

## INTEGRATED LAND USE PLANNING AND RIVER BASIN MANAGEMENT (ILUP)

Hubert Siegel<sup>1</sup>, Anton Schabl<sup>2</sup>

### ZUSAMMENFASSUNG

Der Schwerpunkt des Projekts “Integrated Land Use Planning and River Basin Management”/ILUP liegt in der ganzheitlichen Betrachtung der wasser-, land-, und forstwirtschaftlichen Behandlungsansätze in einem Einzugsgebiet, mit dem Ziel der naturräumlichen Risikominderung und der Kostenminimierung sowie der Integration der sozioökonomischen Rahmenbedingungen.

In den Themenbereichen Raumplanung, Hydrologie, Wildbach- und Lawinenschutz, Landwirtschaft, Jagd, Landnutzungsplanung, Naturschutz und Tourismus wurden Teilprojekte abgewickelt. Das Projekt ILUP war eines der Ersten, bei dem Fragestellungen flächendeckend im gesamten Einzugsgebiet behandelt wurden. Innerhalb des Projektrahmens von ILUP wurden neue Methoden erprobt, Strategien entwickelt und Pilotprojekte in ausgewählten Einzugsgebieten umgesetzt.

**Keywords:** Naturgefahren, Raumplanung, ländlicher Raum, Gefahrenkarten

### ABSTRACT

The project “Integrated Land Use Planning and River Basin Management” /ILUP has a major approach in harmonisation of water management, agriculture, forestry and integration of socio-economic aspects.

Fields to be involved are spatial planning, hydrology, torrent and avalanche control, agriculture, hunting, land use planning, nature conservation, and tourism. ILUP is one of the first project integrating several programmes, since the issues dealt with the cover of the entire catchment.

Within the framework of the ILUP project exemplary new methods are being tested, strategies developed and pilot projects implemented in selected river basins.

**Keywords:** natural hazards, spatial planning, rural zones, hazard map

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<sup>1</sup> Head of Subdivision IV4b Landscape Analysis and Risk Prevention, Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management, Marxergasse 2, A-1030 Vienna, Austria (Phone: +43 1 71100 7204; Fax: +43 1 71100 7399; email: [hubert.siegel@lebensministerium.at](mailto:hubert.siegel@lebensministerium.at))

<sup>2</sup> Managing Director of Schabl & Partner OEG, Vienna, Untere Viaduktgasse 53/5a, A-1030 Vienna, Austria (Phone: +43 1 503 7590; email: [office@schabl.at](mailto:office@schabl.at); web: [www.schabl.at](http://www.schabl.at))

## BACKGROUND

Intensive agriculture, settlement and traffic and increasing human activities have affected very much the way of water from precipitation to river. The same is valid for the plain surfaces of river valleys, which are utilised intensively and thus compete directly with the space requirements of rivers and streams to discharge floods safely and to sustain a species-rich river- and alluvial forest eco-system.



Fig. 1: Landuse close the river Raab

Abb. 1: Landnutzung neben dem Flusslauf der Raab

Utilisation claims for the river basin are raised also from agriculture, recreation and leisure time, nature conservation etc.

The floods and damages of the last years showed, that sustainable flood protection can be achieved only by a combination of land management in the catchment area, provision of additional space for flood prevention and technological solutions and prediction models. Infrastructure planning, land use and the protection of resources demand an integrated approach due to the space limitations.

The problem statements at the foothills and the hill country related to the integrated management of water resources, risk management and natural landscape management are only sustainable solvable in an interdisciplinary way, as common strategies of the involved disciplines (Departments and authorities from the sector forest spatial planning, hydraulic engineering, torrent and avalanche control, agriculture, hunting, spatial planning, nature conservation, tourism etc.) are obligatory. This demands an intensive collaboration, clarifying the base data, harmonising the respective bodies, and coordination of the

joint developing operation strategies. In the risk areas e.g. in the Danube zone, the water management is important for the land use development. With a spatial planning and a land use steering approach the sectoral protective water management will be enhanced to an integrated river basin management.

### From sectoral water management to Integrated River Basin Management (IRBM)

The goals of this project contain the drafting and implementation of an integrated strategy for the assessment of foothill and hill country, due to in terms of area evaluation and with regard to the natural hazard and use potential and the resultant conflicts as well as a prevention support (flooding, mudflows etc.) with transnational coordination (transferability of the evaluation approach).

Further part targets concern:

- Harmonisation and integration of existing sectoral appendage – implementation of an integrated river basin management as a new efficient planning tool
- Development of new methods for the detection of future risk scenarios and the effects of floods specially also considering the climate change
- Integration of the essential effects on the environment and aspects of the resource management

- Developing middle- and long-term concepts for land use and natural landscape management for sustainable development as well as for transnational cooperation
- Preparation of investments by roadmaps which are directly introduced in the practical decision-making of the community development
- Increasing the acceptance among the population for river basin management through new market and communication mechanisms, simultaneously setting river oriented impulses for the regional development

Sustainable flood protection in natural river basins can only succeed with a cross-sectoral approach and multisectoral cooperation. Modern market and communication mechanisms should make the concrete benefits of measures of river basin management, as like as creation of free space without or low damage potential along the rivers for flooding, clear to as many citizens as possible. Awareness with regard to the rivers and thus the acceptance of river basin management is to be enhanced and at the same time impulses are to be set for regional development. In the basin of Ybbs it has been done by environment teachers within a so called water school.

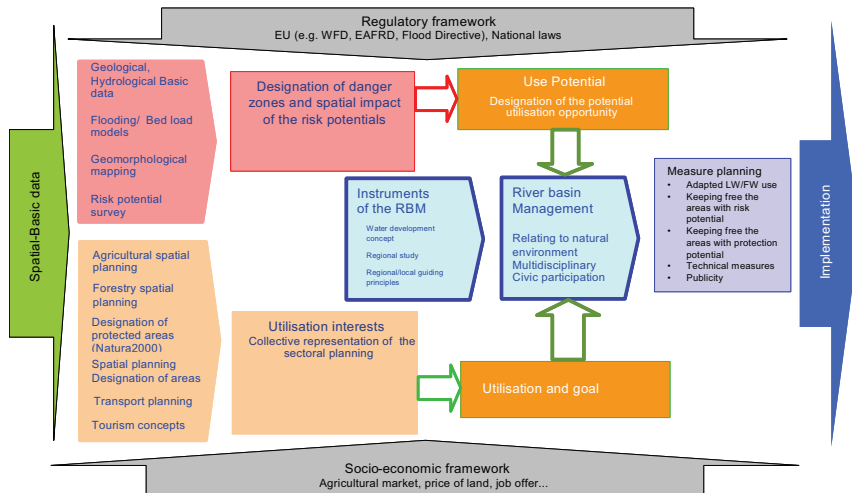


Fig. 2: Integrated river basin management flowchart  
 Abb. 2: Integriertes Flussraummanagement Ablaufdiagramm

## RIVERS NEED SPACE

People want to live, work and travel on good transportation lines, but space in the valleys is limited, also nearby the rivers. Flood protection, nature conservation, agriculture and also forestry – all this utilization forms need space.

- Development of new methods for early detection and reactivity to risks with special consideration for the climate change

- Concepts for land use and landscape management (minimising use conflicts) for a sustainable development and transnational cooperation
- Increasing the acceptance among population for river basin management through new market and communication mechanisms
- River related impulses for regional development

## **DEVELOPING AND TESTING**

In several selected river basins an integrated approach of planning and land use optimisation has been tested. In numerous transnational conferences and workshops the partners have reported their experiences of assessing the national hazards, combining with the land use effects a spatial planning aspects.

As a result of the process, an integrated river basin management strategy according the new EU-Flood Directive has been derived exemplarily in the pilot basins. This should deliver further fundamental data for preparing new guidelines for functional aspects within the EAFRD-program beyond 2013.

This has to be realised with an integration of the stakeholders of the relevant areas.

### **National Approach Austria**

The field of the spatial basic data (terrain model, orthophoto, satellite images, and geographical material) is widely covered; selective improvements and updates will be conducted by the regional public authorities in the partner countries.

These are important resources for the priority string of measures as well as the basis for the planning of the use potential. In the range of the sectoral spatial planning fields: agriculture, forestry, transport etc., mainly the agricultural land-use planning poses a problem for the natural hazard prevention purposes. The exclusive regulation by financial incentives from the agrarian aid is a too weak instrument for risk potential purposes. The adoption of the potential ways of agricultural utilisation, regarding the efficient IRBM, is an important element. A methodological approach for a functional assessment of the agricultural utilisation forms was developed in the scope of the project ILUP (WAGNER 2007). The major task of IRBM was restoring the balance of the utilisation interests taking into consideration the use potential which in turn derives from the risk potential.

### **National Approach Bavaria**

In course of the project work's a new planning process was developed. This actual planning and implementation methodology can be described as a linear approach with main five steps from planning towards implementation.

This development was basically affected that the main problems in this line arise during the steps stakeholder participation, financing and spatial management.

Especially failures in the dialogue with different interest groups can endanger the necessary financial contribution or the availability of space for implementation. Therefore the need was seen to develop new methods of stakeholder participation: the integration of regional and socio-economic development aimed to start a planning process from the stakeholders perspective and integrate later on the objectives of water management authorities into a starting project. (DORNER 2007a)

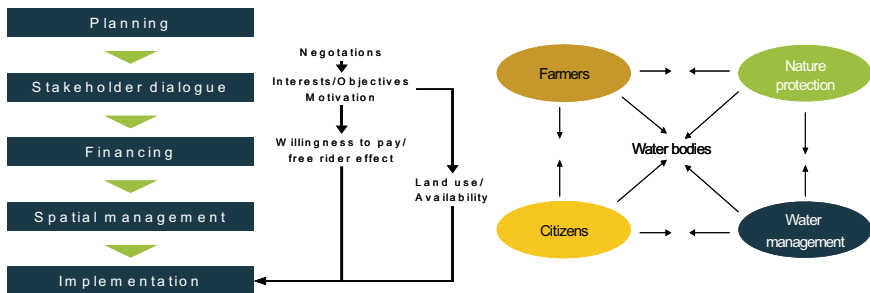


Fig. 3: Integrated River Basin Management, Planning process (DORNER 2007a)

Abb. 3: Integriertes Flussraummanagement, Planungsprozess (DORNER 2007a)

As a developing, planning, and implementation method, IRBM is able to provide a flexible and updateable instrument to follow changing framing conditions.

This means for an dynamic approach for river basin management to integrate institutional learning and an updateable approach to follow trends, scientific achievements and political developments. Besides the new water management planning methodology, the interdisciplinary approach for river basin management also asks for a distinct process management. To achieve a maximum of synergies and avoid contradictory goals disciplinary plans need to be parallelized. In a next step intersectoral implementation projects can combine e.g. the strengths of different funding and implementation measures and achieve a maximum benefit from a societal and stakeholder perspective.

### National approach Czech Republic

Common proposals of measures in landscape come from water, forest and agricultural management. They respected nature prevention demands and development of rural enterprise activities. The project team searched for such solution that involves a discussion of multi branches linked to landscape and by thus significantly lowers risk zones. The Pomoraví basin functioned as a pilot area for setting up of a new legislative in forestry, nature prevention, agriculture and spatial planning (TRANTINOVA 2007), and caused a new spatial planning directive of the Czech Republic

### GOOD PRACTICE GUIDE

All over the partnership numerous subprojects have been developed and summarized in a Good Practice Guide:

- Integral, multidisciplinary, regional evaluation of the natural hazard and use potential
- Transferable water management system and Good Practice Guide
- Concerted planning and implementations of land-use optimisation
- Long term impact on the instruments of spatial planning (risk prevention) below a few distinctive examples.

## Flood Hazard Maps

The Lower Rott was chosen as project area because of its wide flood plains on the one hand side, and the high values at risk in urban and industrial areas at the other side. The upstream detention reservoir Rottauensee has a flexible control strategy for small flood events up to a 20 year flood. Resulting variable flood plains for distinct flood events had to be taken into account, because resulting maps should also serve as an information instrument for the control of the reservoir.

Methodology: In Austria, Switzerland and several German Federal States experiences have already been made with flood hazard maps. These achievements had been picked up and evaluated for use in the Tertiary Hilly Landscape.

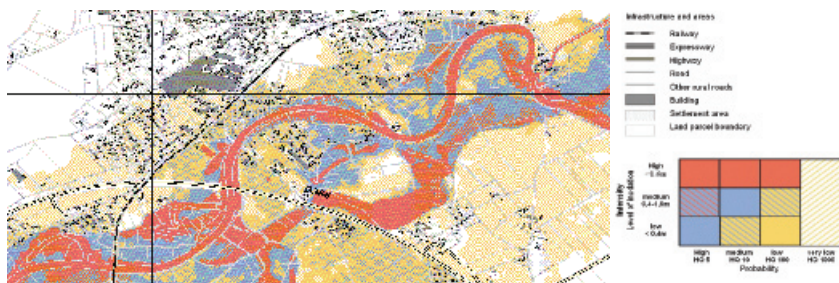


Fig. 4: Flood hazard maps (DORNER 2007b)

Abb. 4: Gefahrenkarte Hochwasser (DORNER 2007b)

## Czech approach implemented in basin Pomoravi

At present time there are two applied approaches for realization of flood preventive measures:

- traditional technical process (used by State Water Management), i.e. building dams, dam removing from flows, spreading and deepening of stream channel, objects removing out of inundation area, application of protection mobile elements,
- approach (implemented in ILUP Pomoravi, phase E05) referring to technical line and space measures on water flow; those measures focus on system application of land consolidation (e.g. technical, bio-technical, organization and agri-technical measurements in the area of river basin) – they have also soil protection from erosion and flood protection effects above all in increasing landscape retention and its ecological stability (Trantinova 2007). Those different approaches support each other interactive very effectively.

Water regime in landscape (ILUP Pomoravi, phase E05) was divided in these parts:

- Evaluation of run-off and erosion situation in the area and retention water capacity of landscape
- Calculations and modelling of basic hydrological characteristics and erosion threaten soils and sediment runoff
- Proposals of complex prevention and organization of river basin
- Optimization of prevention and organization of river basin

## Austrian Agrarian Spatial Planning

Four reference communities represent the different natural conditions and are subdivided into 19 functional units (homogenous in terms of agricultural production within themselves) which have been evaluated due to different major functions.

- **Function of Production** The function of production of food and raw materials is calculated from the shares of a given soil-evaluation for arable land and grassland in the digital soil-map 1:25.000.
- **Function of Protection** The function of hazard protection takes into account the share of official risk zones for hazards on agricultural areas.
- **Function of Resource Protection** The resource protection (risk of water and wind erosion and leaking pollutants into the groundwater source: soil map) is compared with the agricultural land use (indicator: share of grass and fallow land) to get evidence of a sustainable agriculture.

The view of different functional patterns of agricultural areas in the communities rises the awareness of a multifunctional agricultural landscape and shows strengths or deficits of agricultural areas in the evaluated terms. The result is one base for integrated regional planning decisions.

## STAKEHOLDER INFORMATION AND PARTICIPATION

The central focal point of this project is the flood protection. To achieve understanding for the appropriate measures, the subject is designed with the methods of natural pedagogy as already mentioned.

Pupils at the age of 6-14 were chosen as target group, so that an additional multiplication effect over teachers and parents can be achieved. The complex knowledge shall be imparted to the pupils both on emotional and cognitive level.

Subsequent to the training, individual tours were held for the guided classes, harmonising with the level of education, in the period May-June 2006. Thereby, about 300 pupils in the basin of river Ybbs area could be reached. There was a positive feedback by teachers as well as by pupils.

This project received also a strong response by the media so that the sub-goal to raise a high profile in public could be achieved.

The positive experiences of the employees of the hydraulic engineering and of the addressed target audience resulted in a continuation of the project beyond ILUP. For 2007, an enlargement of the guiding area and the number of tours at the Ybbs, Url and Melk (bordering river basin) has been established.

The river pedagogical tours will be a fixed part of the department of hydraulic engineering. Accordingly, further new staff will be trained or rather the involved persons qualified.

To raise the high profile, information material (calendar, brochures etc.) and the setup of a homepage shall be broadened.

By the end of the project, new, interdisciplinary, and transnationally harmonised planning concepts and papers (e.g. integrated river basin management plans, cross-sectoral danger-preventing plans, transferable management systems with practical examples etc.) are available for the project regions in the partner countries. They will also be a basis for further sustainable development.

The expectations of the project partners were particularly high, since on the one hand, a new kind of “planning culture” was caused through the development of fundamentals. On the other hand, the assessment of the natural danger potential in the project regions and differentiated specifications for an optimisation of land use will be incorporated in all future space planning measures. Already now, extensive investment plans are available – in particular where public administration is responsible.

The pilot measures have demonstrated that the planning products developed in the framework of ILUP are practicable. Active countermeasures in relation to natural danger and floods are demanded not only, as apart of the project, but also increasingly by the population. More awareness of the problem will certainly result in an enforced problem awareness within the European Commission.

## **TRANSNATIONAL DIMENSION**

Improvements in the catchment area of the Danube can only be reached by an integrated river basin management already in small catchments. The key to have success in this context are the new land-use strategies as well as the creation of new retention zones, a more intensive cooperation with agriculture, and primarily a much more intensive integration of both the new EU member countries and those Danube River Basin countries further east into the global idea of the ILUP project – the integral and transnationally harmonised water management. The proving of new land use strategies for flood plains, a close cooperation with new EU-member states or rather candidate countries and establishing the creation of additional retention areas require a transnational coordinated approach for reaching the goal of hazard reduction and risk prevention in a manageable time.

## **LITERATURE**

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