Global Climate Change Alliance
Support Facility

Module 7

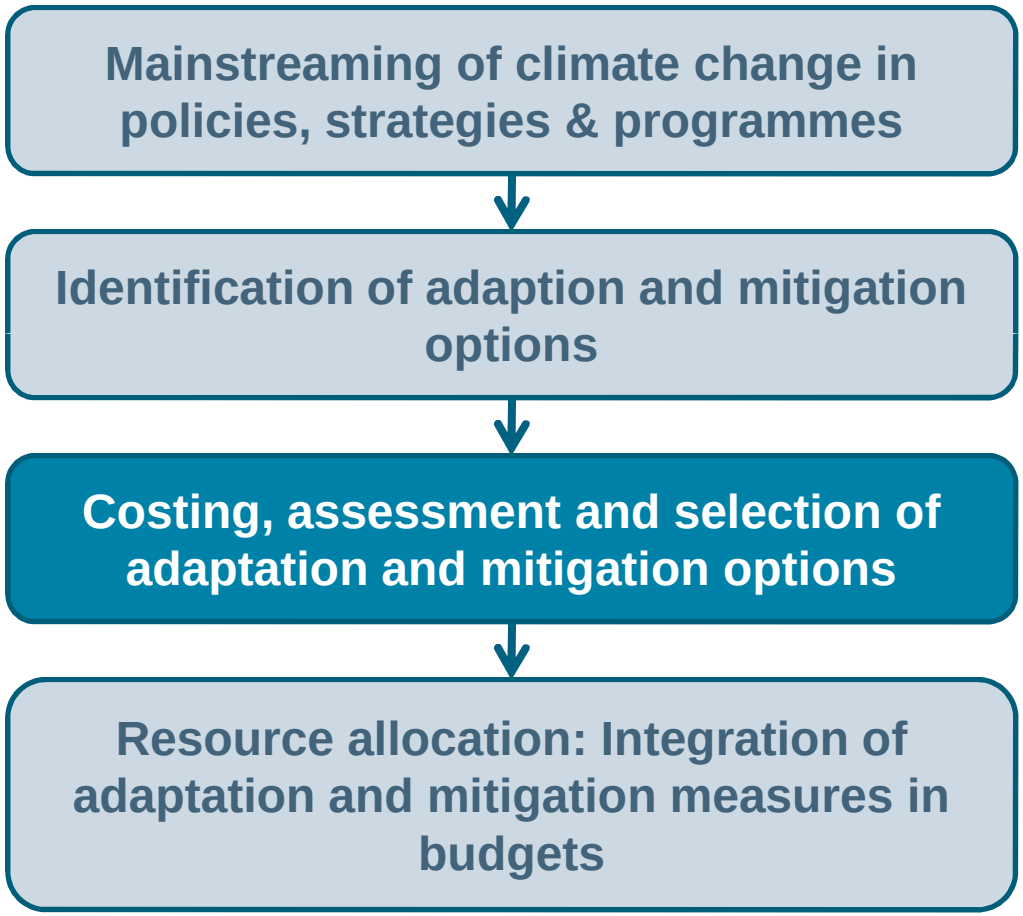
Costing, assessing & selecting adaptation & mitigation options & measures

Training workshops on
mainstreaming climate change

MWH

BUILDING A BETTER WORLD

Linking policy, costing and budgeting



Tools for costing and assessing adaptation and mitigation options

Cost-benefit analysis: identifying costs and benefits

Adaptation

Costs: extra costs incurred compared with the 'business-as-usual' scenario

Benefits: avoided damage and losses, extra developmental benefits compared with 'business-as-usual' scenario

Mitigation

Costs: extra costs incurred compared with 'business-as-usual' scenario, reduced economic growth opportunities

Benefits: cost savings, sales of carbon credits, positive environmental and related health/livelihoods outcomes (+ difficult to value: strategic and competitive advantages)

Can you think of some examples?

Cost-benefit analysis (1)

- Cost-benefit analysis (CBA):
  - Quantifies all the costs and benefits (*) of an intervention (with benefits including both 'positive' benefits and avoided losses) over the entire lifetime of the intervention
  - A 'discount rate' is applied to all costs and benefits to represent 'preference for the present' or simply the opportunity cost of capital -> calculation of 'present value'
    - The higher the discount rate, the smaller the present value
    - The further away in the future, the smaller the present value
    - Significant controversies over the 'right' discount rate for assessing long-term options

(*) Actually the 'incremental' costs and benefits, i.e. the difference in costs/benefits between a 'with intervention' and a 'no intervention' scenario

Cost-benefit analysis (2)

Outputs of cost-benefit analysis:

Cost-benefit ratio (CBR)	Ratio of costs to benefits calculated at their present value (the smaller, the better – should be <1)
Net present value (NPV)	Benefits minus costs calculated at their present value (the larger, the better)
Internal rate of return (IRR)	The discount rate at which NPV = 0 A measure of the 'benefit-generating power' of the option or intervention (the larger, the better)

Cost-effectiveness analysis (1)

- Cost-effectiveness analysis (CEA):
  - Costs are valued in monetary terms, and benefits (*) quantified in 'physical' units, over the entire lifetime of the intervention; a discount rate is applied to both
  - This allows calculating unit costs, as the ratio of total discounted costs to total discounted benefits obtained
  - The obtained unit costs support :
    - the comparison of several options
    - comparison with 'benchmark costs' for similar interventions, where available

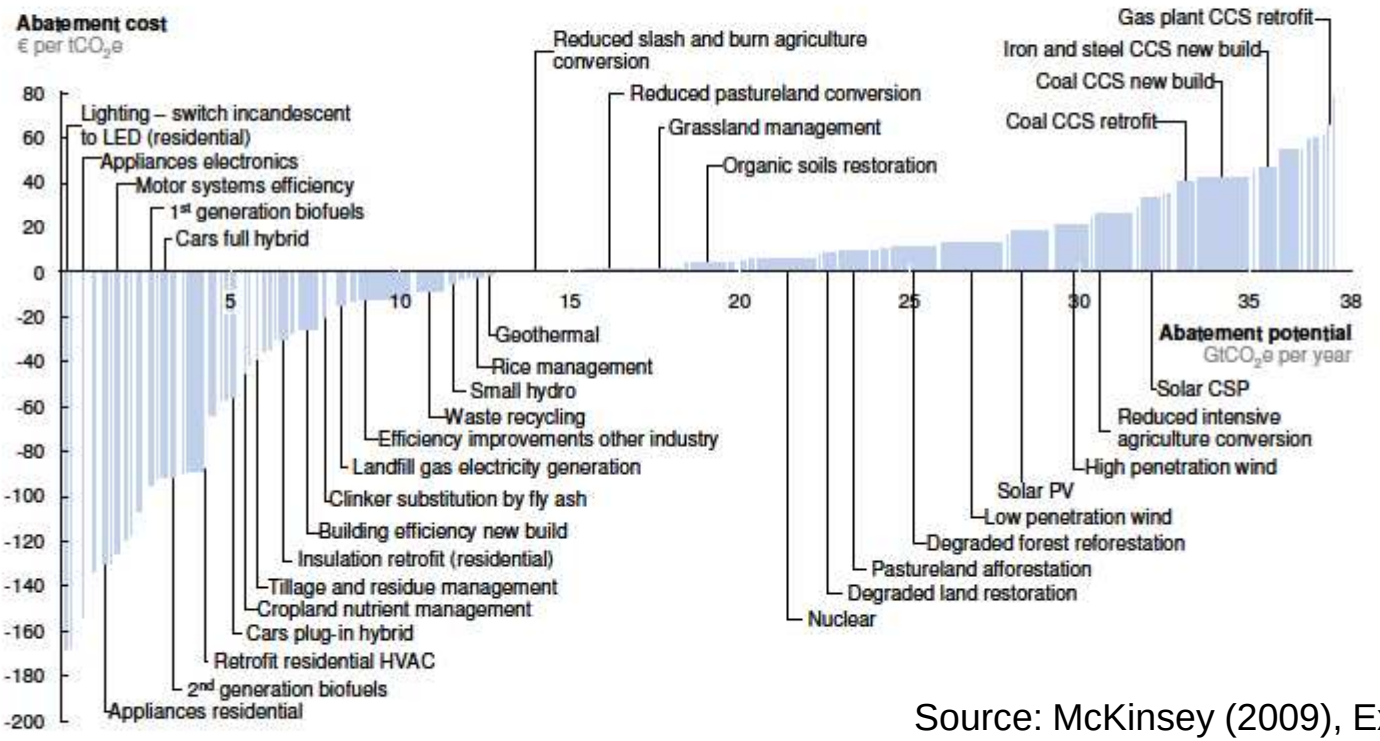
(*) As in cost-benefit analysis, 'incremental' rather than absolute costs and benefits should be taken into account

Cost-effectiveness analysis (2)

- Compared with CBA, CEA:
  - is suitable where it is difficult to assign a monetary value to benefits
  - but requires identifying a single, all-encompassing measure of benefits – which may be both difficult and reductive

Illustration of CEA: Global GHG abatement cost curve

Global GHG abatement cost curve beyond business-as-usual (v2.1) – 2030



Source: McKinsey (2009), Exhibit 8, p. 17

Note: The curve presents an estimate of the maximum potential of all technical GHG abatement measures below €80 per tCO_2e if each lever was pursued aggressively. It is not a forecast of what role different abatement measures and technologies will play.
Source: McKinsey & Company: The impact of the financial crisis on carbon economics – Version 2.1 of the Global Greenhouse Gas Abatement Cost Curve

Example: land-based mitigation options

Significant mitigation potential for developing countries

Typically cost-effective and requiring low upfront investment

Atmosphere

CO_2

CO_2
CH_4
N_2O

Forests	Peatlands	Grasslands	Cultivated systems
Net sink (tree biomass + soil organic matter)	Largest & most efficient terrestrial store of carbon biomass	Net carbon sink if not degraded	Both a sink and a source of GHGs, net balance depends on cultivation methods

Improved ecosystem management also supports adaptation

Financial and economic analysis

Basis for private sector decision making

- Both CBA and CEA support:
  - *financial analysis*: considers the 'monetary' costs and benefits (or equivalent) accruing to parties directly concerned by a project or programme, at their 'face value'
  - *economic analysis*: broadens the analysis to more accurately reflect costs and benefits to society

Basis for public sector decision making

Complementary tools

- For the assessment of robustness and the integration of uncertainty, CBA/CEA can be combined with:
  - the use of multiple scenarios (e.g. ‘no change’ scenario and various climate change and development scenarios)
  - sensitivity analysis (i.e. testing of the effect of changes in scenario assumptions on the CBR, NPV, IRR or unit costs)
  - risk analysis (-> risk probability analysis includes the probability of occurrence of various cost and benefit outcomes in calculations... assuming probabilities are known)

Tools for prioritising and selecting adaptation and mitigation measures

Supporting decision making

- CBA/CEA support the financial and economic assessment of adaptation/mitigation options
  - They help identify measures that offer the best 'value for money' – a key aspect in situations of budgetary constraints
- Other types of assessment and other criteria (e.g. technical, social, environmental) are required to fully inform decision makers

Multi-criteria analysis (MCA) helps integrate various criteria

Multi-criteria analysis (1)

- An approach to decision support that uses more than one criterion to assess performance and rank various options or interventions
- The term actually covers a wide range of methods
- Typically:
  - various options or interventions are assessed against a pre-determined set of criteria
  - qualitative ratings or quantitative scores are given
  - rules are then applied to rank options/interventions
    - Numerical scores can be added up to calculate a total score (with the possibility of applying different weights to different criteria)

Example of MCA grid: options for addressing water supply reduction

Polokwane, South Africa

Adaptation option	Effective-ness	Cost	Technical feasibility	Social & cultural feasibility	Speed
Water conservation & demand management (existing)	High	Low	High	High	High
Level of service (future)	High	Low	High	Low	Medium
Recycle (urban)	Medium	High	High	Medium	High
Reuse (mining)	Low	High	High	High	Medium
Reallocation of dam yield	Medium	High	High	Medium	High
Conjunctive use	Low	Low	High	High	Medium
Expand well fields	Low	Low	High	High	High
Build new dam	High	High	High	Medium	Low
Rainwater harvest	Low	Low	High	High	High

Source: USAID (2007), Exhibit 12, p. 18

Multi-criteria analysis (2)

- MCA is a useful complement to CBA/CEA
- Allows combining financial/economic criteria with technical, environmental and social ones
- It can be used on its own, or in combination with CBA/CEA:

MCA before CBA/CEA	Allows reducing the number of options to which CBA/CEA is applied
MCA after CBA/CEA	CBA/CEA helps eliminate financially or economically unviable options, then MCA allows for final selection based on extra criteria

Action planning

Turning words into action

Costing, assessing and selecting adaptation and mitigation options and measures

What can be done and what are the institutional and capacity needs in your organisation?

References

- McKinsey & Company (2009) *Pathways to a Low-Carbon Economy: Version 2 of the Global Greenhouse Gas Abatement Cost Curve*. Available from: http://www.mckinsey.com/globalGHGcostcurve
- USAID (2007) *Adapting to Climate Variability and Change: A guidance manual for development planning*. United States Agency for International Development, Washington, DC. Available from: http://pdf.usaid.gov/pdf_docs/PNADJ990.pdf