



TIAS Quarterly

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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

Scenario Development for Integrated Water Resources Studies in the semi-arid Southwestern USA

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Introduction

Large parts of the semi-arid American southwest have recently seen years of drought conditions that had not been experienced in this region for about 700 years, a time when the region had a much warmer climate than today (Cook et al., 2004). Even the recent extreme (2005) rainfall did not fully make up for this problem. Globally, about one-third of the Earth's land surface can be classified as arid or semi-arid, which means that these areas receive precipitation amounts of less than 250 mm year⁻¹ or between 250 and 500 mm year⁻¹, respectively. Ecosystems in these regions are particularly vulnerable to climate variability and change; while - in many of these regions - population is growing most rapidly, resulting in serious stress on and strong competition for limited water resources.

The southwestern states of the USA (New Mexico, Arizona, Nevada, Utah, Colorado and California) are largely semi-arid. Vast regions in this area have experienced a long term drought aggravated by the highest population growth in the USA, largely due to immigration from Latin America and the Far East. The population growth in Nevada, Arizona, New Mexico and Colorado by far exceeded the national average for the USA over the last decade, and predictions for the next 20 years suggest an almost linear continuation of this trend. Competition for water resources in this area stems mainly from agricultural, urban and in-stream usages. The stress on these resources has led to overdraft of groundwater, resulting in subsidence problems, and disappearance of much of the riparian habitat. Three water-related issues have been deemed to be of particular importance to support sustainable water

resource management in the southwestern US:

1. An extensive ongoing landscape transition from historical grassland to shrub land.
2. A continued loss of riparian habitat and invasion by non-native species such as tamarisk (salt-cedar).
3. The need for mechanisms for effective and efficient allocation of water among competitive uses, while maintaining appropriate checks and balances to prevent lasting and irreversible environmental damage.

The US National Science Foundation (NSF) funded center for Sustainability of semi-Arid Hydrology and Riparian Areas (SAHRA; <http://www.sahra.arizona.edu>; Sorooshian et al., 2002) attempts to improve sustainable use of water resources in semi-arid regions by informing water management and policy, through addressing these questions. SAHRA conducts interdisciplinary activities, including research, education and knowledge-transfer, to actively create an effective mechanism for rapidly moving the state-of-the-art science into widespread usage for water resource management. The center is a partnership of numerous universities, federal, state and local agencies, and non-profit organizations, predominantly located in the southwestern USA. To focus the research of such a large and heterogeneous group is in itself a difficult task. In addition, only if interaction with stakeholders is pursued from early stages onward will it be possible to achieve the close relationship that is needed to accomplish SAHRA's objective. The three vehicles to achieve this close relationship are: [1] a few well defined science questions; [2] a clear geographical (basin) focus;

and [3] the development of scenarios involving all participating groups. The third aspect is a strong focus of current research activities.

Integration through science questions, basin focus and scenario development

SAHRA has identified three stakeholder-relevant integrating questions on which to focus its scientific research and modeling activities, all of which are or will soon become critical for the wise management of water resources in semi-arid regions and which can only be addressed by researchers operating within a multi-institution center through the consistent deployment of integrated, multidisciplinary science (Figure 1). These three questions, which are broad-based and capable of engendering and crosscutting many related topics of inquiry, touch on scenarios that are of prime interest in this region: land use change, population growth, and climate variability:

1. Vegetation question: What are the impacts of (decadal-scale) vegetation change on the basin-scale water balances?
2. Riparian zone question: What are the (physical, ecological and economic) costs and benefits of riparian preservation and/or restoration?
3. Water markets question: How can water markets or water banking be implemented in this region?

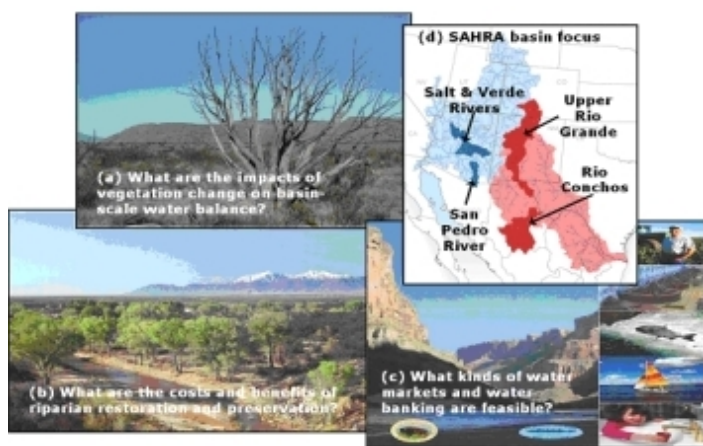


Figure 1. Plots (a) to (c) show the three integrating science questions, while plot (d) shows the research basins located in the southwestern USA.

SAHRA frames its science and stakeholder activities in a river basin context. Basin-focused science yields a synergy of activities that helps to drive science integration and, because stakeholder issues are tied to river basins, also helps to drive the application of research results. SAHRA's primary geographical focus is on two river basins: the Rio Grande/Rio Bravo and the Upper San Pedro, although we maintain interest and some activity in other basins.

The third component and current focus is the development of scenarios for the southwestern USA (Wagener et al., 2006). Scenarios are descriptions of possible alternative futures that take into account the interactions of different components of a complex system. Scientists and stakeholders in the Southwest are working together to define a series of regional scenarios that reflect large-scale processes with broad applicability. Consequently, current efforts are developing a set of scenarios for SAHRA researchers that:

1. inform stakeholder-relevant decisions;
2. hold up to the scrutiny of the scientific community;
3. are consistent with the three SAHRA integrating science questions and across SAHRA projects;

4. represent a broad range of future natural resource conditions, management institutions, and socio-economic conditions that are feasible in the future.

To this end we currently perform workshops and meetings with scientists and stakeholders (individually and combined) in the focus basins specifically, and are coordinating workshops (IEMSS 2006) and conference sessions (e.g. AGU Fall 2006) to engage the wider science community in advancing scenario development and analysis in general.

Outlook

SAHRA's vision of impacting water resources policy and management centers around demonstrating success in achieving a viable and credible integrated assessment and modeling framework/decision support system as a fundamental vehicle for bringing scientific understanding to bear on the decision making process (Wagener et al., 2005). Eventually this integrated modeling framework will be available to assess impacts of climate variability and land use change on water resources in semi-arid river basins around the world. We strongly encourage interaction with interested researchers on the issues discussed in this shorter paper.

Acknowledgements

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Events

31 July 2006. Final Scientific Conference AMEWAM project: "Agricultural Measures for Water Management and their Integration into Spatial Planning". University of Hohenheim, Stuttgart, Germany.

5 - 27 September 2006. **Innovations in coping with water and climate related risks**. Amsterdam RAI, The Netherlands. <http://www.moorga.com/Climate%20Change/Conference3.htm>

6 - 8 September 2006. 20th International Conference on Informatics for Environmental Protection (EnviroInfo-2006). **Managing Environmental Knowledge**. Graz, Austria. For more information and call for papers <http://www.enviroinfo.net>

10 - 14 September 2006. **IWA World Water Congress**. Beijing, China. www.iwa2006beijing.com

11 - 13 September 2006. **The Future of Science, Technology and Innovation Policy: Linking Research and Practice**. SPRU 40th Anniversary Conference. Brighton UK. <http://www.sussex.ac.uk/spru>

21 - 22 September 2006. **Formalised and Non-Formalised Methods in Resource Management. Knowledge and Learning in Participatory Processes**. Workshop. Osnabrück, Germany. www.partizipa.net.

26 - 28 Sept. 2006. 3rd International Symposium on Integrated Water Resources Management "**Reducing The Vulnerability of Societies Against Water Related Risks at the Basin Scale**", Ruhr-University Bochum, Germany. <http://www.conventus.de/water/index.php>

7 - 8 November 2006. Immediately prior to the Global Environmental Change Conference, the **2nd International Young Scientists (YSC) Global Change Conference**, organized by the ESSP SysTem for Analysis Research and Training (START), will convene in Beijing. <http://www.start.org>

9 - 12 November 2006. **Global Environmental Change: Regional Challenges**. An Earth System Science Partnership (ESSP). Global Environmental Change Open Science Conference. Beijing, China. www.essp.org/ESSP2006

17 - 18 November 2006. Berlin Conference on the Human Dimensions of Global Environmental Change. **Resource Policies: Effectiveness, Efficiency, and Equity**, Berlin, Germany. <http://web.fu-berlin.de/ffu/akumwelt/bc2006/call.htm>

4 - 6 December 2006. Symposium: **Man and River Systems II: Interactions among Rivers, their Watershed and the Sociosystem** Paris, France <http://www.sisyphes.jussieu.fr/mr2>

May 2007, International Water Association, "Watermatex 2007", Joint IWA-TIAS Event. Washington DC, USA (a two-day TIAS workshop will be held, including the society's annual general meeting) <http://www.ensic.inpl-nancy.fr/iwa-saia/>

Job Openings

PhD candidate sought for research in learning from experience in **high hazard industries**. Safety Science Group. Technical University Delft, Netherlands. <http://www.tbm.tudelft.nl>

PhD candidate for "**Modelling residential mobility and effects for in shrinking regions**". Computational Environmental Systems and Social Sciences, Centre for Environmental Research, Leipzig, Germany. Deadline for Applications: Aug. 21, 2006. For more information: ralf.seppelt@ufz.de

Graduate Research Assistantships (MS/PhD) in Water Resources Engineering, Civil and Environmental Engineering, University of Maine <http://www.umaine.edu/> USA. To begin Autumn 2006 or Spring 2007. Contact Shaleen.Jain@noaa.gov

IIASA Annual Postdoctoral Program. IIASA's program for young scientists is now accepting applications for two post-doctoral researchers to receive full funding for a 12-24 month stay at IIASA. The application deadline is August 15th, 2006. <http://www.iiasa.ac.at/Admin/YSP/pdoc/index.html>

PhD opening to undertake an assessment of the impacts of individual variation on population dynamics using an IBM approach. The Department of Life Sciences and Chemistry, Roskilde University, Denmark. For more information contact Chris Topping cjt@dmu.dk

Courses

NeWater Autumn School 2006: **Adaptive River Basin Management**. Peyresq, France 27 Sep - 07 Oct 2006. <http://www.newater.info>

Danish Political Science Research School offers PhD courses related to **political science, public administration and international relations**. For the autumn 2006 catalogue: http://nepos.net/neposnet_courses_06_2

Wageningen International offers a wide range of courses that may be of relevance to IA researchers and practitioners (examples: Participative planning, monitoring and evaluation; Leadership and adaptive management; Facilitating multi-stakeholder processes and social learning; Strengthening local stakeholders processes to enhance governance and decentralisation; and lots more) Courses take place primarily in Wageningen University, Netherlands. Fellowships are available for some courses.

More information: <http://www.wi.wur.nl/UK/newsagenda/agenda>

Marie Curie Summer Schools Series 2006 - 2009: **Emerging Theories and Methods in Sustainability Research**. The theme of the June 2007 summer school is **Institutional Analysis of Sustainability Problems**. <http://www.umb.no/?avd=109>

New MSc programme: **Sustainable Energy Technology**, University of Twente, Netherlands. <http://set.graduate.utwente.nl>

New Links and Lists

European Platform of Women Scientists: <http://www.epws.org>

Water Footprint and Virtual Water: <http://www.waterfootprint.org> Includes an individual water footprint calculator.

DIALOGIK gGmbH. Non-profit institute for Communication and Cooperation Research. <http://dialogik-expert.de/en>

New list for academics and policy makers interested in **Impact Assessment** research, procedures and recent developments: **ia-research**. Contributions are welcome by academic research and practitioners of Impact Assessment (European and national officers, consultants, stakeholders). An exchange and discussion is welcome on publications, research projects and events related to Impact Assessment. To become a member please write an Email to majordomo@majordomo.zedat.fu-berlin.de with the only text "subscribe ia-research"

The EU funded project, **New Approaches to Adaptive Water Management under Uncertainty** is releasing a newsletter series (available at www.newater.info) which is to be published on a bi-monthly basis and will make available results of the project as it progresses over the next few years.

Call for Submissions

Conference on "**Sustainable resource management, raw materials security, Factor-X resource productivity - tools for delivering sustainable growth in the European Union**" 6 - 7 December, Bruges, Belgium 2006. Organised by the College of Europe, in cooperation with the Wuppertal Institute Researchers (in particular from economics) as well as high-level decision-makers from business, public policy and NGOs are invited to submit an abstract by 7 July 2006.

More information: <http://www.coleurop.be>

European Research Workshop: **Mapping eParticipation**, 5 October 2006. In conjunction with MCIS 2006 The 7th Mediterranean Conference on Information Systems Venice, Italy, 6-8 October 2006: <http://www.mcis06.org> Authors must submit a 2-page white paper for presentation at the workshop by July 30, 2006. For more information contact: conference organizer: Jeremy Rose, jeremy@cs.aau.dk.

Journal Submissions

The journal "Integrated Assessment" is seeking submissions for upcoming issues. Prospective authors may visit the website www.iajonline.org for more details on manuscript submissions.

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Articles & News Items

Members of the IA community are invited to submit feature articles and/or news items (events, publications, job openings) for publication in future issues of the TIAS Quarterly. Features that appear in this newsletter will also be published in the "Perspectives" section of the IA journal. For more information, please contact Caroline van Bers:

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