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Cooperative Research in Water Management

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1. Introduction

Due to changes in climate, land use and regional policies, new spatial and water resource integrated management strategies are needed. The aim of WAREMA was to develop participatory watershed planning procedures based on stakeholder networks to contribute in the implementation of the Water Framework Directive 2000/60. New strategies tailored to watersheds, including large protected areas (e.g. Ramsar Sites, Biosphere Reserves) were developed and tested in four pilot projects, in Hungary in the watershed of Lake Velence. The tools that will be used were private - public partnership, context analysis reports, action plans, spatial planning concepts, extensive discussions and information. The parties involved will gain a common vision on the priorities for nature and landscape protection, cultural heritage preservation, socio - economic development and water resource management. The ultimate aim of the project was to achieve a genuinely sustainable regional development based on preservation, enhancement and effective use of local resources.

2. Definition of WAREMA Spatial Planning Concept

The objectives of WAREMA project were: to establish the basis for the sustainable regional development of the river basin that - beside the increased utilization and protection of local resources - ensures the integrated regional and water management of the river basin in the course of a planning procedure based on community participation. WAREMA was intended to support the achievement of Water Framework Directive and the preparation of river basin management plan. The method of achieving the objectives defined above was to *prepare a regional development concept, corresponding to the long-term goals of river basin management plan (2015), that specifies the long-term strategic aims and priorities with regard*

to the professional relations in connection with protected areas and water management. WAREMA project worked out an innovative methodology by comparing international results to assist the work on the river basin management plan.

3. Precedents of the river basin management planning of Lake Velence

There has been planning activity on Lake Velencei for a long time, thus, it is practical to proceed from the planning work of the past providing fundamental information for this project as planning has always focused on the preservation of water quality and the sustainable utilization of natural water for recreation and touristic purposes. The current task of the river basin managament planning of Lake Velence is in close connection with the regional developmental concept of the highlighted holiday resort of Lake Velence and Vértes mountain. Agricultural and rural development strategies and programmes providing fundamental information for this work have also been prepared for the region. Recreation and touristic concepts for the county and region have been practical as well. Therefore, a number of complete concepts were available for the area of Lake Velence that were re-evaluated in accordance with the aims of WAREMA.

4. The methodology of WAREMA project

WAREMA project applies the methodology of planning from beneath, involving professional and social strata of people concerned. In Hungary, no such active participation of people concerned is conventional in the planning processes. The obligatory procedures of judging plans are rather carried out as discussions with the competent authorities, or the plans are introduced at residents' forums. Within the frame of WAREME project, the involvement of people concerned in the planning work was based on a permanent co-operation to promote the interests of the different organisations and inhabitants from the planning process to the accomplishment.

In the application, 10 workshops were scheduled for the following three work phases:

- Creation of future vision (3 workshops),
- Preparation of strategy (4 workshops),
- Introduction and evaluation of concept (3 workshops).

The creation of future vision means the definition of objectives on the basis of the examination material. The examination material has to contain the problems that the future vision is based on. The strategy specifies and considers - on the basis of future vision - the solutions resulting in the achieving of objectives and defines

the key strategic aims. In the third phase of workshops, the concept prepared by the experts in accordance with the results of preceding workshops is introduced and evaluated.

The workshops were supported by the comprehensive background work of experts. Tasks in connection with this can also be divided into three groups:

- Preliminary definition of problems. Designation of people concerned.
- Preparation of people concerned for the team-work. Professional guidance of workshops by problem areas. Processing of results.
- Preparation of periodic reports relating to the project's work phases. Participation in discussions. Preparation of final documentation.

Plans prepared earlier could be used also at this stage as we discussed the fulfilment or the unaccomplishment of former objectives with the people involved. In the course of the analysing process further problems arose and proposals were elaborated. During the preparation of workshops, the experts compiling the issues of each workshop and define the groups of people to be involved had to be designated.

The constant members of the expert team are the two project managers, the experts in the fields of water management, nature conservation, environment protection, soil protection and land utilization, as well as the representatives of self-governments and micro-regional associations being responsible for the subjects in relation to the inhabitants, settlement infrastructure, recreation and tourism. These experts are, at the same time, people concerned who can surely define the groups of people to be involved.

In the course of this preparation process, the experts also specified the issues to be discussed with the people concerned.

During the three workshops held to create the future vision, not only the subjects but also the conflicts of fields were introduced. On the basis of them, long-term objectives and priorities can be specified.

The people concerned have to be involved in the planning procedure by emphasizing their professional interests. In order to raise their interests, sometimes they had to be contacted personally in the frame of the professional background work. he aim of meetings during the stage of the creation of future vision was to give information to help the definition of objectives and to collect further information and problems to be solved. Thus, a wider basis of people could be targeted.

The strategy was specified by the team of experts, keeping in mind to involve the representatives of all the relevant interest groups.

When the concept was introduced and evaluated, more people was involved again in the exchange of information. At this stage, tools used in the first phase (such as media, leaflets, internet access) was applied again beside workshops.

An important element of the experts' background work is the introduction of subject matters on digital maps. The different problem areas were compared to maps of certain fields of use (e.g. the utilisation of Lake Velencei for recreation activities and tourism, or Lake Velencei as a water base to be protected, as well as

the conflict between ecological corridors, nature conservation areas and agricultural exploitation).

The Hungarian adaptation of the Strategic Environmental Assessment (SEA) Directive prescribes the compliance with the requirements of sustainability. The Directive lay emphasis on the need for consultations with the authorities and the public as well as the discussion on the concept versions.

The principles of sustainability were taken into account throughout the entire planning process. The public, including the self-governments, agricultural producers, civil organisation of the region as well as the students of the Agricultural Vocational and Boarding School of Velence and the College of Geoinformatics representing the future generation, was successfully involved in the work during the 10 consultations. The public was informed about the project at the beginning of the work through the media (local television and newspaper), and regularly through the website that was continuously updated.

Organisations evaluating the material as authorities or providing documents and information to support our work also took part in the different phases of professional work. Significant co-operation has developed with the Central Transdanubian Environmental and Water Authority, the Plant and Soil Protection Directorate of the Central Agricultural Office, the Central Transdanubian Bureau of Nature Conservation, the Pro Vértes Nature Conservation Foundation, and the Developmental and Regional Co-ordination Office of the Local Governments of the County. Our work has been helped and assessed by several other experts as well.

The alternatives of the developmental concept were elaborated in accordance with the availability of sources and the requirement of harmonization. On the basis of the opinions gathered, the second "project controlled" scenario is expected to be achieved. This scenario would not result in great losses in the region but to accomplish the proposed future vision the scenario of "strategic development" is practical to be accepted, especially because this one ensures a sustainable developmental model.

One of the most important elements of the implementation of the concept and sustainability is to state that the water use of the region should not be regulated only to ensure the water level of Lake Velencei. Other aspects of nature and landscape protection have also to be observed to establish a water resource management system that promotes the development of agroecological farming and the extension of ecotouristic supply, thus, the balance of social, economic and environmental requirements for the entire region can be guaranteed.

5. Assessment

Prior to the preparation of the concept, the current state had been explored. The results of this exploration process is summarized in the table of SWOT analysis.

Strengths	Weaknesses
Favourable geographical location, the river basin is located on the Budapest – Lake Balaton touristic axis in the second most developed region of the country. The area is crossed by several international public roads and railway lines.	Due to the lack of ring roads, traffic is loaded on the settlements (air pollution, noise)
Natural and landscape features protected internationally and nationally. Unique plant and animal species.	Because of the high rate of protected areas, nature friendly agricultural technology is of low standard.
Natural, landscape and settlement environment attracts tourists and visitors who are looking for recreation.	The structure of accommodation is unfavourable. Hotels and camping sites do not meet the actual requirements.
The suitability for agricultural production exceeds the average of the country and the county as well.	Access to agricultural and rural developmental subsidies is impeded by the subdivided estate and proprietary structure and the lack of co-operation.
Fruit and grape production is on the upgrade due to favourable microclimate.	Small amount of forests in spite of the advantageous features.
The reduction in the use of agricultural chemicals resulted in less contamination to the soil and water.	The real use of plant protective chemicals and artificial fertilizers is hard to check in the new system of land-owning and land-use (deficiency of information)
Several animal husbandry farms was closed down and significant investments were implemented at the farms still in operation, reducing the level of contamination.	Liquid manure storage places contaminate the soil.
There are no large industrial plants discharging pollutants in the region.	Lots of illegal waste dumps.
Positive demographical tendencies due to immigration.	The settlements expand toward places that are unsuitable to be built up. In the southern shore green areas were occupied by built-up areas.
Considerable activity of business ventures can be observed.	Most of the agricultural and touristic ventures are deficient in funds.

Opportunities	Threats
The vicinity of Székesfehérvár is a great advantage for the area considering both the employment and the service possibilities	The capital-scarce of the local authorities and enterprises hinder the project participation
The subsidies from the European union increase from 2007. The better the project proposal the more the subsidies	Lack of cooperation of the settlements
The subsidisation structure of the European Union prefers the different type of ecological and biological farming types, the forestation and wildlife management. Cooperation is a top priority issue in the EU	The lack of necessary steps on the watershed area (eutrophisation, reed pollution)
The water management plans that considers the Water Framework Directive helps to solve the water- and flood management of the watershed area	Lack of embankment wall reconstruction investments
Tourism development and rural development should be tuned for more effectiveness	Leave out of consideration of water user's claims for complex development of the region

Table 1: SWOT analysis

6. Analysis of the conflicts in the use of river basin

On the basis of the assessment, it can be seen that the river basin of Lake Velencei is an area developing dynamically and having natural values of considerable protection.

In the river basin, protection categories include nature and landscape conservation, and the protection of water and soil. The developmental potential residing in the features is primarily the improvement of recreation services and tourism as well as agricultural production. Beside the development of economic functions, an important element of balanced structural development is the improvement of the settlement environment involving the advancement of settlements, infrastructure and services.

The relations between the categories of protection and the possibilities and demands of development are entered into a matrix in order to be examined.

Natural resources	Usage / Protection	Development possibilities, demands		
		Tourism	Agriculture and forestry	Urban environment, services
	Water	1. Conservation of good water level of the lake 2. Water quality (status of the channels and water courses) 3. Dredging of beaches and harbours 4. Further usage of thermal water 5. Possibilities of water supply the golf courses	1. Sustaining of water demand of agriculture and fishery 2. Use of pesticides and water pollution 3. Nitrate pollution of groundwater due to the animal husbandry farms	1. Temporary lack of water (Pákozd, Sukoró) 2. Scarcity of the sewage system (risk of nitrate pollution) 3. lack of lake side reconstruction 4. Lack of water management in the urban areas 5. Security of the waste deposits
	Soil	1. Deposit of thermal wastewater 2. Sludge deposits considering soil protection	1. Soil erosion on hilly areas 2. Deep areas become wetlands 3. Lack of land consolidation	1. Expansion of urban areas 2. Illegal waste deposits
	Natural, environmental and cultural endowment	1. Eco tourism possibilities 2. To preserve the Dinnyési wetland living habitat water supply from the lake is needed 3. Usage possibilities of the Csákvár airport 4. Disturbing effect of Börgönd airport 5. The landscape demolition effect of the abandoned mines	1. Protective type land use and low level of agro techniques on sensitive natural areas 2. The need for reed harvest	1. Lack of urban green areas 2. Expansion of Székesfehérvár's eastern industrial zone 3. Endangerment of landscape elements due to urbanisation

Table 2: Matrix of spatial use conflict

7. Long-term development concept

7.1. Future vision and scenarios

Regarding the long-term developmental concept being prepared in the frame of WAREMA project, the following future vision for the river basin of Lake Velencei was created in the course of consultations with the people concerned. The region remains an area of dynamic development where the basis of improvement is the

changes in the quality features of the environment. By preserving the values of the natural resources of the area during their utilization, the role of the region, recreation and tourism will increase as the possibilities of high quality tourism are expanded in such a way that tourism is one of the sectors that the inhabitants earn their living from. Another economic basis of the residents is agriculture and forestry that develops in harmony with the protected natural areas. Harmonized developmental programmes are prepared with the active participation and co-operation of society and professional organizations that promote the achievement of developmental objectives. They give a basis for investments that improve the region's economic and settlement infrastructure, the comprehensive advancement of the natural and settlement environment.

The achievement of long-term objective can be predicted on the basis of different scenarios of development. Scenarios can be characterized as follows:

Scenario of spontaneous development:

- Current tendencies continue.
- Primarily, short-term developmental policy is dominant.
- Improvements follow the demands.
- Bottle-neck problems are solved desultorily.

Project controlled scenario:

- "Take the opportunities. Let's apply for grants."
- Entrepreneurs, self-governments and other organizations try to induce quantitative and qualitative improvements through investments.
- Improvements are broken-up and inefficient.

Scenario of sustainable development (strategic scenario):

- It can be accomplished only by conscious, long-term, harmonized development.
- Strengthening of the inner cohesion based on local resources and regional features.
- Utilization of external energies coming into contact with the area.
- Establishment of an internal improvement spiral.

Any of the above scenarios may occur but, considering the features of the region, the developmental concept was elaborated on the basis of the scenario of sustainable development.

7.2. Comprehensive aim and priorities of sustainable development

The comprehensive aim of sustainable development on the river basin of Lake Velencei is to protect the environmental, natural and cultural values of the region and to gradually improve the living standard of the inhabitants.

Tool / Aim		Life quality improvement of the inhabitants on the watershed area			
Sustainable development	Value conservation usage	Development / Resource	Tourism	Agriculture and forestry	Urban environment, services
		Water	1. Water quality conservation of Lake Velence 2. Harmonisation of water management 3. Lake side and lake pool regulation tasks (dredging considering tourism and environmental issues) 4. Wellness tourism development	1. Changes of the land use categories (meadow, forest) in order to protect the surface water quality 2. Incensement of water storage capacity of soils through suitable agro-techniques 3. Consideration of the irrigation and fishery's requirements	1. Development of a water quality improvement action plan for water management in urban and in natural areas 2. Sewage system and water cleaning plant development 3. Elimination of illegal waste deposits
		Soil	1. Sludge deposit considering soil protection aspects 2. Thermal wastewater management	1. Change of land use category due to soil protection 2. Liquid manure management considering soil conservation 3. Reconstruction of former melioration works 4. Land consolidation in bottom up approach	1. Restriction of urban developments 2. protection of intensive agricultural areas
		Natural, environmental and cultural endowment	1. Development of eco tourism possibilities (training centres, presentations) 2. The sustain of water supply of Dinnyési Wetland 3. Improvement of natural status to develop tourism (landscape management of the abandoned mines, reconstruction of the whole landscape) 4. Protection and development programmes of the cultural values	1. Development of nature protective agriculture and forestry (structural changes in land use, extensive farm management) 2. Implementation of nature friendly reed management 3. production of regional agricultural and forestry products	1. Improvement of quality tourism (reconstruction of housing possibilities, development of the institutional background 2. Improvement of rural tourism together with making the traditions alive (wine roads, equestrian tourism) 3. Improvement of tourism cooperation (travel infrastructure improvement, programme coordination, marketing development

Table 3: Matrix of strategic development

The priorities beside the preservation of natural resources during their utilization are as follows:

- In accordance with the Water Framework Directive, preserving the quality of waters and achieve good status of waters up to 2015.
- Protection of soil as an important resource of the region
- Protection of natural, environmental and cultural values.
- Development of recreation and tourism with regard to the feature of the landscape.
- Establishing nature friendly agriculture and forestry.

- Development of the settlements' environment (infrastructure and services).

The concept priorities and strategic programmes can also be entered into a matrix where the first row and column of matrix contain 3 priorities each, while the fields of matrix include the strategic programmes correspond to the relations (Matrix of strategic development).

8. Conclusion

Water resources are going to be one of the key issues for the future, considering the increased need for drinking water, tourism, agriculture, energy production and industry. On the other hand the availability, quality and certainty of fresh water supply is decreasing due to climate change, increasing pollution and insufficient infrastructures. As the water issue plays a key role for society and economy, it becomes a lead factor and indicator in territorial planning.

In protected areas nature has priority and land use is subordinate to the targets of nature protection. But water scarcity as well as floods has an impact on ecosystems and biodiversity. Protected areas are therefore even more sensitive than other areas and need appropriate planning. Further more stakeholders need to respect and expect the right of the nature. With a participatory process, linking nature protection and land use, an increased awareness as well as a shared vision and strategy can be achieved.

It is true, the knowledge and the basic instruments have been existing for a long time. The missing implementation is mainly due to economic and political factors, e.g. other dominating human interests, misunderstandings, but also lack of commitments from the stakeholders. In order to achieve the efficient use of water resources, clear visions and goals as well as well elaborated action plans are needed. This can be realized only through the involvement of all stakeholders in the whole decision and implementation process. Unfortunately institutional participation was dominating; therefore real commitment was rarely given. Only directly affected people are able to act appropriately.

Efficiency means paying less and earning more. Paying less means that through the decrease of water consumption, loss and pollution, the costs for consumers can be reduced. Through participation processes less bureaucracy can be achieved. A more focused water use and a careful land use in allied ecosystems will lead to higher income of local business indirectly.