



TIAS Quarterly

No. 02/2013 October

The newsletter of *The Integrated Assessment Society (TIAS)*

<http://www.tias-web.info>

ISSN 2077-2130

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Mount Tremblant, QC, Canada (J. Halbe)

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 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 Article

Transferring water management knowledge

Joanne Vinke-de Kruijf, PhD, Water Engineering and Management and Twente Centre for Studies in Technology and Sustainable Development (CSTM), University of Twente, Netherlands

Many countries around the world are facing similar water management problems such as floods, droughts, water scarcity and poor water quality. International collaboration and knowledge transfer can contribute to reducing these problems. By using knowledge that has been successfully applied in another country, governments may accelerate policy development, reduce costs and prevent the reinvention of the wheel. The doctoral research described here, "Transferring water management: how actors, interaction and context influence the effectiveness of Dutch-funded projects in Romania" examines projects in which such knowledge is being transferred. Building on the experiences of Dutch-funded flood risk management projects in Romania, the research investigates the actors, interactions and context of these knowledge transfer projects.

Dutch-funded projects in Romania

In a research context, knowledge transfer is defined as the interactive process by which actors often from different countries – transferring actors and receiving actors – share and acquire knowledge for the purpose of applying that knowledge. The research particularly focuses on externally supported knowledge transfer projects in the water management domain, i.e. projects that are implemented with financial support of the transferring country. Projects that involve the application of Dutch water management concepts, methods and technologies in Romania are used as cases.

The Dutch government supports these projects for a combination of altruistic and economic reasons. Through the transfer of water management knowledge, the government

aims to contribute to solutions for worldwide water problems and to strengthen the economic position of the Dutch water sector abroad. The research explores the extent to which these externally supported projects indeed help to achieve these policy objectives. Romanians have a keen interest in learning from Dutch experts about flood risk management and highly value Dutch water management expertise. As both the intensity and frequency of floods have increased considerably in Romania over the past decades, the reduction of flood risks is high on the agenda of the Romanian government. To actually reduce the extent and impacts of flooding is a complicated exercise, as this research also demonstrates.

Theoretical starting-points

Theoretically, the research is based on a model of policy implementation that was developed at the University of Twente. The model asserts that policy processes are multi-actor interaction processes for which the course and outcomes are basically shaped by the dynamic interactions between actors and their diverse motivations, cognitions and resources. The wider contexts, structural (governance) context and the case-specific context, have an influence on these interactions, but only in as far as they influence the characteristics (i.e. motivations, cognitions and resources) of actors. In the research, this policy implementation model is complemented with insights about policy and knowledge transfer, governance, evaluation, knowledge management and social learning. These insights are synthesized in one conceptual model of which various aspects are elaborated further in the thesis.

Case study methodology

The core of the research is formed by an assessment of the Romanian context for flood risk governance, three case studies and comparisons of the cases. Data on the governance context were collected through document analysis, a questionnaire (in collaboration with a Romanian university) and interviews. The case studies are based on the experiences of three projects in

which Dutch and Romanian actors were jointly dealing with flood-related problems. The projects were implemented with Dutch financial support in the period 2008-2011. The author participated as an observer in all three projects and analyzed them in-depth using qualitative methods (observations, interviews and document analysis). Each of the case studies investigates a specific aspect of the knowledge transfer process in more detail: the criteria affecting the effectiveness of knowledge transfer projects, the interactive process through which actors with diverse knowledge backgrounds transfer knowledge and processes of social learning. The case studies are followed by two comparative chapters that examine the influence of contextual factors on the case study projects and the effectiveness of the projects. The applied theory and methods and the generalizability of the results are critically reflected upon also using the experiences from researchers and practitioners in other water management projects in other countries.

Evaluation of knowledge transfer projects

Knowledge transfers may be evaluated using various criteria. In this research, the author chose to focus on the degree to which knowledge is not only shared and acquired, but also applied for the intended purpose. For the systematic evaluation and comparison of the case studies, an evaluation framework was developed consisting of criteria related to the process, the immediate outcomes and the ultimate outcomes. On the basis of literature, six process criteria were defined: stakeholder involvement, institutional embedding, integration of context-specific knowledge, mutual understanding in communication, proactive diffusion strategy and adaptive management. The immediate outcomes, which form the basis for the realization of intended or desired outcomes, were evaluated using four criteria: joint motivating goal, the creation of negotiated knowledge, the mobilization of resources and positive relational experiences (forming a basis for mutual trust). The overall effectiveness of the case studies was evaluated in terms of their contribution to problem-solving and to the generation of follow-up projects.

Conclusions and policy implications

The research concludes that knowledge transfer projects, which are implemented with external support, are less effective than hoped for. The interactions among various actors enable the sharing and acquisition of knowledge, but do not often result in the actual application of knowledge. Follow-up actions are needed but do not proceed in the absence of an actor who is able and willing to coordinate or take the lead in the mobilization of (financial) resources. Regular and intense interactions accelerate learning processes and may bring actors closer together. Learning can be constructive in creating a pathway for further collaboration, but may well lead to a decision by actors to cease further collaboration. Furthermore, the pilot nature of the knowledge transfer projects imply that they intend to apply knowledge that has not been applied in that specific context before. Therefore, to adequately embed a project in the receiving context is difficult. As a result, knowledge transfer projects, and externally supported projects in particular, easily run the risk of not fitting local realities.

Therefore the effectiveness of knowledge transfer projects crucially depends on adequate institutional embedding and adaptation to new insights and changing circumstances, which in turn highly depend on the availability and integration of context-specific knowledge. The author recommends adoption of a longer term perspective on knowledge transfer projects. This means that projects should not be seen as the ultimate means by which water management problems are solved.

Knowledge transfer projects are better seen as learning processes that can form the building blocks for the realization of the desired outcomes.

Future research

The policy implementation model that was used to investigate knowledge transfer projects offers a useful starting point for understanding knowledge transfer processes. By focusing only on those contextual factors that actually impact the actors and their interactions, the model reduces the factors to be examined to those factors that matter most. Nevertheless, an adequate understanding of the structural context remains indispensable since projects do not necessarily involve all relevant actors. To understand multi-actor processes, one needs to understand not only the interactions and characteristics of actors involved, but also the characteristics of actors who have a crucial role in the implementation of a project or follow-up actions.

An interesting direction for further research would be to develop a better understanding of how learning processes may facilitate knowledge transfer. This research could focus on what learning processes and modifications of knowledge are required (and feasible) to enable knowledge transfer under which conditions (i.e. given contextual differences). Also a better understanding of the impacts of learning on the structural context and on longer-term impacts would help to better understand the actual benefits of knowledge transfer projects.

More information: Vinke-de Kruijf, J. (2013) Transferring water management knowledge: how actors, interaction and context influence the effectiveness of Dutch-funded projects in Romania. PhD thesis, University of Twente. Available from: <http://doc.utwente.nl/85809/>

Projects

Harnessing Research and Development for Sustainable Development (RD4SD)

Since the end of 2010, a group of European science funders and policy-makers have engaged in a process to develop a vision for harnessing research and development for sustainable development (RD4SD). Funded by the European Commission in the 7th Framework Programme, the VISION RD4SD project is now nearing completion. Concrete products from the project include a set of national and regional case studies of RD4SD, a vision of the kind of science needed to meet global challenges, a set of eight principles for harnessing RD4SD and a web-based resource tool that can be used by funders and programme managers as well as the research community for developing, funding and evaluating implementation-oriented research. For more information see www.visionrd4sd.eu

Linking Research and Policy making on the Contradictions of Sustainable Consumption and Economic Growth (RESPONDER) - Knowledge Brokerage using System Mapping

Research agencies of EU Member States and Associated Countries met at a workshop in June 2007 to discuss "Research for sustainable development – How to enhance connectivity". One of the resulting agreements was on the need to improve the role of research in policy making and introducing the idea of **knowledge brokerage**. Within the 7th Framework Programme, the European Commission Directorate General for Research and Innovation

has funded a set of projects on “knowledge brokerage”. These projects have tested / are testing various approaches for knowledge brokerage. The RESPONDER (Linking Research and Policy making on the Contradictions of Sustainable Consumption and Economic Growth) project has been testing **participatory system mapping** in a series of EU dialogues and multinational knowledge brokerage events. The aim is to determine if participatory system mapping as well as other approaches, such as poster walks and facilitated discussions on topics including mobility, housing and food consumption can engage researchers and policy-makers in a two way dialogue about central issues of sustainable consumption and economic growth. Examples of the system maps can be found on the project website. The third and final EU dialogue – on the theme of innovation – will be held in Brussels 10-11 October 2013. For information on the RESPONDER project and this event, see www.scp-responder.eu/events/eu_dialogue

Courses

Catalyst - Local Winter Academy on Disaster Risk Reduction and Climate Change Adaptation: Applying Science and Strategies at the Community Level

Guanajuato City and Las Palomas, Mexico
1–13 December 2013

Young graduate and post-doctoral researchers from across Europe and Mexico will convene in Guanajuato State in Mexico in December 2013, to learn from experienced trainers and local communities about the theory and practice of disaster risk reduction and climate change adaptation. The academy, which co-sponsored by TIAS, is intended to enrich the research activities of the participants and increase their practical knowledge of the possibilities for and the limits to the implementation of the theory at the community level. In addition to TIAS, the event is co-organised by seeconsult GmbH, Programa de Investigación en Cambio Climático (PINCC) de la Universidad Nacional Autónoma de México (UNAM), The United Nations University Institute for Environmental and Human Security, and Universidad de Guanajuato.

Topics to be covered range from vulnerability assessment and risk analysis to the use of ecosystem services for disaster risk reduction and adaptation. Four days of applied work with a community in the Sierra Gorda will provide the opportunity for participants to apply what they have learned. More information is available from: <http://www.seeconsult.org/en/index.php?page=catalyst-local-winter-academy>.

New Publications

(The abstracts presented here are taken directly from the publications themselves)

Gracceva, F. and P. Zeniewski. 2013. Exploring the uncertainty around potential shale gas development – A global energy system analysis based on TIAM (TIMES Integrated Assessment Model). *Energy* 57: 443-457.

This paper quantitatively explores the uncertainty around The global potential of shale gas development and its

possible impacts, using a multi-regional energy system model, TIAM (TIMES Integrated Assessment Model). Starting from the premise that shale gas resource size and production cost are two key preconditions for its development, our scenario analysis reveals the way these and other variables interact with the global energy system, impacting on the regional distribution of gas production, interregional gas trade, demand and prices. The analysis shows how the reciprocal effects of substitutions on both the supply and demand-side play an important role in constraining or enabling the penetration of shale gas into the energy mix. Moreover, we systematically demonstrate that the global potential for shale gas development is contingent on a large number of intervening variables that manifest themselves in different ways across regionally-distinct energy systems. A simple theoretical model is derived from the results of the scenario analysis.

Its purpose is to simplify and explain the complex behaviour of the system, by illustrating the chain of actions and feedbacks induced by different shale gas economics, their magnitude, their relative importance, and the necessary conditions for the global potential to be realised.

Athanas, A. K. and N. McCormick. 2013. Clean energy that safeguards ecosystems and livelihoods: Integrated assessments to unleash full sustainable potential for renewable energy. *Renewable Energy* 49: 25-28.

In promoting renewable energy options, the environmental problem of GHG emissions should not be replaced with other environmental problems. Large-scale renewable infrastructure projects in particular from offshore wind farms to concentrated solar towers to hydropower installations need to be accompanied by adequate environmental and social impact assessments. For policies, plans and programmes around renewable energy investments, strategic environmental assessments should be applied. Such assessments will increasingly need to consider the changing nature of supporting ecosystem services and the need for climate adaptation. Financing institutions should promote appropriate safeguards, supported by capacity building activities from international organizations, including IRENA, in order to unleash the full sustainable potential of renewable energy options. This paper explores the experiences of applying impact assessment tools and processes to renewable investments and highlights some of the key aspects which should be taken into consideration when pursuing a renewable energy future.

Döll, C., P. Döll and P. Bots. 2013. Semi-quantitative actor-based modelling as a tool to assess the drivers of change and physical variables in participatory integrated Assessments. *Environmental Modelling & Software* 46: 21-32

Integrated assessments that aim to support sustainable natural resources management require analysing how biophysical systems are impacted by human actions. These analyses are often performed by modelling the physical system, while human actions are prescribed as scenarios and introduced into the physical models by varying the model input. To achieve a more thorough analysis of the human system component in participatory integrated assessments,

we developed a semi-quantitative approach for actor-based modelling which focuses on modelling actions of societal actors based on their problem perceptions but also computes the resulting changes of physical system variables. Our approach is intended to support transdisciplinary research and identification of sustainable development options in problem fields with high levels of uncertainty or ignorance, together with the actors that are being modelled. Actor-based modelling is done using an enhanced version of the DANA software. DANA allows modelling the actors in a specific problem field by representing the perception of each actor by directed graphs, and by computing optimal actions from the perspective of each actor. These perception graphs are semi-quantitative causal maps, which can easily be discussed among stakeholders in a participatory process. DANA was extended to support, in addition to actor modelling, the other two steps in actorbased modelling, modelling of actions and modelling of factors. Modelling of actions refers to determining the actions of each actor under certain scenario assumptions, taking into account the diverse problem perceptions of the individual actors in the problem field, the action of the other actors and exogenous changes. Modelling of factors refers to calculating, in a semi-quantitative way, the resulting changes of physical variables (e.g. pollutant emissions), which may serve as input to physical models. We applied actor-based modelling in an integrated assessment of mobile organic xenobiotics in rivers. Our study shows that actor-based modelling allows generating scientifically better founded and more transparent scenarios of the drivers of change in integrated assessments, in particular because they are based on a structured analysis of the actors' problem perceptions.

Harfoot, M., D. P. Tittensor, T. Newbold, G. McInerney, M. J. Smith and J. P.W. Scharlemann. 2013. Integrated assessment models for ecologists: the present and the future. *Global Ecology and Biogeography*.

Abstract: Human impacts on the biosphere are a matter of urgent and growing concern, with ecologists increasingly being asked to project biodiversity futures. The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) is likely to comprehensively assess such projections, yet despite being widely used and potentially critical tools for analysing socio-environmental futures, integrated assessment models (IAMs) have received little attention from ecological modellers. We aim to raise awareness and understanding of IAMs among ecologists by describing the structure and composition of IAMs, assessing their utility for biodiversity projections and identifying limitations that hamper greater interaction between scientists using IAMs and those using ecological models. We also hope to inspire more accessible and applicable models by suggesting development needs for IAMs.

We conduct a systematic review of four state-of-the-art IAMs, which describes and contrasts key model features and analyses six aspects of IAMs that are of fundamental interest to ecologists.

IAMs could be valuable for modelling biodiversity futures; however, current IAMs were not developed for this application and challenges remain for ecologists looking to use their outputs. Separating and understanding the differences resulting from IAM formulation and those resulting from specific scenario assumptions is currently problematic, and current IAMs may be unable to accurately represent environmental conditions for both Earth-system projections and for building robust models of biodiversity

because key ecological processes are absent. We suggest that model intercomparisons would identify differences in model dynamics, and detailed studies of how dynamical interactions between components influence behaviour would address why such differences arise. Bioeconomic fisheries models and agriculture pollination models provide starting points for integrating key ecological feedbacks within IAMs. Ultimately, making IAMs more accessible within the multidisciplinary study of global change, drawing on user-centred research, would enable more resolved, reliable and accurate assessment of how Earth's socio-ecological system is approaching planetary boundaries.

TIAS AGM

The TIAS Annual General Meeting (AGM) took place on 3 July 3rd in an online meeting forum. A few highlights follow:

Next Theme for TIAS

Social Impact Assessment was adopted as a new focus for future activities (publications, workshops, etc.). This responds to an interest among IA practitioners in improving current SIA methods, tools and indicators. The new focus theme will be introduced in the next newsletter.

Legal/Constitutional Matters

Elections of the vice-presidents will take place at the end of Oct. 2013. Elections for president take place in 2014.

TIAS North America

TIAS can become more active in North America this year beginning with an online meeting of several regional members to develop potential projects of mutual interest.

Call for Submissions

Readers are encouraged to submit feature articles and/or news items for future issues of TIAS newsletter. Please send your ideas or news items to: info@tias-web.info

The TIAS Quarterly

The TIAS Quarterly is the newsletter of The Integrated Assessment Society.

ISSN: 2077-2130

Editor: Claudia Pahl-Wostl

Associate editors: Caroline van Bers, Johannes Halbe

Layout: Johannes Halbe

Postal Address:

TIAS Secretariat

c/o Institute of Environmental Systems Research (USF)

Barbarastr 12

University of Osnabrück

D-49069 Osnabrück

Germany

Phone: +49 (0)541 - 969 2297

E-Mail: info@tias-web.info

Internet: <http://www.tias-web.info/>

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