To create passage for heavy run offs	Municipal Authority	Low	Banjul City Council/ community	Local	1.5	2	Type NAME Voter-1, press ENTER, Andy	3
Consruction of concrete structures	To reduce infrastractural collapse during	Private/Housing sector	High	Banjul City Council	Local	1.5	2	Andy	3
Halt encroachment on wetlands	To protect wetlands and mangroves	Forestry/Environm sector	Low	National Environment Agency	Local and cross scale	0.0	n.a.		
Provision of treated water to community	To reduce water salinity and also to control water	Water sector	High	National Water and Electricty company	Local and cross scale	0.0	n.a.		

No. preferred options 3   Ok

Figure 22: An ADx result case where there are two options tying for a second position.

Method 2: Analytic Hierarchy Process
Step 1: Define the problem

- Define the main overall goal of the all adaptation options identified by the community (i.e. what do these options try to achieve?)

- Define the criteria and sub-criteria to use in the AHP evaluation (i.e. what attributes are you going to use to compare? which options are better than others) Criteria can be social, economic, or environmental in nature (e.g. social criteria: equitable benefits, pro-poor; environmental criteria: enhance natural buffer capacity of ecosystems, robust against different possible future climate projections; economic criteria: avoided housing loss, number of benefited people).

- The adaptation options identified by the communities to be evaluated by the tool have to be uploaded to the ADx as an XML file.

- Define the participants to involve in the process (same actors as in the voting method; these can be community representatives and local decision-makers, local practitioners, etc.)

Step 2: Structure

- The ADx sets up the hierarchy using the elements defined in Step 1: Goal on the top level, criteria in the intermediate level, set of options in the lowest level

Step 3: Pairwise comparison

- Using the sliders in the ADx, compare elements to one another, two at a time, with respect to their impact/ importance on an element above them in the hierarchy

- Use numerical values provided in the ADx to conduct the pairwise comparisons

- The ADx will construct a set of pair-wise comparison matrices to compare the options (alternatives) with respect to each criterion, and the criteria with respect to the goal. An example is shown in figure 23.
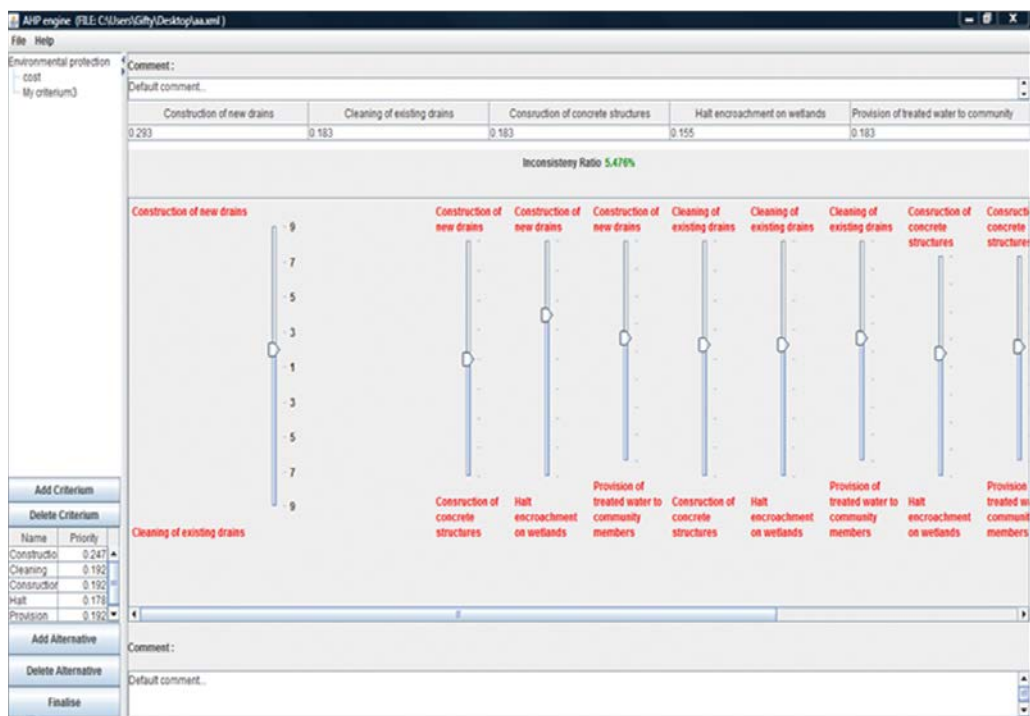
Figure 23: A pair-wise comparison of the AHP method
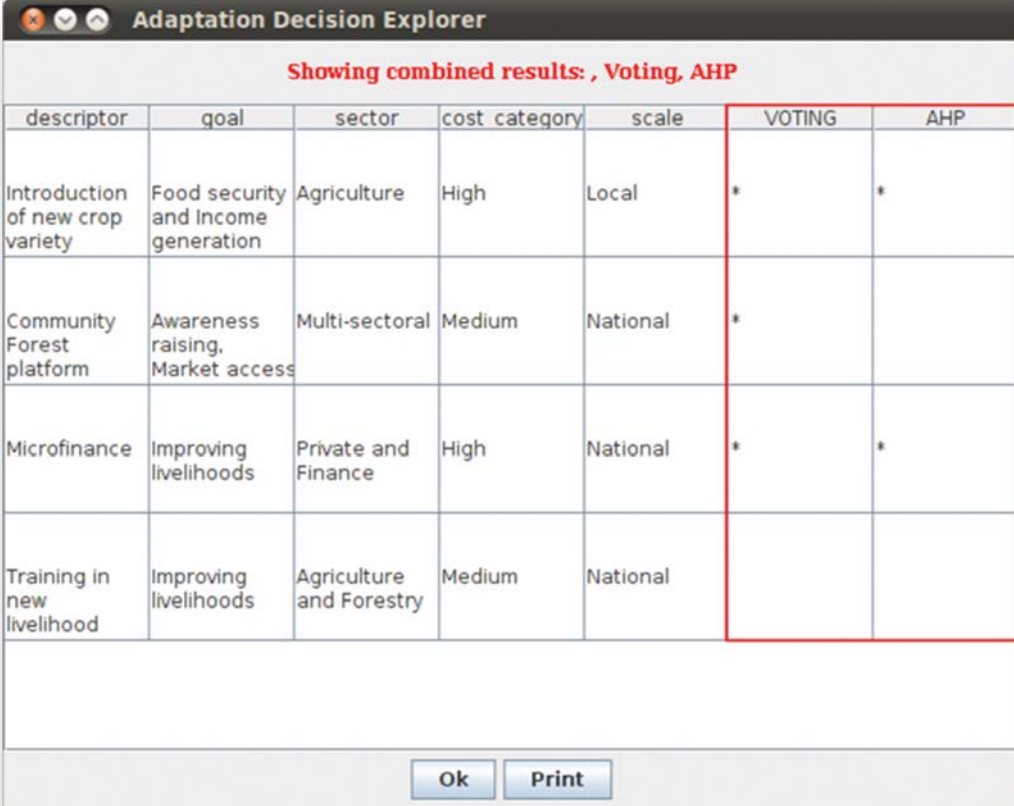
Step 4: Calculate relative priorities

- Values in step 3 are processed to obtain numerical priorities or weights given to the elements. Priorities are absolute numbers between zero and one, without units or dimensions. For example, a priority.200 for a criteria has twice the weight in reaching the goal as one criteria with priority .100

- Depending on the problem at hand, a priority or weight can refer to importance, or preference, or likelihood

Step 5: Aggregate priorities
- The ADx aggregates relative priorities to produce overall priorities (final evaluation metrics) which sum to 1.000.

Once you have completed both methods, the ADx presents the results in a comparison table (See Figure 24). This table serves as input to an informed discussion about the selection of appropriate adaptation options. More methods will be added to the ADx in the future to support this process.

descriptor	goal	sector	cost category	scale	VOTING	AHP
Introduction of new crop variety	Food security and Income generation	Agriculture	High	Local	*	*
Community Forest platform	Awareness raising, Market access	Multi-sectoral	Medium	National	*	
Microfinance	Improving livelihoods	Private and Finance	High	National	*	*
Training in new livelihood	Improving livelihoods	Agriculture and Forestry	Medium	National		

Figure 24 : ADx comparison table showing the results from the Greater Banjul case study in Gambia

7.5 RESOURCES/FACILITIES
The facilities needed for this exercise are:
- Flipcharts
- Laptops with tool installed
- Markers of different colours
- Notebooks to take notes of the discussions

7.6 EXPECTED OUTPUT
The final products of this exercise are a list of selected adaptation options, as well as a synthesis of the discussions.

8. LOCAL RESEARCH: GOOD PRACTICES

8.1 SYNOPSIS OF THE CASE STUDY

A case study was used to test and refine the toolkit. We focused on the Greater Banjul Area in Gambia, which located in the far west of Africa, on the Atlantic coast. The country shares all borders with Senegal, being almost entirely surrounded by Senegal, except for a small stretch of coastline. The Gambia's total land area is 11,300 km2 with 1,300 km2 covered with water (River Gambia). Lying along the Sahelian West Coast of Africa, it is located between latitudes 13° N and 14° N, and longitudes 13° W and 17° W. The country is exposed to three main climate threats. The first is sea-level rise, which leads to shoreline retreat and saline intrusion into soil, underground water and also the River Gambia. The second climate hazard is increasing temperatures contributing to heat stress, especially in the months of August, September and October. Thirdly, there is also erratic rainfall that is observed to be contributing to seasonal floods.

Two pilot communities within the Greater Banjul Area (GBA) were chosen for this case study, namely Lamin and Ebo town. These communities are exposed to almost all the above-mentioned hazards with the most serious one being seasonal flash floods resulting in the destruction of infrastructure and soil erosion.

The purpose of the study was to:

(1) Assess how vulnerable people are to these climate hazards and to identify appropriate adaptation strategies in response.

(2) Contribute to the enhancement of institutional capacities within the country to undertake climate vulnerability assessment and adaptation planning.

(3) Test the adaptation toolkit and refine it based on experiences of this study.

From the process of testing and refining the toolkit in the context of this case study, we identified some good practices for local research:

• Political collaboration and approval

Research activities started with a first field visit to engage stakeholders, identify local partners and to select pilot zones. Relevant stakeholders from different sectors (both national and sub-national) were engaged. Through these stakeholder engagements the study was introduced, highlighting the participatory tools to be used. Following this, the case study benefited from the collaboration of both government and non-governmental institutions. Apart from the institutional support, the collaboration also offered a chance of accessing relevant materials and data for the study. Also, the engagement of policy-makers throughout this case study created a potential avenue to influence policies with the research outcomes especially at the local level. One advantage, not to be overlooked, was the active engagement of these stakeholders in the refinement of the toolkit.

• Local institutional ownership and inclusiveness

Local partners were identified to lead the in-depth field research activities. This was very useful especially as the use of participatory tools needed lots of interactions and discussions with respondents. These local organisations are normally well equipped with personnel who are able to facilitate discussions in local languages to enhance good understanding among community members. In this study, our local partners were very instrumental in the selection of the two pilot sites and the introduction of the case study to local 'gate-keepers'. This was very helpful in preparing the community ahead of the research activities, enabling them to be ready for the discussions since participatory tools take much time and therefore the need to inform respondents well in advance.

Also the engagement of local partners promoted a good response to the study as members identified themselves with the leaders thereby assuming local ownership of the initiative.

• Local capacity building

Stakeholder capacities at both the institutional and community level were enhanced through the use of the toolkit. To ensure accurate application of the tools hands-on training was given to local partners. They were taken through a step-wise process of all the tools, which enabled them to be comfortable with using them. This also gave them some practical experience of the kind of responses to expect from respondents and how best to explain each subject of discussions in their local languages.

• Shared knowledge among community members

The use of these participatory tools encouraged knowledge sharing among participants throughout various discussion sessions. Some local knowledge on historical experiences was transferred from the elderly to the youth. It was inspiring seeing community members trying to identify a local name for climate change and identifying its influential factors and effects in their local dialect. These participatory tools also provided opportunities for researchers to share their scientific knowledge of climate dynamics with the local community. The knowledge acquired using these tools helped community members make informed adaptation plans when required to do so.

8.2 TOOLS APPLICATION: LESSONS LEARNED

- The step-by-step introduction and instructions to use each tool in this kit made it more comprehensible and easily applicable in the field with local community members. It gave researchers opportunities to initiate interesting discussions about how vulnerable the community is to the impacts of climate change, what the specific pathways are that lead to negative impacts and what can be done to reduce these.

- The tools are user-friendly and flexible, making them applicable to many climate change studies across different sectors at all levels. The advantage of this toolkit is that it has been tested in the field and refined on the basis of feedback from the users and participants.

- Through the application of these tools on a case study it has been realised that it is very important to follow ongoing discussions during the use of each tool. This is to ensure that all details of the discussions are well captured.

- It was identified that the assessment of community perceptions on climate change (tool 5) helps to unpack the local understandings of variations and changes in the climate but this does not necessarily arrive at the factors (causes and effects) that have been scientifically proven. In other words, the researcher should not expect local people to come up with climate change factors that are proven by hard science. However, the outcome of this activity does help to identify local knowledge that can be discussed further in relation to the available science and as a basis for identifying possible adaptation options.

- The ADx tool is very useful for decision makers (at all levels) especially in developing countries where there are limited resources for implementation of adaptation strategies so there is a need to screen and prioritise them. The ADx helps screening proposed adaptation options, which enables possible implementation of adaptation actions amidst limited resources. Applying the tool also helps to reduce the risk of mal-adaptation.

- Unlike the other tools mentioned in this toolkit, which entail applying different participatory exercises with community representatives, the ADx may require involving also local decision makers /community leaders in the process to enable many reflections to be made especially during voting sessions and the discussion of the results to inform adaptation decisions.

- Being computer-based, it becomes challenging to run the ADx in areas without access to computers, and it requires local researchers/ practitioners applying the tool to be computer literate and be familiar with the software running the tool before its implementation. It is therefore necessary to consider a hands-on approach to effectively train local researchers on the use the ADx tool; this makes it more comprehensible and appreciable by the trainees. It must be noted however that, a hands-on training of this tool requires much preparations of the trainees. It is important that each trainee have access to a computer with downloaded Java script software as this is needed to run the tool. Also, the adaptation options in the case study need to be readily documented in XML format.

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ANNEX I: GLOSSARY

Adaptation to climate change:
Refers to the adjustment in natural or human systems in response to actual climate stimuli or their effects, which moderates harm or exploits beneficial opportunities (IPCC, 2007).

Climate change:
"Climate change refers to a statistically significant variation in either the mean state of the climate or in its variability persisting for an extended period (typically decades or longer)". (IPCC, 2001). (http://www.ipcc.ch/pdf/glossary/tar-ipcc-terms-en.pdf)

Mal-adaptation:
Refers to "any changes in natural or human systems that inadvertently increase vulnerability to climatic stimuli; an adaptation that does not succeed in reducing vulnerability but increases it instead." (IPCC, 2001). (http://www.ipcc.ch/pdf/glossary/tar-ipcc-terms-en.pdf) .

Stratified groups:
By Stratified groups mention in this tool kit, we mean distributing actors in groups by age range or gender or different livelihood pratices. This allows identifying differences between these groups (e.g. how different groups respond to specific conditions).

Vulnerability to climate change:
According to IPCC (2001), vulnerability to climate change is the degree to which a system is susceptible to, or unable to cope with adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity and its adaptive capacity.