Session 4
Reviewing and appraising adaptation options
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Supporting LDCs to advance their National Adaptation Plans
Asia Regional Training Workshop
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D. Reporting, Monitoring and Review

1. Monitoring the NAP process
2. Reviewing the NAP process to assess progress, effectiveness and gaps
3. Iteratively updating the national adaptation plans
4. Outreach on the NAP process and reporting on progress and effectiveness

A. Laying the groundwork and addressing gaps

1. Initiating and launching of the NAP process
2. Stocktaking: identifying available information on climate change impacts, vulnerability and adaptation and assessing gaps and needs of the enabling environment for the NAP process
3. Addressing capacity gaps and weaknesses in undertaking the NAP process
4. Comprehensively and iteratively assessing development needs and climate vulnerabilities

C. Implementation Strategy

1. Prioritizing climate change adaptation in national planning
2. Developing a (long-term) national adaptation implementation strategy
3. Enhancing capacity for planning and implementing adaptation
4. Promoting coordination and synergy at the regional level and with other multilateral environmental agreements

B. Preparatory Elements

1. Analysing current climate and future climate change scenarios
2. Assessing climate vulnerabilities and identifying adaptation options at the sector, subnational, national and other appropriate levels
3. Reviewing and appraising adaptation options
4. Compiling and communicating national adaptation plans
5. Integrating climate change adaptation into national and subnational development and sectoral planning
Reviewing and appraising adaptation options

Issues that need to be addressed when reviewing and appraising adaptation options, with an indication of a standard tools and criteria involved in making decisions about selecting adaptation options.
At least 33 Ministers and their representatives witnessed the launch.
Framework for Water Security & Climate Resilient Development

Understand the problem
- Make the case for climate resilience (4.1)
- Gain stakeholder perspectives (4.2)
- Climate vulnerability and impact assessments to inform decision makers (4.3)

Identify and appraise options
- Identify opportunities for building resilience in ongoing development activities (5.1)
- Identify new and innovative investment opportunities (5.2)
- Sift ideas, assess robustness and make the economic case for a balanced portfolio of no/low regrets investments (5.3, 5.4, 5.5)

Monitor and move forward
- Learn lessons from application of the Framework (7.1)
- Set a monitoring and review process (7.2)

Deliver solutions
- Integrate no/low regrets investment strategies in development planning (6.1)
- Develop financing and investment strategies (6.2)
- Mainstream climate resilience in development planning (6.3)
OUTPUT

Balanced portfolio of adaptation options and measures for risk reduction to existing assets and planned projects / programmes.

Portfolio presents a strongly argued case for options using RDM to test resilience and economic appraisal techniques to ensure viability.
Identifying options to improve resilience of existing assets, ongoing or planned development activities

Screening tool for climate risks
Strategic Framework process – Phase 2

**TOOL – Screening tool for climate risks**

- **Screening for climate risks**
  - Generic approach can be applied across sectors and scales
  - Requires simple climate change scenarios
  - Risk reduction;
    - reduce uncertainty
    - do things differently
    - do different things
    - bear the risks

- **Examples for screening**;
  - Infrastructure development (e.g. energy, transport, agriculture), Water resources policies, projects and programmes
  - Urban planning policies and regulations
The Strategic Framework process – Phase 2

Stakeholder cross sector dialogue, partnerships to identify new opportunities for adaptation
Robust Decision Making (RDM)

Process for making decisions under uncertainty

Uses multiple scenarios of climate and development futures to ‘test’ performance of investment options (sensitivity analysis)

No/low regrets investment options prioritised over climate risky investments

Risk reduction measures promoted to deal with residual risks
Strategic Framework process – Phase 2

Make the case for priority options

✓ TOOLS – Benefit Cost Analysis (BCA), Cost Effectiveness (CE), Multi Criteria Analysis (MCA)

Economic appraisal techniques are key to make the case for investment

Estimating social and environmental costs is also important in ensuring decisions are equitable.

An ecosystems approach can highlight ecosystems services
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Tools for reviewing and appraising adaptation options
GENERAL APPRAISAL PROCESS FOR INVESTMENT UNDER UNCERTAINTY

General process for appraising adaptation investment options
1. Identify priority investment options
2. Select appropriate method to appraise adaptation investment options
3. Identify and measure investment returns and costs
4. Select robust adaptation investment option to implement
According to UNFCCC, decision making methods vary in terms of the objectivity of decision and the complexity of the problem.
Cost Benefit Analysis (CBA) is the most commonly used economic analysis for decision making due to its ‘simplicity’ in systematically comparing all the costs and benefits that are accrued from a project.
Cost Effectiveness Analysis (CEA) is an economic valuation to compare intervention options by comparing the gains to the costs of the intervention.

It is not meant to be a sole evaluation tool - widely used in assessing intervention in health sector.

In practice, CEA is often preferred when the benefits of investment project are difficult to measure in monetary terms.
Multi-criteria analysis (MCA) is useful when there are a number of criteria that need to be taken into account rather than the focus on a single criterion, such as CBA and CEA.

MCA can provide simple yet rich insight on key criteria and it can be graphically represented by mapping the distribution of the values of its criteria.

This simple graphic representation illustrate the trade-offs between different criteria.

MCA techniques in general consist of two stages:

1. Weighting
2. Scoring

A standard analysis of MCA includes a “Performance Matrix” or evaluation matrix.
Case of Bhutan NAPA

• 17 adaptation options
• Screened to 9 options
  – Level of risk and adverse effects
  – Cost effectiveness
  – risk @do nothing scenario
  – Contribution to social-economic development
• MCA applied
  – Human life saved
  – Arable land saved
  – Infrastructure saved
  – Project cost
• Prioritisation of options-top 2
  – Disaster management strategy
  – Artificial lowering of thorthomi glacier lake
Towards a water supplement for NAPs Guidelines
Primary focus is on Element B ....
GWP/UNICEF: TOWARDS STRATEGIC FRAMEWORK FOR WASH AND CLIMATE RESILIENT DEVELOPMENT

**FRAMEWORK OVERVIEW**

1. **UNDERSTAND THE PROBLEM**
   - Literature Review: CCA and WASH
   - Literature Reviews with focus on UNICEF WASH:
     - Literature Review: CCA – Opportunities for the WASH Sector and Support for UNICEF Programming
     - Literature Review: Evidence - Climate Change impact and adaptation approaches in the WASH Sector
   - Technical Brief explaining existent adaptation national programmes and strategies (i.e. NAPAs, National Communications to UNFCCC...)
   - Technical Brief to facilitate a stakeholder analysis
   - Technical Brief proposing how to approach and conduct “Impact and Vulnerability analysis” (At national and local level)

2. **IDENTIFY AND APPRAISE OPTIONS**
   - Technical Notes on innovation and best practice to CCA in WASH:
     - Water Quality
     - Water Quantity
     - Sanitation
     - Enabling Environments
   - Technical Note outlining screening principles of WASH Development Projects under the light of CCA
     - Annex with check list before implementation of WASH projects
     - Technical Note outlining a Robust Decision Making (RDM) tool – help identify what is the best option (technical or not)
   - Technical Note on climate adaptation funding streams

3. **DELIVER SOLUTIONS**
   - REAL IMPLEMENTATION OF CCA PROGRAMMES/PROJECTS
   - Technical Note to assist partners within the WASH sector to facilitate the incorporation of climate change adaptation within sectoral WASH strategies

4. **MONITOR AND MOVE FORWARD**
   - Lessons learned from the implementation of the framework
   - Case Studies based on successful stories that can support the framework’s implementation
   - Technical Note outlining monitoring indicators and review process to track implementation of no/low regret options

**CAPACITY DEVELOPMENT OF UNICEF’s STAFF AND PARTNERS**

- WASH Climate Change Core Module (Adapted for MENA, WCARO, ESARO, EAPRO, ROSA and TACRO)
- Drought Management Module
- Flood Management Module
CONCLUSION

- In developing investment options, it is important to be aware level of risk or uncertainty, sources of this risk and uncertainty.

- For initial adaptation investment, priority should be on early and robust options, while if possible also address low-regret, long-lead options and options that avoid locking-in future vulnerability.

- Robust decision making concept- take into account uncertainty by assessing its performance under a wide range of uncertainty scenarios or by incorporating sensitivity analysis.

- Fit for purpose-methods have their own advantages, shortcomings and resource requirement.

- In practice, methods not necessarily mutually exclusive, can be modified or used in conjunction. For example, CBA can be used together with MCA for non-monetary investment returns.
SUPPORT AVAILABLE

UNDP-GEF, GWP
ECONOMICS OF ADAPTATION TRAINING INITIATIVE FOR AFRICA
ADDITIONAL INFORMATION AND ECONOMIC TOOLS AND METHODS
Cost Benefit Analysis (CBA) is the most commonly used economic analysis for decision making due to its ‘simplicity’ in systematically comparing all the costs and benefits that are accrued from a project.

Steps in conducting CBA:
1. Specify adaptation investment options to be compared.
2. Define the lenses and scope of impacts.
   - The lenses are the perspective of the decision makers who value the benefits and costs. The construction of highway with or without toll pricing option, for example, can be a cost or a benefit (revenue) depending on whose lenses.
   - Ideally, the ‘lense’ to be used is of a “social welfare planner” who aims to maximise the net benefits of the society within the scope of analysis.
   - A clear boundary definition of impact scope will also enhance the effectiveness of CBA by focusing on a system boundary upon which the impacts are estimated.
3. **Classify and assess the benefits and the costs.**
   a. Determine measurement variables and quantify the impacts
   b. Determine valuation methods

   This step will draw on identification of returns and selection of valuation methods. It also requires defining a baseline upon which each investment option will be compared to. The baseline scenario is normally called “Do Nothing” scenario.

4. **Provide qualitative analysis of non-monetised impacts (optional).**

   This step is an optional step and normally not conducted in traditional CBA. However it is important for investment in public sector in which some key impacts cannot be monetised.

5. **Choose discount rate and calculate Net Present Value of investment options**

   The stream of future costs and benefits in a project occur in different years. To compare future benefits and costs in one project to those in other projects, these future costs and benefits need to be discounted relative to the present values in order to obtain their *present values*. 
5. Choose discount rate and calculate Net Present Value of investment options.

- *Discount rate*: the interest rate that is used to discount future costs and benefits of a project.
- *Net Present Value (NPV)*: the difference between the present values of future benefits and costs.

\[
NPV = \text{Present Values of Future Benefits} - \text{Present Values of Future Costs}
\]

- The choice of *discount rate* is the most contentious aspect of using CBA.
- In practice, the discount rates might refer to those interest rates suggested by the relevant financial institution, e.g. 10-12% for World Bank and AfDB;
- For nationally funded projects, the discount rates might be different to those funded by multilateral development banks.
6. **Perform sensitivity analysis.**
   - In conducting CBA, there is always some degree of uncertainty regarding the magnitude of impacts or the value assigned to each impact.
   - Sensitivity analysis is conducted to acknowledge this uncertainty and to inform decision makers of how and in what direction this uncertainty might affect the results on which alternative.
   - Sensitivity analysis can be done using three approaches and the three of them can be conducted in each CBA
     - Partial sensitivity analysis: it is conducted by varying one assumption at a time while holding the other assumptions constant.
     - Worst and best scenario assumption:
       As these two scenarios are probably the ones decision makers are most concerned about, sensitivity analysis of the two scenarios provide extreme values that decision makers can prepare themselves for before making the decision.
6. Perform sensitivity analysis.
   - Monte Carlo simulation: uses random probability distribution of key numerical values to see if it affect the results.
   - Calculate switching values of key parameters which values are not known with certainty. Switching values are the values of parameters that significantly change the results of CBA and the decision on which alternative yields highest net benefits.

7. Analyse the results and provide recommendation.
1. A project (adaptation option) is feasible if NPV > 0
2. Choose project (adaptation option) with the greatest net benefit or Net Present Value (NPV)

Notes:
• Another decision rule that is commonly used is Benefit Cost Ratio (BCR)
• BCR of a project should be greater than 1
• NPV criterion should take priority than BCR criterion as:
  • NPV focuses on the amount of net benefits rather than merely the ratio. This is in line with the objective of maximising net social benefit from the investments.
  • BCR is highly sensitive to how impacts are categorised as benefits or costs, while NPV does not face this problem.
## DECISION RULE - EXAMPLE

### Choosing among projects: NPV vs BCR

<table>
<thead>
<tr>
<th>Project</th>
<th>Costs ($ million)</th>
<th>Benefits ($ million)</th>
<th>NPV ($ million)</th>
<th>BCR ($ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do Nothing</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Project A</td>
<td>1</td>
<td>10</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Project B</td>
<td>10</td>
<td>30</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>Project C</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Project D</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>Project C &amp; D</td>
<td>7</td>
<td>21</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Project E</td>
<td>10</td>
<td>8</td>
<td>-2</td>
<td>0.8</td>
</tr>
</tbody>
</table>

TREATMENT OF UNCERTAINTY IN CBA

- Apart from using sensitivity analysis, the treatment to uncertainty in CBA can also be done by assessing how well each investment option work under a wide range of climate scenarios.

  - Four investment options ("scenario" in this case) were identified.
  - The results are as below.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Net Present Value in US$’000</th>
<th>Indirect use trends (Index)</th>
<th>Natural Capital in 30 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cost</td>
<td>Incremental tank benefits</td>
<td>Quantifiable net benefit</td>
</tr>
<tr>
<td>S1: Do nothing</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>S2: Raise spill</td>
<td>0.4</td>
<td>24.2</td>
<td>23.8</td>
</tr>
<tr>
<td>S3: Raise spill and rehabilitate</td>
<td>35.8</td>
<td>64.6</td>
<td>28.8</td>
</tr>
<tr>
<td>S4: Remove silt and rehabilitate tank reservation</td>
<td>62.8</td>
<td>120.7</td>
<td>57.9</td>
</tr>
</tbody>
</table>

Reference: Russi et al., 2010 (Reference #5)
Cost Effectiveness Analysis (CEA) is an economic valuation to compare intervention options by comparing the gains of objective (in appropriate unit) to the costs of the intervention.

It is not meant to be a sole evaluation tool and it is widely used in assessing intervention in health sector.

In practice, CEA is often preferred when the benefits of investment project are difficult to measure in monetary terms.

McKinsey developed Economics of Climate Adaptation that use CEA method to produce adaptation cost curve (ACC) for each unit of benefit. The ACC is considered a novel approach in which a single criterion of non-monetary benefit can be used to a wide range of different adaptation investments. Nevertheless, this approach also contains flaws as the single criterion might overlook a number of important impacts.
Example: Valuation of climate change impacts on human health

*Annual Cost per Case of Diarrhea Avoided with Water and Sanitation Programs 2000-2015 (US$, 2000)*

<table>
<thead>
<tr>
<th>Intervention Scenario</th>
<th>Annual Cost per Case Avoided (US$, 2000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halving proportion of people without access to improved water</td>
<td>11.52</td>
</tr>
<tr>
<td>Halving proportion of people without access to improved water and sanitation</td>
<td>20.71</td>
</tr>
<tr>
<td>Access for all to improved water and sanitation, with water disinfected</td>
<td>25.04</td>
</tr>
<tr>
<td>Access for all to regulated piped water and sewage connection at home</td>
<td>8.61</td>
</tr>
<tr>
<td>Access for all to regulated piped water and sewage connection at home</td>
<td>36.72</td>
</tr>
</tbody>
</table>

Source: based on cost estimates from Hutton and Haller [27].

Source: Markandya 2009 (Reference#6)
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CAVEATS

- This lecture is only an introductory material for participants to be aware of various investment appraisal methods. Further study on relevant references and/or training specific to each investment appraisal method is required before participants can conduct the method independently and sufficiently in order to meet their needs in investment appraisal.

- There is no one single bullet method for investment appraisal that works well regardless of the circumstances. It is important to be aware of the characteristics, requirement, advantages and shortcoming of each method in relevance to the contexts being evaluated.

- Clear definition of the scope of analysis is crucial for the identification and measurement of investment returns and costs.

- Stakeholders inputs and participation in the appraisal process is also important to define the goal of the appraisal and the criteria upon which investment options are evaluated.

- Trade-offs among investment options and the distribution of benefits and costs among stakeholders also need to be taken into account in the decision making.
WEB REFERENCES 1

- http://www.gwp.org/Global/Activities/News/November%202013/Third%20draft%20of%20the%20Water%20Supplement%2011%20November%202013%20pdf.pdf
REFERENCES (2)


REFERENCES (3)


