



Internalizing cross sectoral effects into cost-effectiveness adaptation analysis

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EUROPEAN CLIMATE CHANGE ADAPTATION CONFERENCE

Integrating climate into action

Hamburg 18-20 March 2013



Adaptation costing: In search of policy relevance

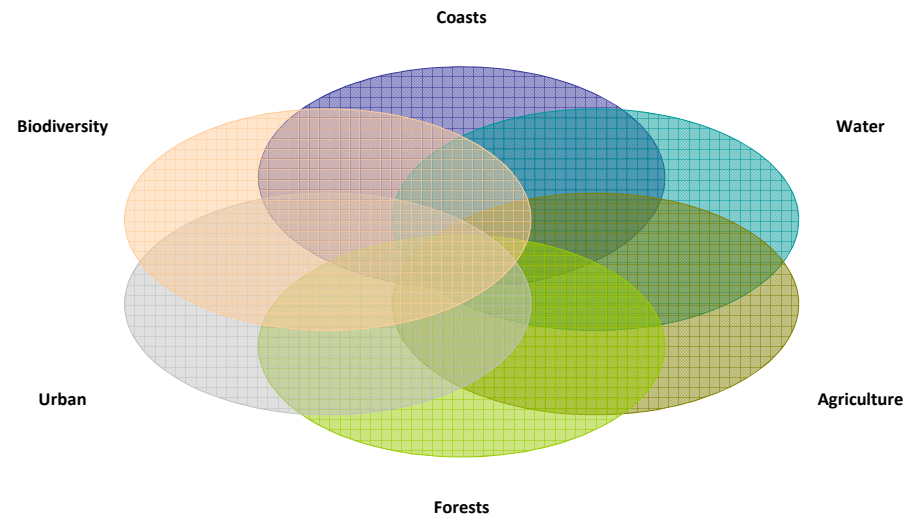
- Adaptation costs: Costs of planning, preparation, facilitation and implementation of adaptation measures, including transition costs (Source: IPCC)
 - Financial cost: The budgeted, historical or projected, investment expenditure within the budgetary framework of the adaptation strategy or intervention under consideration.
 - Economic cost: A wider concept that includes, besides out-of-pocket financial expenditure, an estimation of opportunity cost.
- Estimations based on macro-models exploiting top-down methods.
- Necessity for sectoral bottom-up analysis within decision making procedure.





The missing link: Cross-sectoral effects

- Existence of positive and negative auxiliary effects on (neighbouring) sectors from the implementation of adaptation measures, which are characterized by high investments.



Few attempts for the identification and quantification of these effects.

Cross-sectoral effects of adaptation measures are rarely taken into consideration during decision-making procedure and for the design of realistic adaptation plans.





Quantification of cross-sectoral effects

- Integration of cross-sectoral effects of adaptation measures as positive or negative externalities.
- Development of an approach based on the assumption of a direct relationship between effectiveness of an adaptation measure and its corresponding cost.
- Utilization of expert judgment method through the development of a specific protocol.





Expert judgment

- Expert judgment is expression of opinion that experts make in responding to problems, based on knowledge and experience at the time of response
- Expert judgment is used in order to:
 - structure a problem, e.g. to determine data and variables relevant for analysis, appropriate analytical methods, etc.
 - provide estimates, e.g. failure or incidence probabilities, forecast future events, etc.



Source: www.pinellascounty.org

Expert judgment is used in all kinds of technical fields, e.g. economics, engineering, risk assessment, decision sciences, etc.



Eliciting expert judgment

- Expert judgment can be elicited via:
 - Individual interviews
 - Interactive groups
- Various approaches for combining expert opinions are possible, e.g.
 - expert panels
 - deterministic and fuzzy Delphi techniques
 - cross-impact analysis
 - scenario analysis





Merits and problems

- **Pros**
 - Low cost, fast and easy approach.
 - Expert judgment does not require extensive data and elaborate statistical tools.
 - Several studies indicate high agreement between the expert estimates and the real numbers.
- **Cons**
 - It relies on judgment, hunch and intuition.
 - Structural biases, e.g. sensitivity of results to questionnaire ambiguities.
 - Motivational biases, e.g. expert has a stake in the study outcome
 - Cognitive biases, e.g. expert subconsciously bases his judgment on some previously given estimate (anchoring effect)



Source: www.lakeshorebranding.com



CrossAdapt



The CLIMSAVE project

Climate Change Integrated Assessment Methodology for Cross-Sectoral Adaptation and Vulnerability in Europe

Surname:	
Name:	
Expertise area:	
Organization:	
Email:	
Notes:	

CrossAdapt

An Expert-based Weighting Scheme for Assessing Cross-sectoral Impacts of Adaptation Measures



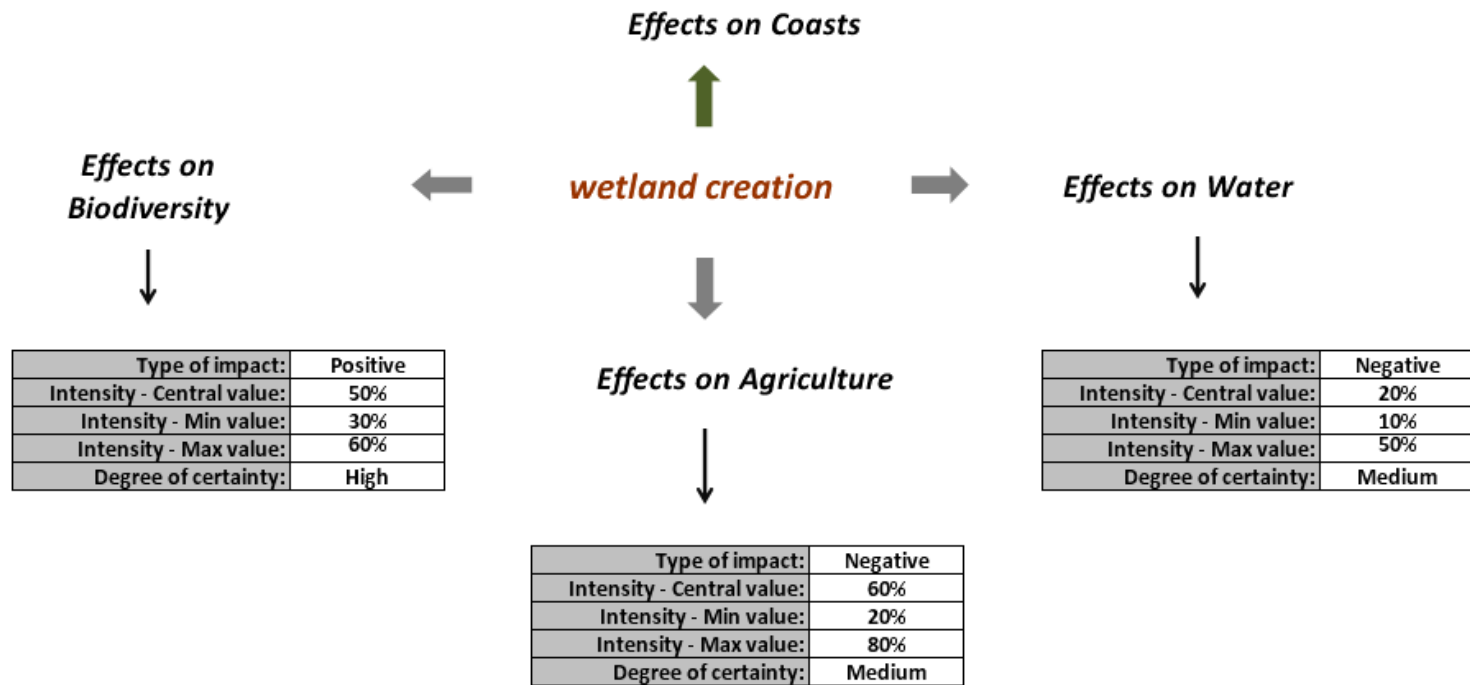
Methodology of CrossAdapt tool

- CrossAdapt consists of separate excel workbooks.
- Each workbook addresses a specific sector.
- Each worksheet within a workbook refers to a specific adaptation measure for this sector.
- For each adaptation measure (e.g. wetland creation) the possible cross-sectoral effects are given (e.g. on biodiversity, agriculture and water).
- For each cross-sectoral experts judgment on five topics is asked:
 - Type of impact [positive or negative]
 - Intensity - Central value [0% to 100%]
 - Intensity - Min value: [0% to 100%]
 - Intensity - Max value: [0% to 100%]
 - Degree of certainty: [very low to very high]



Example: Cross-sectoral effects of wetland creation

Wetland creation as adaptation measure to coasts and its cross-effects to sectors: Biodiversity, Agriculture & Water.



Definition of wetland creation

The current measure includes the creation of a wetland on a site location, which historically was not a wetland or is a wetland but the site will be converted to a wetland with a different hydrology, vegetation type, or function than naturally occurred on the site.

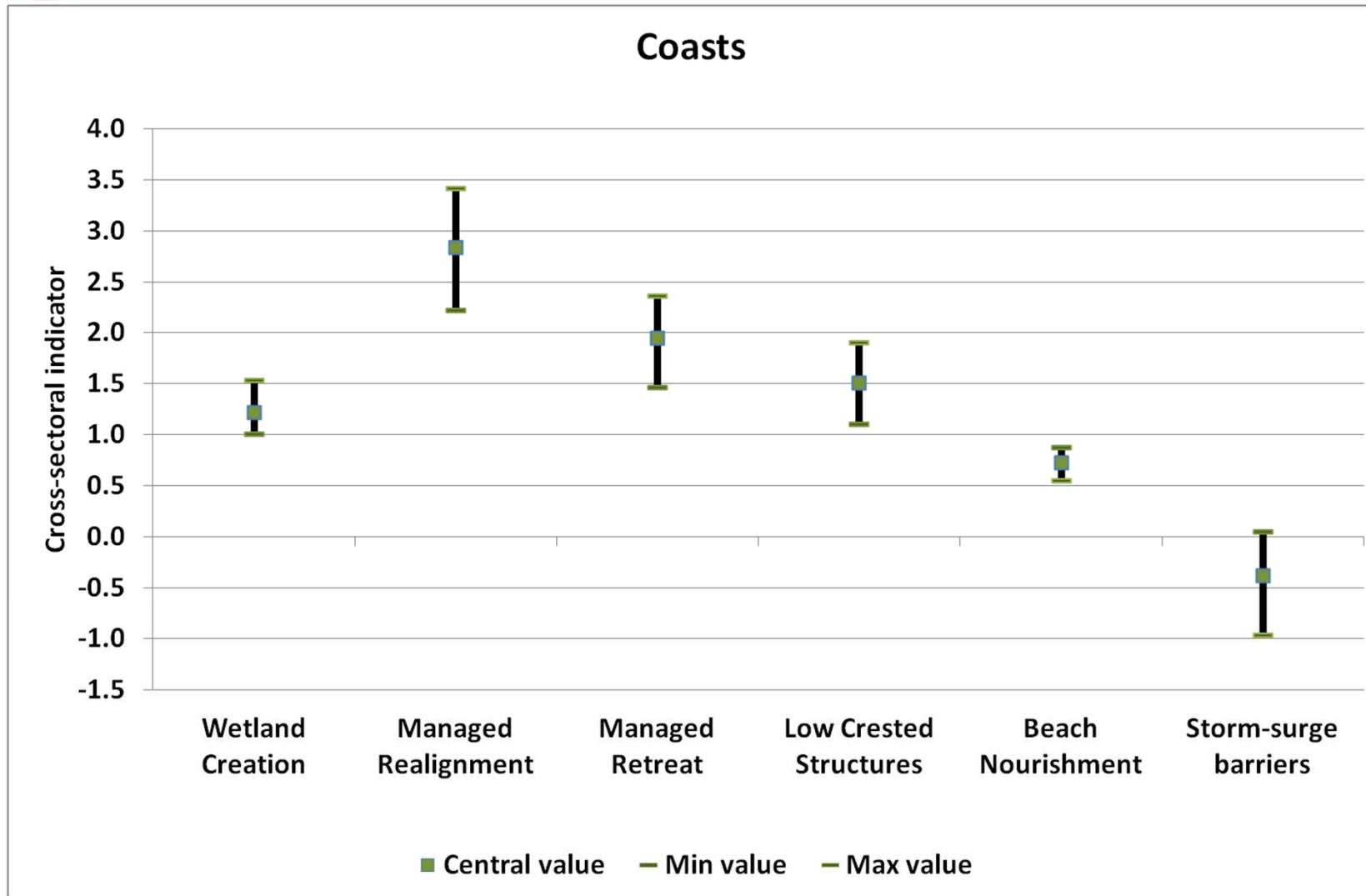


Data collection

- CrossAdapt has been developed and completed for the following sectors:
 - Coasts
 - Water
 - Forests
 - Urban
 - Agriculture
 - Biodiversity

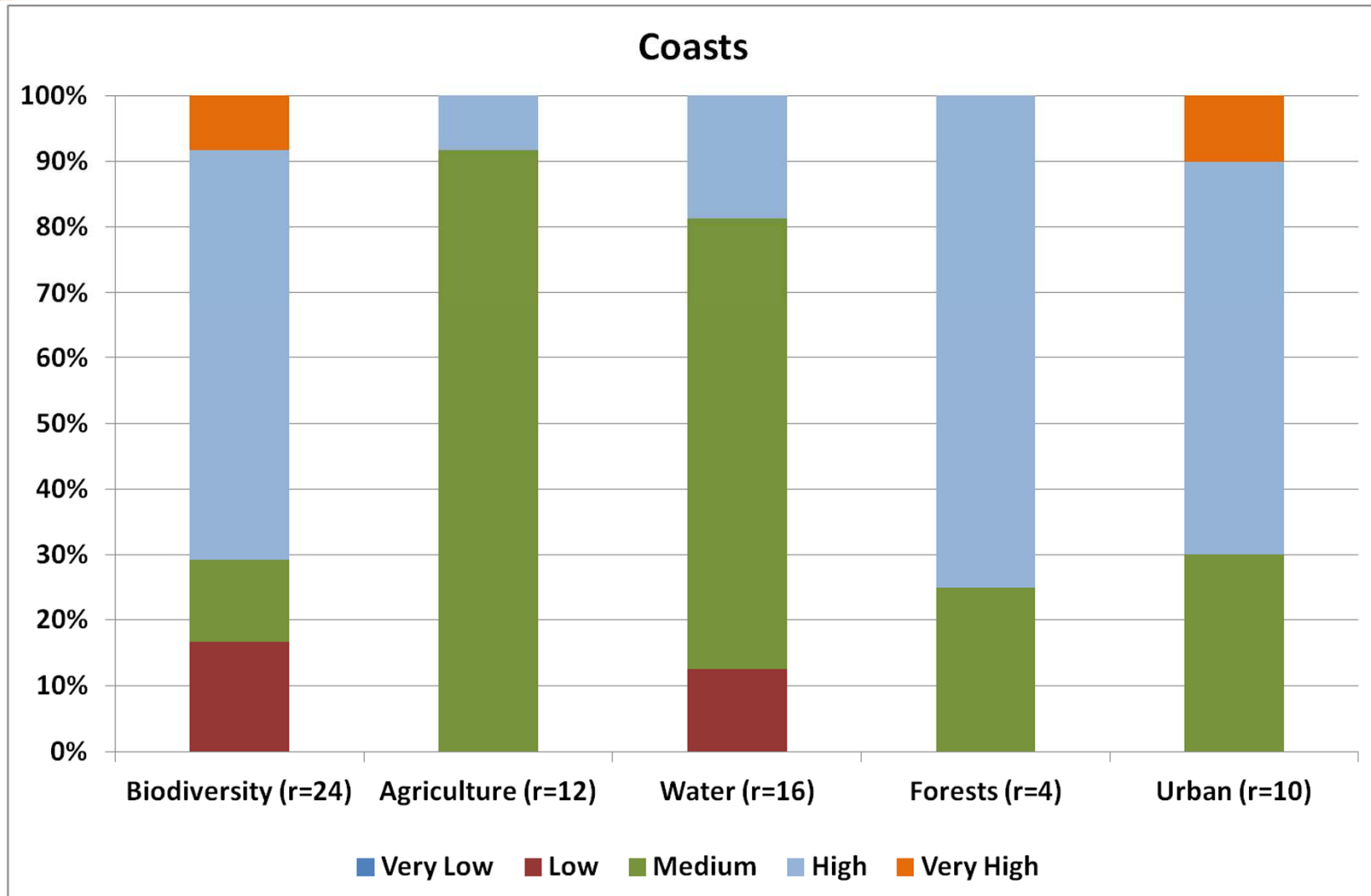


Results: Coasts - Cross-sectoral indicator with sensitivity analysis



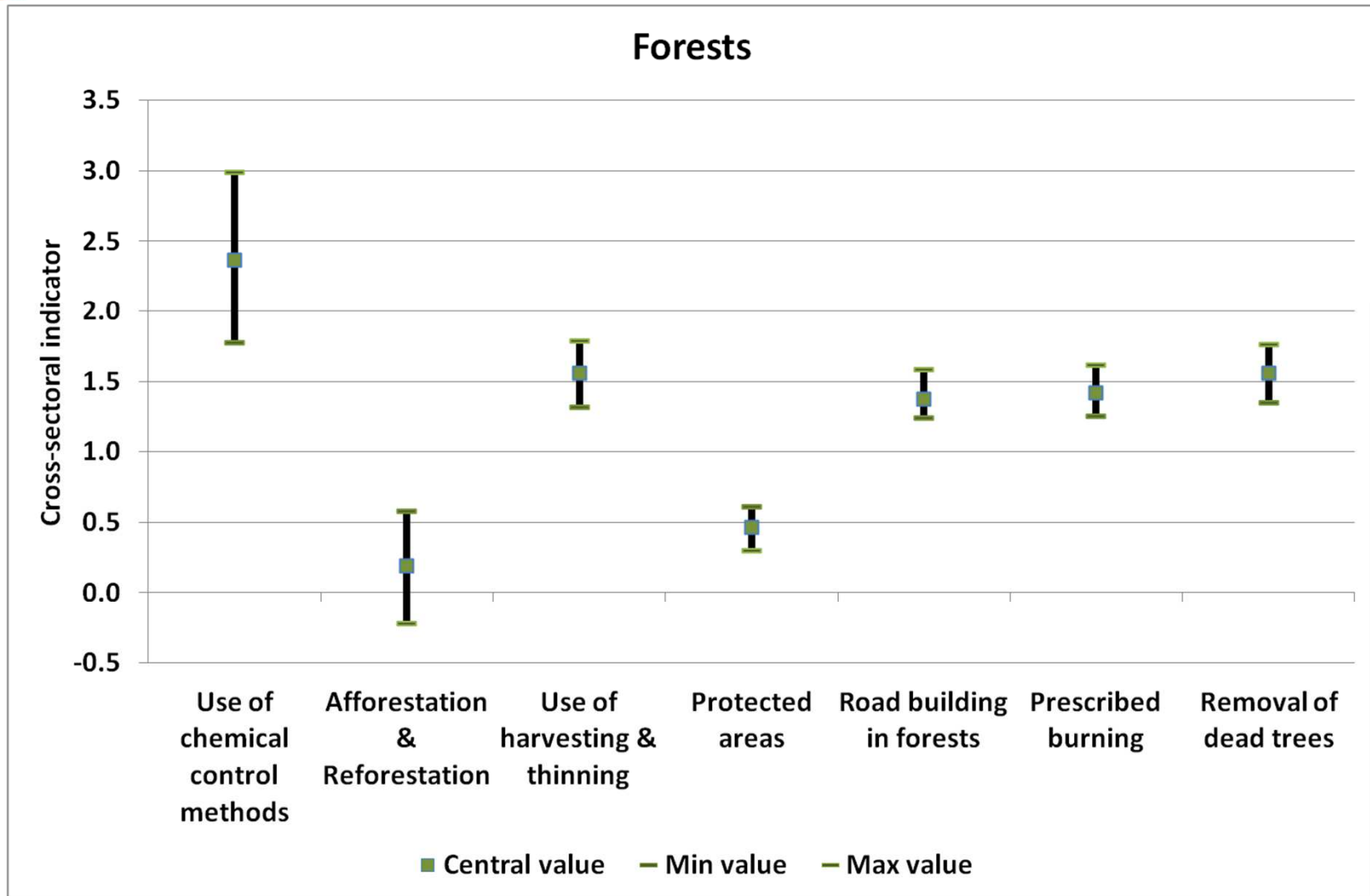


Results: Coasts - Level of certainty



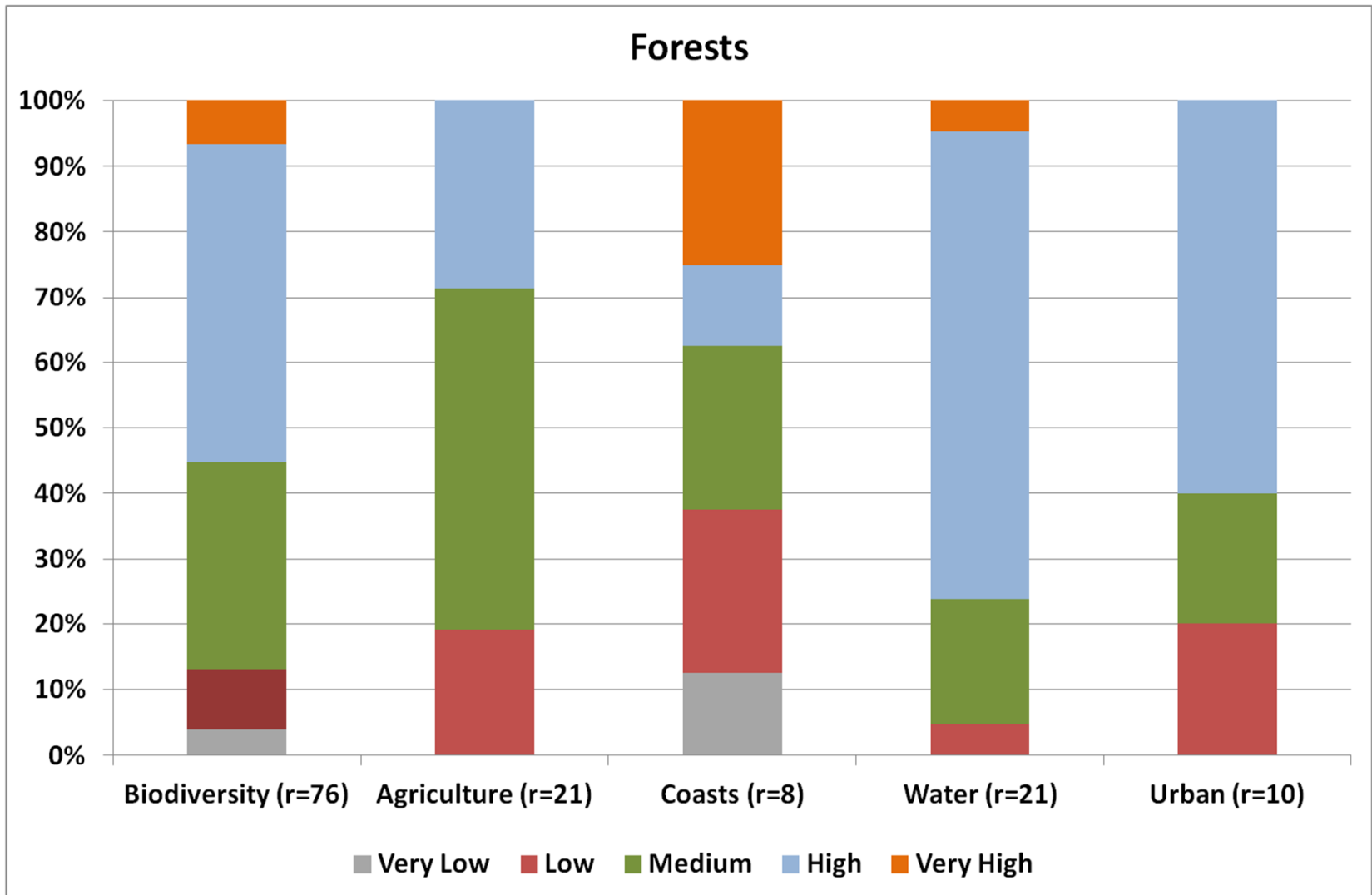


Results: Forests - Cross-sectoral indicator with sensitivity analysis





Results: Forests - Level of certainty





Integration of cross-sectoral indicators into CEA analysis

- The analysis of the completed CrossAdapt tools will provide indicators for the assessment of cross-sectoral effects.
- These indicators will be introduced into proposed CEA analysis modifying the cost estimate of each adaptation measure.
 - Negative externalities
 - Cost including cross-sectoral > Cost no cross-sectoral
 - Positive externalities
 - Cost including cross-sectoral < Cost no cross-sectoral



Example of the integration into CEA analysis

Cost estimates without cross-sectoral effects (€/m of coastline)

measure	r	ax
Wetland Creation	0.02	19 94
Low Crested Structures	3	24 55
Managed Realignment	1,092	1,226 1,361
Managed Retreat	1,092	1,226 1,361
Beach Nourishment	8	30
Seawalls	300	7,704 16,407

Wetland creation is the most cost-effective solution

Seawalls are the least cost-effective solution

Cost estimates including cross-sectoral effects (€/m of coastline)

measure	r	ax
Seawalls	-15,997	-2,953 15
Wetland Creation	0.02	23 143
Low Crested Structures	3	36 105
Beach Nourishment	76	1,132 1,903
Managed Retreat	1,593	2,380 3,221
Managed Realignment	2,421	3,474 4,650

Including cross-sectoral effects seawalls are the most attractive option



Discussion

- The quantification of cross-sectoral analysis is priority in order to address multiple climate impacts triggered by adaptation investments at the same time.
- The preliminary results of the Cross-Adapt methodology show the effectiveness of the tool.
- Selection of representative experts for the elicitation of robust estimates.
- Future European adaptation strategies can be benefited from the analytical possibility of estimating net adaptation costs based on CrossAdapt.



Thank you for your attention!!!