



# TIAS Quarterly

March/April 2009

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

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

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Courtesy of D. Günther

## 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

### Qualitative Systems in Sustainability Assessment

*Jasper Grosskurth, STT Netherlands Study Centre for Technology Trends*

The concept of ‘sustainability’ is born from the awareness that our ability to serve the needs of current and future generations is threatened. Since sustainability has made its entry in science and politics, researchers have been struggling to define, measure, analyse, communicate and stimulate it. It’s a struggle, because moving towards sustainability is a matter of fundamentally changing system structures. It is generally accepted, that this requires the amalgamation of knowledge from many different disciplines and perspectives.

In recent years, an increasing number of tools and methods have been proposed to address these challenges in different contexts. In the work presented here, we focus on the perspective of regional governments in the Netherlands. As a result of primarily external constraints, their main policy levers are sectoral and largely disconnected. As a consequence, the administrations of these regional governments would benefit from efficient ways to identify robust policy strategies, effective policy levers, and potential side effects resulting from their use, possibly in alliance with other stakeholders.

Over the past ten years, we have worked in that direction and developed a set of three tools to support regional decision makers in making ‘their’ region more sustainable: SCENE, eQSA and QSSI. The tools are meant to help in structuring the complexities of regional sustainability in a manner that is accessible to the target audience, to aid the identification of systemic problems and solutions, and to stimulate integrated thinking. We have co-developed and applied these tools in co-operation with the Dutch Province of Limburg.

**SCENE:** The acronym SCENE stands for the three domains of sustainability: SoCial, ENvironmental, and Eco-nomic. SCENE was developed to foster the understanding of sustainability’s underlying dynamics. It is based on the participative and qualitative representation of ‘stocks’ and ‘flows’ in the format of an influence diagram. Stocks describe core elements of a system in generic terms, such as “lifestyle” or “economic vitality”. Flows are relationships between stocks and can represent material flows, information flows, or other relationships that follow a cause-effect line. With SCENE, the ‘sustainability triangle’ is transformed from a concept for the structuring of sets of sustainability indicators to a framework that allows for the representation of underlying dynamics.

**eQSA:** The influence diagrams resulting from SCENE are further enriched and analysed with the help of enriched Qualitative System Analysis (eQSA), a tool for the structural qualitative analysis of complex systems. eQSA explores the role of different elements in a system, identifies policy levers and possible pitfalls, and uncovers uncertainties. The analysis results in guidelines for the implementation of policy strategies and provides a framework of integration for sustainability assessment tools. The approach is a key element in our ambition to improve integration among assessment tools and the integration of assessment tools in policy-making.

**QSSI:** The Qualitative Systems Sustainability Indicator (QSSI) is an indicator that focuses exclusively on the inter-connectedness among different aspects of sustainability rather than the current state of a set of symptomatic measures of sustainability.

The QSSI measures the degree to which different sectoral sustainability goals conflict with each other. By reducing or resolving these conflicts, the QSSI can be moved closer to its optimal value '0'. The approach results in an agenda for a sustainability transition. The value of the process of developing this indicator - with participatory methods - is at least as important as the resulting value.

All of the tools described are experimental. They are insufficiently tested to assess their value, but there is also significant potential to improve them. Even if further developed, these tools combined will never result in a truth machine prescribing panaceas for sustainability related problems in regional governance. However, they do contribute a structured systems perspective to ongoing discussions. This helps in the identification of priorities, circular reasoning, hitherto unforeseen surprises, win-win elements and potential partnerships among stakeholders.

All three tools are also based on qualitative, rather than quantitative information. It is widely accepted that quantification introduces a bias in sustainability assessments, because less measurable, but not necessarily less important, factors are neglected. We have explored the impacts of quantification in considerable detail in one of our case studies. The figure below shows two system representations of the same system; the region of the Dutch province of Limburg.

The graph in Figure 1a has been drafted in an extensive participatory process. The graph in Figure 1b shows, how the same system is represented in the 13 quantitative forecasting models used by the province's administration. Both graphs contain the same 18 stocks: population (Popu), consumption (Cons), social structure (Soci), public amenities (Amnt), housing (Hous), security (Secu), space (Spac), air (Air), groundwater (G-wat), surface water (S-wat), soil (Soil), nature (Natu), entrepreneurship (Entr), production (Prod), knowledge and innovation (Know), work (Work), mobility (Mobi), and infrastructure (Infr).

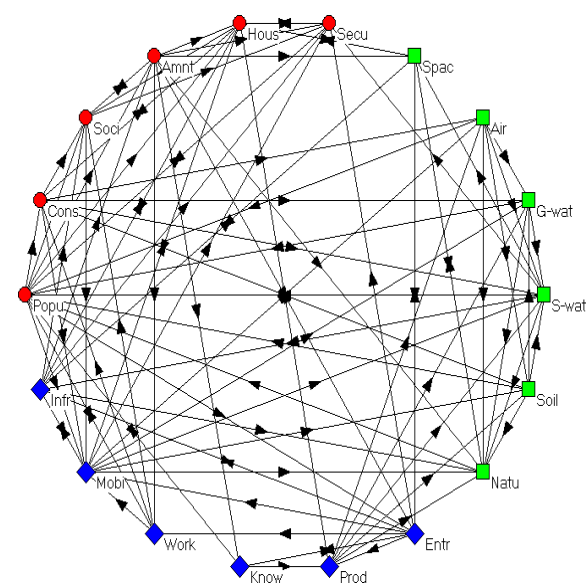


Figure 1a: The Dutch region of Limburg represented in a qualitative system graph developed in a participatory process.

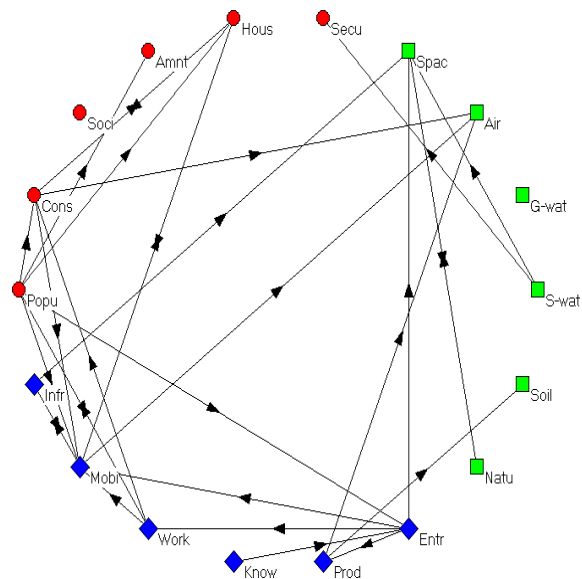


Figure 1b: The Dutch region of Limburg represented in a set of relevant quantitative forecasting models.

It is obvious that the loss of information moving from qualitative to quantitative analysis is significant. In the first graph, 95 flows connect the 18 stocks, and only 30 of these can be traced in the quantitative models. These modelled flows are not necessarily comprehensively addressed. Also, the models are not suited for use within a single system of models. This fragmentation of coverage is lost in the illustration above. Nevertheless, the stocks 'social structure' and 'groundwater' are not covered at all. A third of the remaining stocks are only connected to the system via a single remaining flow. Some flows are covered by several models, most of which concern population and labour-market dynamics. We did not detect a single flow covered in any of the models that group participants had not previously identified.

It could be argued, that the modellers skilfully apply Occam's razor. The modellers minimize the number of assumed relationships by 'shaving off' those with little statistical significance and thus reduce the system's complexity without significantly changing the dynamic properties. To test this argument, we analysed the two systems in more depth using the MICMAC method. This method determines the character of a variable through its passive and active potential. The passive potential describes the degree to which a stock is influenced by other stocks within the system. The active potential describes the degree to which a stock influences other stocks. Variables in the bottom left sector are hardly embedded in the system at all. The top left sector contains highly dependent variables with little influence. Active, but independent variables are found in the bottom right sector of the chart. Variables in the top right sector of the system are critical. They are part of a large number of feedback cycles in the system.

The results of the MICMAC analysis shown in figure 2 clearly illustrates the misrepresentation of variables in the quantitative system and loss of dynamic information. In the conceptual model (figure 2a), all variables are to some degree influential (active) and dependent (passive).

## News

The European network, IWRM-NET, is initiating new research activities on Integrated Water Resources Management (IWRM) at national and regional levels, with a focus on the implementation of the European Water Framework Directive.

**IWRM-Net invites scientists, stakeholders and policy-makers to propose urgent research topics and comments to the current research agenda.**

As an interface, IWRM-Net has established a forum and database with national IWRM-related funding programmes (<http://www.iwrn-net.eu/spip.php?rubrique3>). It is anticipated that the forum will be a valuable tool for the development and management of knowledge for researchers and managers. The forum also allows policy makers to see what is happening within the research community. IWRM-net partners will be able to share the details of their work and allow the user to comment and provide direction to the partners to ensure that most up-to-date and valuable research is made available to those who will use it. .

**The Ministerial Conference on Water** held on 22 December 2008 in Jordan marked the speeding up of the issue of water management and the first important step for the implementation of the decisions made by Heads of State and Government on 13 July 2008 in Paris for the Union for the Mediterranean.

The Ministers adopted guidelines for a Strategy for Water in the Mediterranean, permitting the challenges of climate change and its impacts to be met and tackled. The strategy has two targets concerning the preservation of water quality and the reduction of pressure on water resources through more efficient use.

As well the Ministers drew the attention of governance bodies of the Union for the Mediterranean, in view of the rapid development of new equipment projects in the domain of water, consistent with the Strategy. They have identified an initial series of projects that are being discussed since January. These projects are being completed during the Fifth World Forum on Water held in Istanbul this month, and the first funds will be finalised for the ministerial conference on sustainable development in Monaco before the end of March 2009.

For further information see:

[http://www.medaquaministerial2008.net/en/press/communique\\_AR.pdf](http://www.medaquaministerial2008.net/en/press/communique_AR.pdf)

## New Publications

Hijweege, W.L. (Ed.), S. Dube, G.K. Kabusimbi, Z. M. Aloyce, C. Nyandiga, T. Gondo, J. Serugo, W. Kozanayi, R. Mayienda (2009): **Emergent practice of Adaptive Collaborative Management in natural resources management in Southern and Eastern Africa: Eight case studies**. Wageningen University & Research Centre, the Netherlands. Download full publication (1,5 MB): <http://www.edic.wur.nl/UK/Publications/>

Grosskurth, J. (2008): **Regional Sustainability: Tools for integrative governance**. Phd Dissertation. Maastricht: International Centre for Integrated Assessment & Sustainable Development

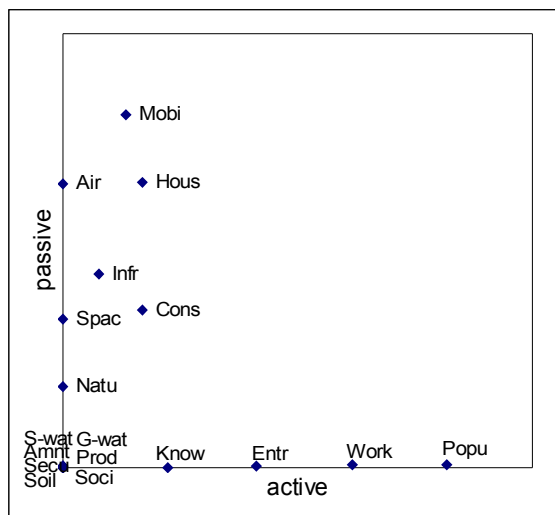
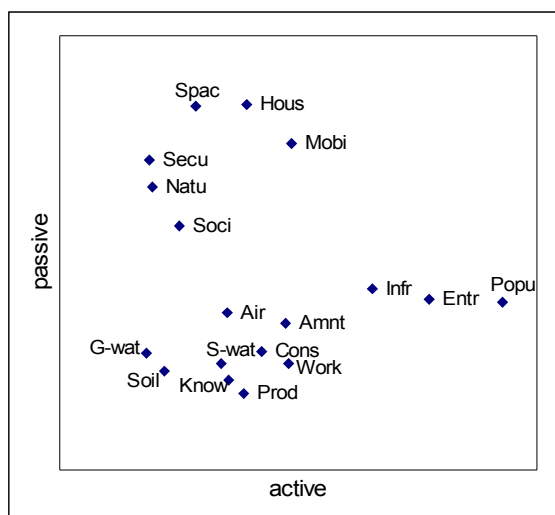


Figure 2: Results of a MICMAC analysis of the system graphs representing the Dutch region of Limburg in qualitative (2a) and quantitative (2b) terms.

This important characteristic is lost when we look at the dynamics of the quantitative models (figure 2b): seven stocks are excluded from the dynamic interplay and three more have an active potential of zero. The stocks 'know', 'entr', 'work', and 'popu' lose virtually all their passive potential. A potential of zero, be it active or passive, interrupts all feedback cycles running through a stock. Stocks become either active, or passive, or excluded. The resulting clear-cut L shape of the variable cloud strongly suggests a misleadingly stable system. Surprising developments and neglected side effects will remain unnoticed based on the given set of models. The system represented in the models fundamentally differs from the conceptual model in terms of coverage, dynamics and behaviour.

The exercise above does not imply that quantification should generally be avoided in sustainability assessments. What it does show is that a well structured and thorough qualitative analysis should accompany efforts of quantification and that tools and methods to do so deserve a high rank on the sustainability research agenda. The work underlying the dissertation on which this article is based has been an effort in that direction. However, the challenges still heavily outweigh the progress made towards a deep qualitative understanding of sustainability related systems.

*This article is based on the PhD dissertation 'Regional Sustainability: tools for integrative governance' and related publications of Jasper Grosskurth. The research was conducted under the supervision of Prof. Dr. Ir. J. Rotmans (DRIFT / Erasmus University Rotterdam) and Prof. Dr. P. Martens (ICIS / Maastricht University). It was successfully defended on 9 December 2008 in Maastricht. The dissertation is available from the author as a pdf document: [jasper.grosskurth@gmail.com](mailto:jasper.grosskurth@gmail.com)*



## Events

April 2, 2009: **Seminar "Drinking Water Production and Resource Protection"**, organised by Kompetenzzentrum Wasser Berlin and held under the umbrella of the international trade fair and congress WASSER BERLIN 2009. The symposium will present and discuss research projects which are currently conducted in Berlin with regard to this topic. The seminar will be held on 2 April 2009 on the fair grounds of Messe Berlin.

For further information see [www.kompetenz-wasser.de](http://www.kompetenz-wasser.de)

21-22 April 2009. **TIAS Experts Workshop II: Methodological Review of Recent Global Assessments**. By invitation. The purpose is to provide insights and guidance for future assessments. Preliminary results available in May.

May 28-29, 2009: **STRIVER Final Conference „Integrated water resource management in theory and practice“, Brussels, Belgium**

This open international conference is intended as an arena for discussions around recent findings in the field of integrated water resources management (IWRM) and will present the major findings from the FP6 project STRIVER (<http://www.striver.no>).

The STRIVER conference is arranged back-to-back with the conference, **'Sustainable development: A challenge for European research', May 26-28, Brussels, Belgium**

For further information see:

[http://ec.europa.eu/research/sd/conference\\_en.html](http://ec.europa.eu/research/sd/conference_en.html)

June 4-5, 2009: **1st European Conference on Sustainability Transitions "Dynamics & Governance of Transitions to Sustainability"**, Amsterdam, The Netherlands.

The conference will bring together a rapidly growing community of researchers and practitioners interested in broad societal transitions towards sustainability. The common goal is to inform strategies for the governance of sustainability through a better understanding of the dynamics of transitions. Recent research has been aimed at gaining a better understanding of the ways in which transitions unfold and the process dynamics can lead to succeeding or failing. The conference is intended to initiate a process of exchange and comparison of the new knowledge that is rapidly being gained in this emerging science of sustainability. The conference will also provide a venue for practitioners and policy makers who are either already involved, or are interested, in, initiating transition steering experiments in their own regions or countries. More information: [www.ksinetwork.nl/conference2009](http://www.ksinetwork.nl/conference2009)

June 5, 2009: The King's College Symposium on **"Varieties of risk research: exploring and expanding boundaries within academia and beyond"**, London, UK

The purpose of the symposium is to stimulate discussions on how to translate risk research findings, especially from the social sciences and humanities, into the practical sphere of risk management.

Call for Papers: Abstracts due by 3 April 2009

For further information on the event and the call for papers see: <http://www.kcl.ac.uk/schools/sspp/geography/research/hrsection/workshop.html>

June 23-26, 2009: **The International Conference WATER POLICY 2009**, organized jointly by ICA (EU) and NASULGC (USA) at the Czech University of Life Sciences (CULS) Prague in June 2009 invites scholars and researchers as well as selected Master and PhD students to participate at this important scientific event. Further information: <http://www.fzp.czu.cz/wp2009/index.php.s>

July 13-17, 2009: **"Participatory decision making and modelling social systems" session at the 18th World IMACS Congress and MODSIM09 International Congress on Modelling and Simulation** in Cairns, Australia.

Further information:

[www.mssanz.org.au/modsim09/page28.html](http://www.mssanz.org.au/modsim09/page28.html)

July 13-17, 2009: **Special UNESCO Workshop on Modelling for Adaptive Water Resources Management at the 18th World IMACS Congress and MODSIM09 International Congress on Modelling and Simulation** in Cairns, Australia.

The workshop provides a forum to bring adaptive management theorists and practitioners together with modellers to share understanding about the role modelling can play in devising responsive policies and adaptive management of water resources at various levels.

Further information: [www.mssanz.org.au/modsim09](http://www.mssanz.org.au/modsim09)

July 13-17, 2009: **'Issues of scale - temporal and spatial aspects of integrated assessment modelling of air pollution and climate change and effects on ecosystems and human health' session at the 18th World IMACS Congress and MODSIM09 International Congress on Modelling and Simulation** in Cairns, Australia.

Further information:

<http://www.mssanz.org.au/modsim09/page26.html>

October 16-18, 2009: **EASY-ECO Budapest Conference 2009 "Stakeholder Perspectives in Evaluating Sustainable Development"**, Budapest, Hungary.

The EASY-ECO Budapest Conference 2009 focuses on key developments in linking Corporate Social Responsibility (CSR) and stakeholder management to sustainability evaluation in the corporate domain in Europe. The Call for Papers encourages researchers from all disciplines (including young researchers), professionals from related fields of work, commissioning agents, evaluation users and other stakeholders to submit abstracts for presentations at the EASY-ECO Budapest Conference 2009 by 15 May 2009. EU-Grants are available for young researchers (with less than ten years research experience) to cover all costs (travel expenses, participation fees, accommodation and living allowance). The presentation of a paper increases the chance of getting a grant, but is not mandatory.

Further information can be found at the conference webpage: <http://www.sustainability.eu/easy/>

December 2-4, 2009: **'Earth System Governance: People, Places, and the Planet' 2009 Amsterdam Conference on the Human Dimensions of Global Environmental Change**. Amsterdam, Netherlands

Call for Papers: Abstracts due by 15 May 2009.

For further information see:

<http://www.earthsystemgovernance.org/ac2009/>

## Courses

May 2009: **“Teaching Adaptive River Basin Management in the Mediterranean: A Training Course for Instructors.”** A training course for instructors of water management organised by the NeWater Project. Various locations. More details: [www.newater.info/everyone/3098](http://www.newater.info/everyone/3098)

June 1-4, 2009: PhD course **“The Politics of Action Research & Creative Methods for Action Research”** of the Aralig network (Action Research Action Learning: Social Learning in Nature-Society Relations) in Wageningen, The Netherlands.

For further information contact Janwillem Liebrand (e-mail: [Janwillem.Liebrand@wur.nl](mailto:Janwillem.Liebrand@wur.nl))

August 31 – September 5, 2009. **Summer School. Understanding global environmental change: Processes, compartments and interactions. Netherlands.**

Applications before June 30. Information available from: [www.sense.nl/courses/course/S310](http://www.sense.nl/courses/course/S310) or contact [nynke.hofstra@wur.nl](mailto:nynke.hofstra@wur.nl).

August 3 - September 30, 2009: **10<sup>th</sup> Summer School on the Latin American Economies** of the ECLAC / CEPAL Division of Production, Productivity and Management, Santiago, Chile. Application Deadline: May 15, 2009. Further information: <http://www.eclac.cl/ddpe/escuela.htm> or contact [summerschool@cepal.org](mailto:summerschool@cepal.org)

Ongoing: **ILRI - International Courses on Land & Water Management.** Alterra-ILRI's international, post-graduate, training courses are designed to meet the training needs of land and water management professionals in mid-career. More information: <http://www.ilri-courses.nl/>

Ongoing: **The SENSE Research School** in the Netherlands offers courses in natural sciences and socio-economic fields of environmental research. More information: <http://www.sense.nl/>

## Job openings

**The Wageningen IMARES (Institute for Marine Resources and Ecosystem Studies, part of the Wageningen University and Research Centre) is offering a post-doctoral position** for the realization of biological and chemical modelling, the implementation of process descriptions and the development plus application of new algorithms, methods and principles within the project "Wadden Sea ecosystem data assimilation and integrated modelling". The project will develop a numerical integration of physical, chemical and biological processes through the application of ecosystem models.

The expected candidate should have a background in mathematical biology, ecology or engineering. The 3-years period of appointment at Wageningen IMARES begins mid- 2009 and runs to mid-2012 at the IMARES-North branch on the island of Texel.

The vacancy will be open until a suitable candidate has been recruited. A first selection however is planned for mid March, 2009.

For further inquiries please contact the project leader Dr. Ir AG (Bert) Brinkman (PO Box 167 1790 AD Den Burg, Netherlands, +31 317 487073, [bert.brinkman@wur.nl](mailto:bert.brinkman@wur.nl))

## 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@jusf.uos.de](mailto:cvbers@jusf.uos.de)

### The TIAS Quarterly

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TIAS Membership information: [www.tias-web.info/](http://www.tias-web.info/)

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