

PRINCIPLES OF INTEGRATED MANAGEMENT OF WATER RESOURCES WITHIN A HYDROGRAPHIC BASIN. APPLICATION IN SOMEŞ- TISA HYDROGRAPHIC BASIN

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Abstract

Some principles of management of water resources were used before the advent of the EU Water Framework Directive, but after its occurrence they have set up an integrated management of water resources within a hydrographic basin. The implementation of measures in the approved Hydrographic Basin Management Plan and the conformation with the EU Water Directives and with the national legislation in the field, that Romania has pledged to fulfil, is possible by establishing and maintaining certain principles that take into account both the novelties brought by this Directive, and the experience in the field.

Keywords: conflict resolution, integrated management, principles, directives, integrated management plan, measures

1. INTRODUCTION

1.1. History Of The Concept Of Integrated Water Management

The first attempts to approach an integrated management of water resources were put to the meeting of professionals in this field, at the United Nations Conference on water, held at Mar del Plata in 1977, where they defined the concept of *integrated planning and management of water resources*.

Between January 26-31, 1992, under the patronage of the highest specialized United Nations bodies, the "International Conference on Water and the Environment", was held in Dublin, which also constituted an important training of the "United Nations Conference on Environment and Development" of Rio de Janeiro in June 1992, during which the United Nations have endorsed the concept of *integrated management of water resources in the hydrographic basin* (Dublin Declaration, 1992), as the only viable sustainable way of solving conflicts in water conflict matters (Şerban P., 1992).

On October 23, 2000 the European Parliament and Council adopted the Water Framework Directive 2000/60/EC (WFD), which Romania has committed to implement with the other countries, which has been transposed into national law by Law no. 310/2004 and Law no. 112/2006, amending and supplementing Water Law no. 107/1996, which provides:

- recognition of the hydro-graphic basin as the natural and fundamental unit for forming, using and protecting waters;
- a common goal for all states that have committed to implement it, namely achieving the "good water status" by 2015;
- a system of analysis and planning at the hydrographic basin to coordinate rational and consistent protection and improvement measures in the condition of the aquatic environment, measures that are established through the *Hydrographic Basin Management Plan* (HBMP).

The International Convention for the Protection of the Danube River (ICPDR), by the representatives of the states that are part of it, including Romania, have determined that the elaboration of the Danube Water District Management Plan (DWDMP) should be made based on a two level strategy: the national level, the decision maker role, and the Danube Catchment Area, the coordinating role. As a result, each Danube country member of the EU or in process of accession must develop its own *Water Management National Plan*, and based on these national plans Danube Water District Management Plan will be developed.

1.2. The Hydrographic Basin Management Plan

The National Plan for Management of Romania is structured based on 11 Hydrographic Basin Plans (WCAP), one for each basin or catchment area, plus the Management Plan of the Danube, Delta and coastal Waters. Thus, by GD no. 80/2011 the management plans of hydrographic basins and water catchment areas in Romania have been approved, including the plan the Someş-Tisa water catchment area.

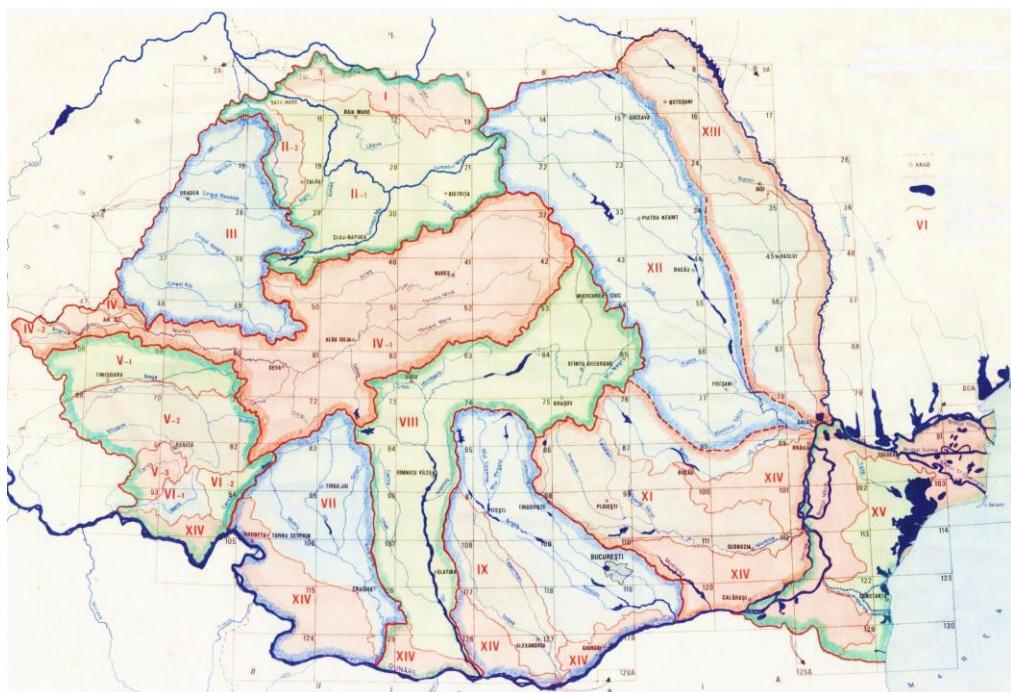


Figure 1. The map of water catchment areas of Romania, according to Water Law no. 310/2004

In 2012 the implementation of programs of measures started, and in 2013 the assessment of the first planning and updating cycle of the major problems of water management at basin level was held. Further, the schedule of implementation of the WFD requires the following steps:

- assessing and updating the first HBMP: in 2015;
- assessing and updating the second HBMP: in 2021
- deadline for achieving the WFD: 2027.

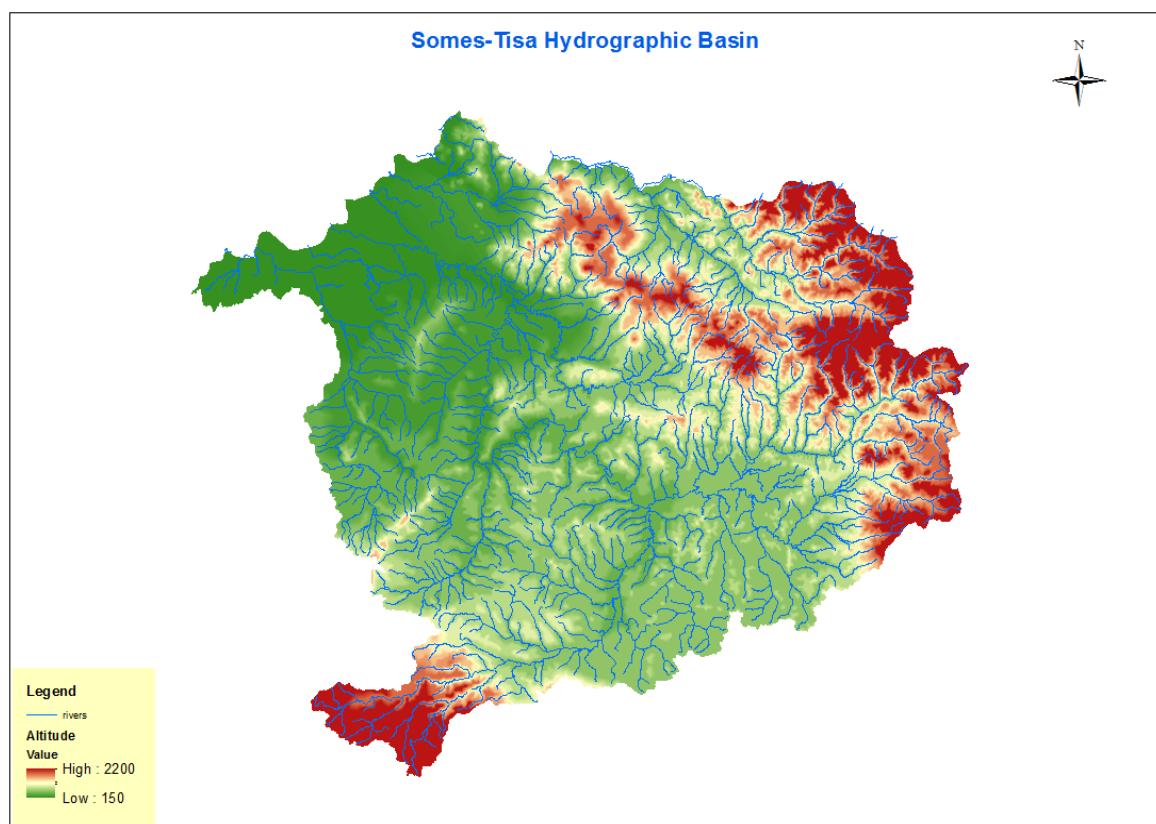


Figure 2. Landforms map of Someș-Tisa hydrographic basin

2. MATERIALS AND METHODS

2.1. The Necessity Of An Integrated Management Of Water Resources And Of Clear Principle For Its Implementation

The increasing pressure on water resources, renewable but limited and vulnerable resources, exerted by increasing water demands and by rising quality standards, make it more difficult to satisfy these requirements because the various water uses have divergent and even competing interests. In meeting these requirements there are often mainly conflicts related to the following issues (Sofronie, 1997):

- distribution of water resources in the area;
- priorities for meeting the needs of water users when these requirements cannot be fully satisfied, being larger than the available resources (in times of drought);
- distribution of water resources in time, by the operating regimes of accumulation that have multiple uses and are part of the complex facilities operated by different users.

These conflicts cannot be solved by (Sofronie, 2000):

- managing water resources without knowing and monitoring them,
- separation of the management of surface from underground water resources,
- separation of the quantitative from the qualitative management,
- allocation of water resources without the operating function of the main hydrotechnical storage systems of such resources,
- implementing a pricing policy in water resource management without a sustainable hydrographic basin development policy,
- competitive leverage of market economy,

but only through an integrated management of water resources, schematically shown in figure 3.

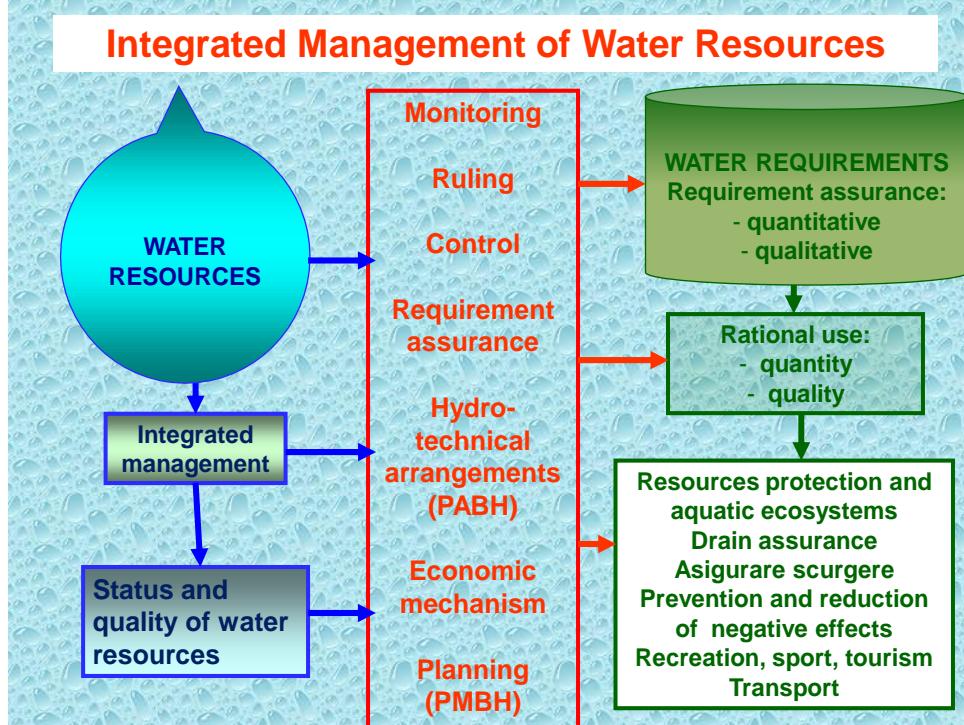


Figure 3 The integrated management of water resources within a hydrographic basin

This integrated management system can be effective in resolving conflicts related to water resource management and to achieve a good water status if is based on clear and correctly applied principles, as shown below.

2.2. Principles Of Integrated Management Of Water Resources In A Hydrographic Basin

Global Water Partnership (Miguel Solanes and Fernando Gonzales-Villarreal, 2004), presents the principles established by the 1992 Dublin Declaration as follows:

- fresh water is a finite and vulnerable resource, essential to maintaining life, to future development and environmental needs;
- water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels;
- women play a central role in the use, management and protection of water;
- water has an economic value in all its uses that are in a situation of competition and should be recognized as an economic good.

The principles underlying sustainable management of water resources, as provided in Law no. 310 of 2004 amending and supplementing Water Law no. 107 of 1996, art. 1 para. 6, are: "*The preservation, protection and improvement of the aquatic environment, in terms of sustainable use of water resources, are based on the principles of precaution, prevention, damage avoidance at source and the polluter pays and must take into account the vulnerability of aquatic ecosystems located in the Danube Delta and the Black Sea, as their equilibrium is strongly influenced by the quality of inland waters flowing into them.*"

Based on these principles and the experience that I gained in various senior positions in units of water management, I also propose other principles of integrated water resources management. These principles can be grouped as follows:

- principles that we have been applying for some time, and which have proven their applicability and effectiveness, the best example being the basin principle, water management being made at us by hydrographic basins since 1975;
- principles that we have given up, because the effect of their application proved to be negative; an example is the application of competitive levers of market economy in establishing priorities for meeting water use: in some industries greater benefits can be obtained than with the population and by irrigations or by aquatic system protection, but we cannot repeat the mistakes made before by primarily meeting industrial water requirements and restricting water use by population and giving up water system maintenance;
- principles that we use for some time, but are really useful, such as liability and precautionary principles.

The 10 principles used in the water management of Somes-Tisa catchment area - we define and explain them as shown below.

1. The basin principle integrates all water resources, water uses and requirements in a hydrographic basin, because:

- resources, water uses and their requirements are interrelated and interdependent;
- achieving and maintaining a balance between the water requirements of utilities and the water availability from sources through derivatives from other pools are too expensive;
- local interests in different areas of the hydro-graphic basin may diverge, but their resolution should be made in the basin;

2. The principle of quantity-quality unitary management: when quantitative management was separated from quality management, when water quantity and quality were managed by different institutions, many aspects were overlooked, in particular, the influence of surfaces on underground waters, especially on ground waters, on both their quantity and quality.

3. The principle of sustainable development: the impact of any development must be properly evaluated in order to improve the status of waters and of aquatic ecosystems and to achieve a good status of all water bodies, not to exhaust or degrade them; their development should not be done by damaging or depleting resources, but by protecting and regenerating them, because development can mean an increase and diversification of pollution, thus becoming a constraint to further development.

4. The precautionary principle: many steps and decisions taken in connection with the use of waters without checking the effects have been shown to have negative effects; this principle states the idea that an action that has potential negative or unknown effects in time should be avoided; it is much easier and less expensive to prevent than to intervene to stop or reduce adverse unexpected effects.

5. The principle of responsibility: water contamination by various pollutants and waste can no longer be regarded as "*a price to be paid anyway by all*" for the welfare that a forced industrialization makes

(Sofronie, 2000); this is why the polluter should pay for the effects of pollution, to discourage their recurrence and in an amount that would encourage him to take the necessary measures to reduce and avoid pollution of any kind than to indulge in a state of a permanent polluter or of a significantly polluting risk polluter.

6. The economic principle: the user pays, otherwise I will not be interested to rationally manage water resources, which is a natural resource with economic value in all its forms to use (Sofronie, 1997), including cost recovery for water, resource and environment services.

7. The principle of the right of access to water for all citizens, in equal terms and by respecting the legal provisions and regulated conditions, so that one user should not affect the legal access of others.

8. The principle of solidarity: collaboration of all those involved and interested in water protection, in keeping waters clean and in preventing and intervening in the event of accidental pollution or dangerous hydrometeorological phenomena by bringing the contribution of each.

9. Public participation: protection of water resources, avoid damaging the interests of water users and a right public motivation for the sustainable management of water resources is possible through consultation and involvement in decision-making, based on appropriate procedures, as required by the legislation in the field (Water Law, art. 77).

10. The principle of the return to facing the water. Since ancient times people have loved waters, they have sought them and have guided their lives and living by the water; they have protected them, because waters have been their swing and guide, as the first human settlements appeared near the water; great civilizations of the world have developed near waters and disappeared when their water source was exhausted. But time has passed, and people turned away from waters, literally and figuratively. In many places houses are placed with their back to the water. It is time to move again to face water:

- to give due importance to our waters;
- to make riversides our place of rest and recreation, not a place of garbage and manure storage.

3. EFFECTS AND RESULTS

The first Management Plan the catchment area was approved, and the application of its provisions (action plans) are in full swing.

The effects of applying the principles used in the management of water resources in Someş-Tisa catchment area can also be seen in the *Interim Report on the Phase of the Implementation of the Programme of Measures* sent to the European Commission on December 22, 2012, uploaded on the European Water Information System- WISE), which notes the:

- increase of the number of natural water bodies - rivers falling both in the good ecological status and good chemical status,
- increase the number of heavily modified water bodies - rivers reaching the good ecological potential;
- all the 15 groundwater bodies in the catchment area are classified as being at risk of failure to attain good quantitative status;
- in the catchment area there are no groundwater bodies at risk of not achieving good status in terms of quality.

Also, after applying the prices and charges for use of water resources, and of the bonuses awarded for the protection of water resources, consumption has decreased significantly, the largest contribution being made by reducing losses.

4. CONCLUSIONS

The effectiveness of the implementation of the EU directives and of measures established by the HBMP was achieved by applying these principles of water resource management in Someş-Tisa catchment area. These principles must still be applied for the completion of the necessary measures to achieve a good status of all water bodies in Someş-Tisa catchment area, but can also be applied to other catchment areas with some small adaptations related to their specific.

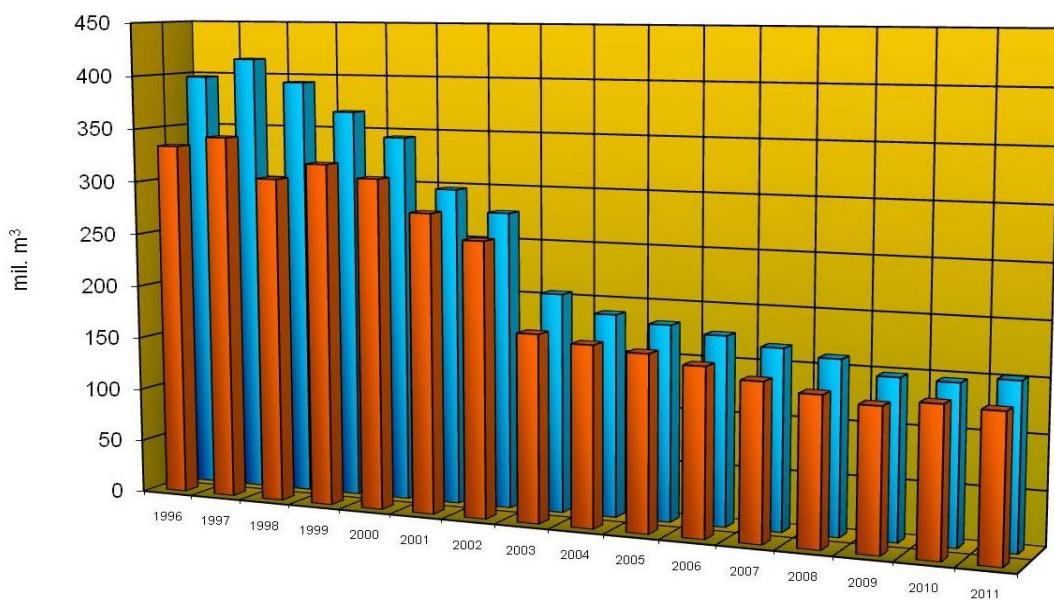


Figure 4. Evolution of captured (blue) and returned (red) volumes in Someş-Tisa river hydrographic area between 1996 - 2011

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