



TIAS Quarterly

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Courtesy of J. Newig

The Society

The Integrated Assessment Society is a not-for-profit entity created to promote the community of inter-disciplinary and disciplinary scientists, analysts and practitioners who develop and use integrated assessment. The goals of the society are to nurture this community, to promote the development of IA and to encourage its wise application.

Integrated Assessment Defined

Integrated Assessment (IA) can be defined as the interdisciplinary process of integrating knowledge from various disciplines and stakeholder groups in order to evaluate a problem situation from a variety of perspectives and provide support for its solution. IA supports learning and decision processes and helps to identify desirable and possible options for addressing the problem. It therefore builds on two major methodological pillars: approaches to integrating knowledge about a problem domain, and understanding policy and decision making processes. IA has been developed to address issues of acid rain, climate change, land degradation, water and air quality management, forest and fisheries management and public health.

Feature

Toddling 'long the River Meuse

Integrated Assessment and participatory Agent-Based Modelling to support River Management

By Pieter Valkering, International Centre for Integrated Assessment & Sustainable Development, Maastricht Univ.

Sustainable river management begins with a balanced representation of river dynamics and human decision-making for a better understanding of the river system as a whole. To achieve such a representation, participatory agent-based modelling (ABM) within the context of Integrated Assessment modelling (IAM) has been adopted as an innovative core approach. This approach was applied to the case study of the Dutch *Maaswerken* project.

The purpose of the *Maaswerken* project is to widen the River Meuse for the benefit of safety, shipping, nature development, and gravel extraction. It is a typical example of a complex sustainability planning problem characterized by high stakes and salient uncertainties. Developing a representation of this case entailed the development of an integrated river model (iRM) that allows users to calculate the impacts of different river management strategies, coupled with an agent-based model representing stakeholder decision-making. The specific modelling objectives included development of a better understanding of the historic course of the *Maaswerken* planning process, assessment of plausible future developments for the management of the Meuse in Limburg, and development of a tool to support dialogue on sustainable river management. In light of the latter objective, the coupled iRM-ABM has been named the Toddler model: Tool to Open-up Dialogue and Debate for Long-term Effective River management.

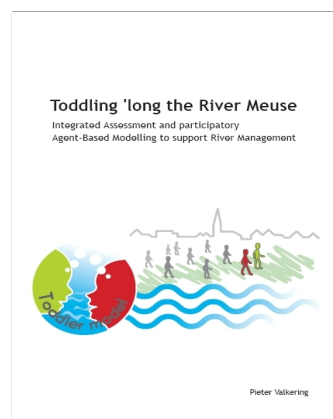
The work carried out contributes to the methodological challenge of better representing human decision-making in Integrated Assessment modelling. To this end, the Toddler model builds upon the well-known IA model concept of Pressure-State-Impact-Response (PSIR). It includes a simple integrated River Model (representing Pressure, State, and Impact) for calculating the order-of-magnitude effects of various river management approaches for a local cross-section in an integrated and interactive way. The Response is framed 'agent-based' as the outcome of a planning process amongst so-called 'stakeholder agents'. The stakeholder agents represent the stakeholders of the *Maaswerken* project on the basis of a simple agent architecture of goals and beliefs. The latter are related to their interpretation of the various uncertainties surrounding river management. The river management process, then, is interpreted as a process of social learning. In this process, stakeholder agents are assumed to adapt their goals and beliefs (adaptive cognition) in response to perceived changes in the river system and/or the interaction with other stakeholder agents. The Toddler model was successfully applied to the analysis of stakeholder support, and reconstructing the historic course of the *Maaswerken* sub-project, *Grensmaas*, over time. Furthermore, a gaming concept was developed in which similar modelling tools are applied to assess the future development of water management in a highly interactive way with (real-life) stakeholders. In the game, the development of cultural

perspectives underlying the water management debate plays a central role.

This research has demonstrated that it is to a large extent possible to represent the complex dynamics of river management through a participatory IAM-ABM approach. In particular, the model application in retrospect - reconstructing the development of the Maaswerken/Grensmaas project over time - shows that the main features of historical river management strategies are adequately represented with the proposed model. Moreover, the model provides an adequate tool for a 'what-if' analysis to assess, for example, how stakeholder support and the policy outcome might be altered when stakeholders would change their preference structures, or when they would take climate change into account. An important added value of the approach, we argue, is the support it can provide to social learning among stakeholders involved in river management. The Toddler model can provide a forum to share relevant knowledge about the river system, to clarify and evaluate stakeholder perspectives, to reflect on uncertainty, and to assess the trade-offs between stakeholder interests in a more transparent way.

Given its pioneering character and broad scope, the study identifies various directions for future research. This includes further participatory model applications to better assess the future development of river management, and possibly to derive formal rules by which goals and beliefs may plausibly change. Also, testing the value of the model as a social learning tool is considered an important next step. Notably, the gaming concept developed shows promise for modelling long-term development of water management (including the dynamics of the water management culture) in a meaningful way. The generic set-up of the approach (based on the PSIR concept) suggests that it is transferable to other areas of resource management, and would be interesting to explore.

Overall, the study demonstrates that the complex and dynamic nature of river management requires a more reflexive planning approach. In such a 'learning-by-doing' approach, continuous reflection on goals and beliefs is equally important to (or even more than) the detailed assessment of river management strategies to fulfill certain goals under given belief systems. To support such a reflexive planning process, the Toddler model can help as a **Tool to Open-up Dialogue and Debate for Long-term Effective River management.**



This article is based on the PhD research of Pieter Valkering (p.valkering@maastrichtuniversity.nl) under the supervision of Prof. Dr. P. Martens, ICIS, Maastricht University, and Prof. J. Rotmans, DRIFT, Erasmus University Rotterdam. It was successfully defended on 11 December 2009.

The dissertation is available as a pdf from <http://www.tias.uni-osnabrueck.de/literature/>

TIAS Highlights

TIAS Quarterly ISSN

The TIAS Quarterly now has a serial number (ISSN 2077-2130). We hope that, in addition to reaching a wider community (by being listed in library and other databases), the ISSN will may make it more attractive for members to contribute feature articles that they can add to their publication list.

First TIAS Webinar Planned

The society will run a trial 'webinar' (web-based lecture and discussion) on **Monday, February 15, 16.00 - 18.00 CET**. Jan Bakkes of the Netherlands Environmental Assessment Agency (PBL), will lead the first of our webinar series on PBL's recently released study, "Getting into the Right Lane for 2050" which was jointly published with the Stockholm Resilience Centre.

The study examines the long-term challenges facing the EU in a vision of Europe for 2050, focusing on the key areas of climate change and energy security; land resources, food and biodiversity; and transport and mobility. The core question is: if we want to achieve this vision, what strategic decisions need to be taken in the next few years?

An announcement will be circulated to TIAS members in early February.

The Right Lane report can be downloaded from:

<http://www.pbl.nl/en/publications/2009/Getting-into-the-Right-Lane-for-2050.html>

TIAS Survey on Improving Methods and Data for Global Change Research

TIAS is collaborating with the multi-disciplinary project: "Responses to Environmental and Societal Challenges for our Unstable Earth" (RESCUE, www.esf.org/rescue/). Funded by the European Science Foundation, the project attempts to develop an integrated response to global environmental change from natural, social and human sciences.

TIAS is contributing to the working group on Requirements for Research Methods and Data. TIAS members and other individuals who are involved in global change research are invited to participate in an online survey at www.tias.uos.de/rescue.php. Respondents may answer as many (or as few) questions as they are able. Results will be made available by early April. Contact: Caroline van Bers [cvbers\[at\]usf.uos.de](mailto:cvbers[at]usf.uos.de)

Global Water Scenarios

In our Oct/Nov. issue of TIAS newsletter we reported on the launch of the 4th United Nations World Water Development Report and World Water Scenarios. Since then Phase 1 of the scenario work covering research on ten key drivers has been started. The coordinators of this programme are interested in collaborating from other groups working on regional or international water scenarios.

Contact William Cosgrove: [wjcosgrove\[at\]unesco-wwap.org](mailto:wjcosgrove[at]unesco-wwap.org) or Michela Miletto [m.miletto\[at\]unesco.org](mailto:m.miletto[at]unesco.org); WWAP website: <http://www.unesco.org/water/wwap>

Website on collaborative solutions in sustainability

Appropedia (<http://www.appropedia.org/>) is a website launched in 2006 for collaborative solutions in sustainability, poverty reduction and international development, through the use of sound principles and appropriate technology and the sharing of wisdom and project information. It is a wiki in which anyone can add, remove, or edit content. Themes covered include energy, water, food and agriculture, health and safety, transport, culture and community, design, built environment, business and international development. The site also hosts collaboration pages for co-creating solutions.

Stopping biodiversity loss by 2020?

The UN has declared 2010 as the international year of biodiversity. In Europe, the goal of the European Commission to halt animal and plant extinctions by 2010 has not been reached. More action is now planned for long-term protection of biodiversity by 2020.

The UN estimates that species are now disappearing at 100 to 1000 times the natural extinction rate. A third of the 1.75 mil. known animal and plant species are under threat. According to the International Union of Nature Conservation (IUCN), 717 animal species were lost in 2008. At present, the beluga whale, koala bear and staghorn coral numbers are declining at an alarming rate. In Europe, the Iberian lynx number just 100.

The EU is now preparing a new long-term vision up to 2050. Whether their strategy should just aim to slow down biodiversity loss, stop it completely, or try to revive dead ecosystems, is under consideration, together with the promotion of biodiversity conservation worldwide. The Commission will decide in the next few weeks just how ambitious their objectives can be.

Further information are available at:

http://ec.europa.eu/news/environment/100119_en.htm

New MSc in Global Environmental Governance

The one-year MSc Political Science specialization in "Global Environmental Governance" offered by the VU University Amsterdam is accepting applications for the academic year 2010-2011. The programme provides a broad training in political science with an intensive stream of lectures and seminars on global environmental governance. The emphasis of this specialisation is on actors, mechanisms and interlinkages within this important field of international relations. Students then finalise their studies with an MSc thesis, which may focus on the many large-scale international research projects on global environmental governance underway at the VU University Amsterdam. The programme is designed for students with both academic and practical career objectives. The deadline for applications is 1 March 2010 for non-European students, and 1 April 2010 for students from Europe.

Further information is available at:

www.fsw.vu.nl/nl/opleidingen/masteropleidingen/political-science-global-environmental-governance/index.asp

8-12 March 2010: EASY-ECO Training on Strategic Environmental Assessment - On-Site Phase in Trento, Italy

The training focuses on the theory and practice of evaluation of sustainable development, with a special focus on the instrument of Strategic Environmental Assessment (SEA). The on-site phase of the training is hosted by the Department of Civil and Environmental Engineering of the University of Trento. This phase will be supported by leading evaluation thinkers and experienced trainers (Frans Leeuw, Thomas Widmer, Clive George, Wolfgang Meyer, Corrado Diamantini, Stefano Bagli and others).

Details on the content and organization of this training and other upcoming events can be found at:

<http://www.easy-eco.eu>

27-28 May 2010. 13th Economics of Infrastructures conference. Governing the commons in Infrastructures:

The economic and political institutions for the governance of next generation infrastructures. In honour of Elinor Ostrom and Oliver Williamson. (Nobel Prize winners for Economics 2009). Delft, Netherlands. Details available at: <http://tbm.home.tudelft.nl/en/>

20-30 May, 2010. Call for Papers and posters for the First Berlin Forum on Innovation in Governance: Studying the emergence and development of new forms of governance.

Berlin, Germany. This Forum is the first in an initial series of four, that will lay the conceptual and methodological grounds for studying the genesis, dynamics and politics of new forms of governance. The forum series will take place on an annual basis until 2013. Travel expenses are available for a limited number of participants. The deadline for the submission of all abstracts is 14 February 2010.

Details are provided at www.innovation-in-governance.org

24 - 26 June 2010. International Conference on Advances in Renewable Energy.

Hosted by the Department of Mechanical Engineering Maulana Azad National Institute of Technology.

More information is available at:

<http://manit.ac.in/content/view/494/142/>

5-8 July 2010. iEMSS 2010: "Modelling for Environment's Sake". Ottawa, Canada.

The conference will include a session on "Integrated Assessment Modelling of Air Quality and Climate Change across different spatial and temporal scales".

Also included is a session on "Tales of DSS adoption: How and why are DSS successful in environmental and related sectors?"

More information on both session is available at:

<http://www.iemss.org/iemss2010/>

November 2010: Call for Papers for the next EASY-ECO Conference on Sustainable Development Evaluations in Europe, Brussels, Belgium.

(Deadline for submissions: 15 May 2010).

More information: <http://www.sustainability.at/easy/>

Courses

16-18 February 2010. Water Footprint Training Course. Amsterdam, Netherlands. Details: www.waterfootprint.org/downloads/WaterFootprint-TrainingCourse-Feb2010.doc

4-25 July 2010. Summer School: Democratic Governance and Civic Engagement.

The program includes courses in Democratic Governance, Civic Engagement and Participation and Environmental Policy. Credits: 5 ECTS / 6 US. Application Deadline: 01 March 2010. Details: www.summer-schools.uos.de

29 August - 3 September 2010. The 9th International NCCR Climate Summer School "Adaptation and Mitigation: Responses to Climate Change". Grindelwald, Switzerland. <http://www.sense.nl/articles/events/5525>

New Publications

J. Nill and R. Kemp. 2009. **Evolutionary Approaches for Sustainable Innovation policies: From niche to paradigm?** *Research Policy*. 38(4): 668-680.

Miguel Mendonça, David Jacobs and Benjamin Sovacool. 2009. **Powering the Green Economy: The Feed-in Tariff Handbook.** London: Earthscan Books.

J. Mysiak, H. Jørgen Henrikson, C. Sullivan, J. Bromley and C. Pahl-Wostl (eds). 2009. **The Adaptive Water Resource Management Handbook.** London: Earthscan Books.

P. Martens, D. McEvoy, and C. Chang. 2009. **The Climate Change Challenge: Linking Vulnerability, Adaptation, and Mitigation.** *Current Opinion in Environmental Sustainability*. 1: 14-18.

Jan-Peter Voß, Adrian Smith and John Grin (Guest editors). **"Designing long-term policy"**. Special Issue of *Policy Sciences* (vol.42, no.4) November 2009. <http://www.springerlink.com/content/0032-2687>. (This special issue includes articles on transition management and transitioning policy).

Recently in the journal, *Integrated Assessment*:

Martens, P. & Raza, M. (2009). Globalisation in the 21st century: measuring regional changes in multiple domains. *Integrated Assessment Journal*. 9(1).

P. Valkering, D. Tabara, P. Wallman, A. Offerman. 2009. Modelling Cultural and Behavioural Change in Water Management: An integrated, agent based, gaming approach. *Integrated Assessment Journal*. 9(1).

Job openings

Executive Director, Conservation, World Wildlife Fund International, Gland, Switz. (Deadline: 14 February), http://www.panda.org/who_we_are/jobs/

Programme Officer, Division of Environmental Policy Implementation, UNEP - United Nations Environment Programme, Geneva (Deadline: 6 February). <https://jobs.un.org/>

European Liaison, Climate and Energy Policy Regulatory Assistance Project, Brussels http://www.ceacconsulting.com/what/current_searches.aspx

15 stipends available for PhD researchers in "Biodiversity and Society" at Georg-August-Universität Göttingen, Germany. The focus is on the perspectives of producers/farmers and consumers/citizens from a mainly international perspective. www.uni-goettingen.de/en/79352.html

Tenure and tenure-track faculty positions. Department of Earth & Environmental Engineering at Columbia University, New York City. For details go to employment link at www.columbia.edu.

Call for Submissions

TIAS Members are encouraged to submit feature articles and/or news items for future issues of *TIAS Quarterly*. Contact Caroline van Bers [cvbers\[at\]jusf.uos.de](mailto:cvbers[at]jusf.uos.de)

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