



Integrating Top-Down And Bottom-Up Perspectives In Adaptation Assessment

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ABSTRACT

GHG emissions generate a global externality, however climate change impacts, mitigation, and adaptation effects, are highly differentiated locally. Accordingly, also the economic assessment of adaptation costs and benefits needs to integrate different investigation scopes. A country/regional perspective is needed to define strategic priorities for adaptation investments; a regional, spatially-explicit detail is necessary for the assessment of environmental impacts and cost/effectiveness of adaptation measures. A solid top-down/bottom-up integration is thus crucial in adaptation research (Pat et al. 2010). However, current top-down models analyzing adaptation (see e.g. Agrawala et al. 2010, Banh et al. 2010, de Bruin et al. 2009, Hof et al 2009), albeit remaining useful in highlighting trends and rough "orders of magnitude", are still too aggregated to offer really informative quantitative insights on the opportunities offered by adaptation strategies, and by their combination. Conversely, bottom up analysis of adaptation, which is rapidly expanding, is still largely scattered and incomplete (Agrawala et al. 2011). Notwithstanding interesting attempts to organize the evidence gathered so far (e.g.: Agrawala and Fankhauser 2008, Parry et al. 2009), much more can be done to systematize the already rich information available.

In summary: bottom-up studies should be collected and then consistently integrated to define adaptation costs and effectiveness per domain in order to develop better top-down estimates of adaptation costs and effectiveness at the country, European and possibly world level. This requires appropriate integration and scaling methodologies for adaptation across different areas and geographical scopes. On the other hand it would be necessary to expand the portfolio of adaptation options that top-down approaches can consider.

This paper discusses challenges, opportunities, limits and some possible methodologies to accomplish these desired outcomes.

REFERENCES

- Agrawala, S., F. Bosello, C. Carraro, E. De Cian, E. Lanzi, K. de Bruin, and R. Dellink. (2010), "PLAN or REACT? Analysis of adaptation costs and benefits Using Integrated Assessment Models", OECD Environment Working Papers, No. 23, OECD Publishing.
- Agrawala S. and S. Fankhauser (2008). Economics aspects of adaptation to climate change. Costs, benefits and policy instrument. OECD, Paris.
- Bahn, O., M. Chesney, and J. Gheyssens. 2010. "The Effect of Adaptation Measures on the Adoption of Clean Technologies." Paper presented at the WCERE Congress, Montréal, 2010. Viewed on December 22, 2010
- de Bruin, K. C., R. B. Dellink, and R. S. J. Tol. (2009), "AD-DICE: An Implementation of Adaptation in the DICE Model" *Climatic Change*, 95: 63-81.
- Hof, A.F., de Bruin, K.C., Dellink, R., den Elzen, M.G.J. and D.P. van Vuuren. (2009), "The Effect of Different Mitigation Strategies on International Financing of Adaptation", *Environmental Science and Policy* 12:



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832-843.

Parry M., N. Arnell, P. Berry, D. Dodman, S. Fankhauser, C. Hope, S. Kovats and R. Nicholls (2009).
Assessing the costs of adaptation to climate change, Imperial College, London.

Patt A.G., van Vuuren D.P., Berkhout, F., Aaheim, A., Hof, A.F., Isaac, M. and Mechler, R. (2010),
"Adaptation in integrated assessment modeling: where do we stand?", *Climatic Change*, 99:383-402.