RISK BASE NEWS
Risk-Based Management of European River Basins
Issue 02 – May 2008
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Ecosystem services

Dear reader,

Sustaining ecosystem services for human well-being is a main EU environmental policy objective [1]. However, it is for another reason that we selected ecosystem services provided to us by the biophysical soil-sediment-water as main risk objective in RISKBASE: we think that this concept may fit very well to the highly dynamic nature of river basins and their adaptive management. Thus we aim to develop a risk-based management approach that enables the conservation and restoration of this service. But how to integrate it all in such an approach and how to make it operational for river basin management planning? This is the key-challenge we have to face in the 2nd and final phase of our project.

I gladly like to share with you our first attempt to describe the ecosystem services concept as it provides a nice starting point for further discussion in RISKBASE (cited from [2]):

"Societies (present and future generations) depend for their well-being on the goods and services provided by ecosystems. Such goods, for instance, comprise (drinking) water, food, fuel, medicines and building materials. Services are the benefits people obtain from ecosystems, for instance, life support (e.g. biodiversity, fishery, fertile soils for agriculture, water supply and protection against natural hazards), regenerative services (cycling of nutrients) and cleansing services (clean water) that nature provides. Also the enjoyment that nature gives to society is such a service. Unlike goods bought and sold in markets, many ecosystem services are not traded in markets for readily observable prices. This means that the importance of natural processes for the well-being of humans is still ignored by financial markets (www.greenfacts.org), except for carbon sequestration.


Photo: Jos Brils

Biodiversity is seen as metaphor for well-being of ecosystems and thus of great importance for the well functioning of natural processes. Hence, according to the EC Commissioner for the Environment, Stavros Dimas, biodiversity should be pushed to the top of the political agenda: "While climate change takes most media attention, there is one fundamental way in which biodiversity loss is more important – it cannot be undone" [3].

Two thirds of ecosystem services worldwide, with large regional differences, are in decline, evidenced by collapsing fish stocks, widespread loss of soil fertility, crashes in pollinator populations and reduced water retention capacity of our rivers. Ecosystem services are further compromised by overuse and loss of the species richness which ensures their stability. Two key-drivers, world-wide, that underlie these pressures are our increasing technological abilities to efficiently consume natural resources and the combination of population growth and growing individual consumption. More specific pressures in Europe are the demand for housing and transport infrastructure [4]. Added to that is the effect of climate change, which has already an observable effect on biodiversity (changing distribution, migration and reproductive patterns."

I warmly invite you to join our discussion on how to bring this intriguing concept of ecosystem services to the operational level of river basin management planning.

I look forward to your appreciated contributions.

Kind regards,

Jos Brils
RISKBASE coordinator

References
[1] European Commission COM 216. 2006. Communication from the Commission – Halting the loss of biodiversity by 2010 – and beyond, Sustaining ecosystem services for human well–being, Commission of the European Communities, Brussels, 22.5.2006, COM(2006) 216 final, 2006.
[2] Brils JM, Barceló D, Blum W, Brack W, Harris B, Müller D, Negrel P, Ragnarsdottir V, Salomons W, Track T, Vegter J. In press. River Basin Risk Assessment linked to Monitoring and Management. In: ‚WFD ecological and chemical status monitoring'. Eds. Quevauviller P. in press. John Wiley & Sons, Chichester, UK.
[3] Stavros Dimas. 2006. Opening session Green Week 2006.
[4] Crutzen PJ. 2002. Geology of mankind, Nature, 415, 23.

RISKBASE partners:

Cross-cutting issues Workshop

The RISKBASE WP2 on “Communication, dissemination and knowledge management” organised a cross-cutting issues workshop that was held on 3rd-4th December 2008 in Venice, Italy.

In addition to summarizing the results of the thematic workshops held during the last year and looking for the next steps to be taken in RISKBASE, the main focus of the cross-cutting issues workshop was on the topics “Science-policy interfacing” and “Resilience thinking”.

Science-policy interfacing

Philippe Quevauviller from the European Commission DG Environment introduced the audience to this very important topic.

At present ongoing activities such as IWRM.Net (www.iwrm-net.org), WISE (http://wise2.jrc.it) and WISE-RTD (www.wise-rtd.info) help to bridge between science and practical use and application. But still stronger transfer of information from science to policy and vice versa is required to ensure that research outputs really meet the needs and that policy is integrating them properly.

During the workshop the following points were discussed and defined as crucial for successful science-policy interfacing:

- Objectives need to be clearly identified in order to decide what kind of knowledge is re-quired in policy
- Knowledge developed within different national and EU funded research projects should be brought together by co-ordination, not to miss opportunities.
- To bring research results to policy and thus to put them into practice, meetings on EU level (with EC DG Environment) and on national level should be held at the end of a research project to have discussions on what can be taken for policy.
- “Translators” are needed that
  - have to be specialised on this business, speaking both “languages”, i.e. being familiar with the requirements and limitations of both science and policy,
  - transfer the results and knowledge from the research community to the end users (policy makers and regulators). This adaptation of scientific information to policy requirements is crucial to make sure that it is taken up by the policy end users.

As this “interface business” was seen as an important step in linking science and policy it should be more rewarded both for policy makers joining research meetings as well as for scientists the other way round.


Photo: Jos Brils

Resilience thinking

In the presentation given by Line Gordon from the Stockholm Resilience Center first of all resilience of a system such as a river basin was defined as the:

- Amount of disturbance a system can absorb and still remain within the same state of attraction.
- Degree to which a system is capable of self-organization
- Degree to which a system can build and increase the capacity for learning and adaptation

Systems have different ways to respond to external impacts, e.g. with linear, threshold or irreversible changes of the system. Drivers for regime shifts can be internal (slow) drivers, external drivers or other sources (e.g. climate change). For river basin manager it is important learn more about the parameters indicating system shifts in their river basin.

In general the resilience thinking is setting the link between different levels, always keeping track of the whole system and the interactions. Thus the resilience approach helps to come to a better system understanding and to manage complex systems. Compared to the risk or vulnerability approach the resilience perspective is a more positive way to look at eco systems.As the resilience approach is to prepare for an uncertain future by rather placing emphasis on learning than on planning for the future, it is the basis for an adaptive management of river basins.

As a direct introduction of the resilience approach into risk based river basin management was identified as too complex at this stage of development, RISKBASE will focus on adaptive management and its measures, such as:

- The installation of early warning for regime shifts
- Investigation of how the social and ecological system reacts to abrupt change situations

Thomas Track, Katja Wendler
DECHEMA e.V., Frankfurt am Main, Germany

Degradation causes, mitigation and remediation

The WP3 “Degradation causes, mitigation and remediation” focuses on the compilation and integration of current R&D results on topics related to degradation in river basins: erosion, contamination, floods, compaction, sealing, organic matter decline and salinisation. The RISKBASE concept has strongly developed towards SPR (Source – Pathway – Receptor) approach. Thus the objectives of the WP3 in the overall RISKBASE concept are to:

- Address the “Risk of What?” question and assess how the risks/threats can be propagated in the soil-water-sediment system by establishing the State of the Art of in soil-water-sediment system processes understanding.
- Assess how soil-water-sediment system is currently measured and monitored by reviewing existing State of the Art measurements and monitoring tools and practices.
- Assess how the risk is currently mitigated and remediated by reviewing existing State of the Art mitigations and remediation technologies and practices.

The 1st WP3 workshop was held in Orléans; France, at the BRGM from the 22nd to the 24th of October 2007. The group of soil, water or sediment experts invited to the first meeting of the WP3 in 2007 includes 24 persons originated from 9 European countries and 20 different research institutes. The workshop was organised into an informative session, including presentations of the experts in the following selection fields: Soil Degradation problems; Sediment aspects; Integrated water resources management; Synthesis of results from FP 5 and 6 EC projects and a working session, which enabled experts to communicate on their field of expertise and made a first draft of the State of the Art.

The working session was organised into four different working groups:

- WG1: Understanding processes (degradation causes, geomorphological changes...) and measurements of the soil/sediment compartment.
- WG2: Monitoring and remediation of the soil/sediment compartment.
- WG3: Understanding processes and measurements of the water compartment.
- WG4: Monitoring and remediation of the water compartment.

The discussion subject of each working group was selected in order for the overall outcomes of the working groups to:

- Address the overall spectra of soil-water-sediment system;
- Identify the degradation causes of river basin and their origins;
- Identify the possible interrelations and sustainable mitigation/remediation options.

The report on the outcomes of each working group and will serve as the basis of the book chapter on degradation causes, mitigation and remediation and represents the view of each working group. The next task will be to reorganise and consolidate the experts’ view to form a coherent approach of the degradation causes, mitigation and remediation.

Photo: BRGM

Philippe Negrel
BRGM, Orléans, France

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RISKBASE NEWS
RISK-BASED MANAGEMENT OF EUROPEAN RIVER BASINS

Risk Assessment in European River Basins – State of the Art and Future Challenges

At the RISKBASE conference and 1st WP4 workshop on risk assessment in European river basins organized by the Helmholtz Centre for Environmental Research-UFZ in Germany in November 2007 more than 100 experts from 20 countries presented their view in 38 lectures and discussed the available approaches for risk assessment and risk-based management in the context of the implementation of the EU Water Framework Directive (WFD). Quantitative aspects of water regulation under global change were discussed together with qualitative pressures affecting biodiversity and ecosystem goods and services of river and groundwater ecosystems. Major pressures under consideration were hydromorphological changes, eutrophication, invasive species and toxic environmental pollutants. The participants agreed on the proposal of integrated, risk-based management of river basins as an appropriate method to achieve the WFD goal of ‚a good chemical and ecological status by 2015‘.

It was acknowledged that investment in the Best Available Technology (BAT) and targeting discrete pollutants in surface waters successfully reduced excess contamination of several European river basins. The concept of chemical status, contained in the WFD, is based on this principle and identifies chemicals that should be phased-out in the future. However, it was stressed that the 33 priority pollutants considered in the chemical status cover only a miniscule portion of possible toxicants and cannot therefore be used to draw conclusions about ecotoxicological stress in general. Recommendations for a further development of this concept were: 1) to focus on river basin-specific toxicants, 2) to regularly update priority lists with a focus on emerging toxicants, 3) to reduce monitoring efforts for compounds no longer in use, where appropriate, 4) to consider state-of-the-art mixture toxicity concepts and bioavailability to link chemical and ecological status, and 5) to add a short list of priority effects and to develop Environmental Quality Standards for these effects.


Photo: UFZ

As one of the key principles of the WFD the experts saw the ecological status, which is reflected by ‚Ecological Quality Ratios‘. Although the improvement of hydromorphological conditions and reduction of eutrophication on a European scale are critical to attaining the good ecological status, it was stressed that multiple pressures exist at a regional scale under local and regional management including, for instance, point-source or even mega-site contamination. Research should focus on the identification of dominant pressures (stressor- and type-specific), the prediction of multi-stressor effects and a better understanding of the ecology of recovering ecosystems. Increased understanding of ecosystem response to change and the development of early warning systems and methods to discriminate disturbance from natural variation were preferred over the current concept of using reference conditions to define ecological status, which is difficult to apply and ignores ecosystem dynamics.

The experts demanded for a management of the entire hydrogeological system of the river basin, including land-use and climate changes, through integrated monitoring, diagnostics and stressor-based management to account for the interconnected nature of ecosystems. Further extension of this approach into prediction of future pressures that can potentially influence ecosystem sustainability remains a major challenge.

Werner Brack,
UFZ, Leipzig, Germany

Exploring the Interactions of social and natural systems

Risk management is a permanent process and interaction of society to organize anthropogenic activities and living with nature. Thus it is generally a major task to get a better understanding on how a social system understands the biophysical system and reacts by different means of risk management, preventive approaches and policies. To analyze nature as a physical system it is a prerequisite to understand political cultures, institutional arrangements, stakeholder involvement, risk perception, risk communication and the how to translate societal values into science related risk management systems.

The 1st WP5 workshop was, after opening by three key-notes providing an overview on the state-of-the-art regarding risk management and river basin management, centred around two case study discussions. The "Dommel-case", a tributary of the river Meuse in the south of the Netherlands, worked on the relationships of contaminated water environments and human health risks, whereas the "Stože-case", where catastrophic landslides induced by heavy rainfall happened in Slovenia by the year 2000, explored risk issues regarding the overall water cycle and natural hazards.

Although the topics of the two discussion groups were rather different the analysis indicates clear general elements which are prerequisite for management processes regarding river basin systems:

- Participation and collaborative approaches: Risk governance of river systems often represents risk prob-lems which are connected to complexity, uncertainty and ambiguities. To make the different societal demands and values visible in the discussion and to deal with the values and worries of stakeholders in the process is of utmost importance. The design of participative processes should allow generating a joint system understanding, accepted risk assessments and informed decisions.
- Joint system understanding: The understanding of the river basin system needs to go beyond the bio-physical system and to recognise the social system. Information flow and joint activities between stakeholders, policy makers and researchers are needed.
- Communication and education: The importance of communication and education (or training) to raise awareness and understanding needs to be recognised. This is a prerequisite for participative or collaborative approaches.
- Spatial planning and future impacts on the river system: One of the major current bottlenecks is that spatial planning and interactions on risk management are so far primarily focusing on natural hazards whereas for risks propagating chronic at the long term hardly any procedures of knowledge exchanges are established.
- Adaptive approaches: Adaptive management is a social as well as a scientific process and attempts to use a scientific approach, accompanied by collegial hypotheses testing to build understanding. Starting from a common system understanding it seeks to anticipate how the system will react on interventions by closely monitoring what happens. Thus, adaptive management should also use interventions to test key hypotheses about the functioning of the system and by doing this, to understand the system in a progressive way and manage the system at the same time.

Based on the case study discussions an adaptive approach to be developed in RISKBASE is envisaged (see figure 1), which starts by creating the common understanding of the system "as it is", addresses "possible futures" by scenarios, facilitates design sustainable futures for the physical and the societal systems by a balanced planning, implementation and monitoring of interventions. Once such an approach is established it asks for a continuous feedback and learning on the systems behaviour.

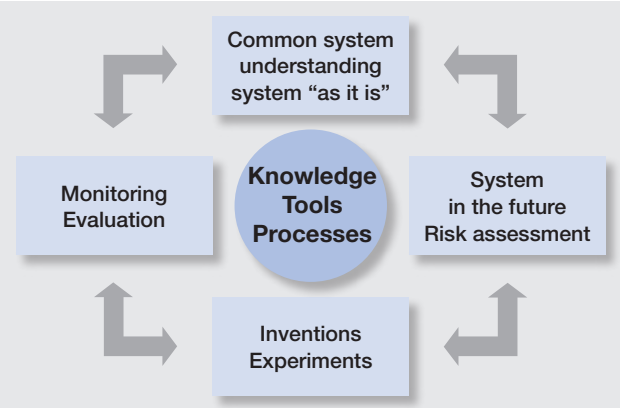

Figure 1: How to manage risks and natural resources within river basins – an adaptive approach according to RISKBASE

The intensive discussions revealed clearly that natural resource management at regional scales and river basins goes beyond natural sciences and engineered or mechanical solutions. Societal values and interests need to be investigated by appropriate cooperation strategies and participative approaches are at the heart of future environmental management and might be necessary at different levels from local to regional. This asks for greater transparency in decision-making and a sound evidence base. Cultural or political 'top-down' styles are conflicting with the idea of natural resource management, where the balancing of natural capacities against economic interests and societal values asks for a close look at local or regional levels.

Dietmar Mueller,
Umweltbundesamt, Vienna, Austria

UPCOMING EVENTS:

RISKBASE:

14th May 2008
RISKBASE Advisory Panel and Consortium Meeting (internal)
Budapest, Hungary
More information: www.riskbase.info and jos.brils@tno.nl

15-17th May 2008
2nd General Assembly and 2nd Thematic Workshop of WP 1b
Budapest, Hungary
More information: www.riskbase.info and Thomas Track (track@dechema.de)
Silvia Diaz-Cruz (sdcqam@cid.csis.es)

3rd-6th June 2008
10th ConSoil Conference 2008
Milan, Italy
Special Session of RISKBASE (Special Session 13)
More information: www.consoil.de and jos.brils@tno.nl

25-29th August 2008
EUROSOIL 2008
London, UK
Workshop of RISKBASE (Workshop 7)
More information: www.ecsss.net and jos.brils@tno.nl

OTHER EVENTS:

16th-21st June 2008
4th ECRR International Conference on River Restoration
Venice, Italy
More information: www.ecrr.org/conf08.htm and info@ecrr.org

2nd-3rd July 2008
FRIAR 2008 – International Conference on Flood Recovery
London, UK
More information: www.wessex.ac.uk/conferences/2008/friar08/index.html and Jenna Solanki (jsolanki@wessex.ac.uk)

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