

The case study describes the pioneering efforts to develop a participatory approach to river resource management in Bulgaria through the establishment of a Watershed Council, in an ethnically mixed region with many water resource challenges. It shows both the advantages (in terms of collecting and focusing unused energies) and the difficulties (in terms of “selling” the participatory result to a central government largely suspicious of local initiative) of an NGO-initiated, bottom-up local approach to IWRM.

ABSTRACT

Brief description

The Varbitsa river is situated in the heart of the Kardjali region of Bulgaria – one of the country’s most interesting and challenging regions, a mixed area (three languages, two main religions – Christian and Muslim – and three ethnicities) which was once expected to blow up inter-ethnic strife and destabilization. From 1998, in preparation for coming Water Law and WFD 2000/60, and to pilot bottom-up a participatory model of river resource management and preservation, the Varbitsa watershed council was set up as a pilot to test on-site effective and participatory approaches to river resource management and, while contributing to regional development, also to provide models for replication across the country and become the basis for new legislation. The Council covers the Varbitsa river, tributary to the Arda in the Eastern Rhodope Mountains of Bulgaria (Kardjali region). Its office is in Kirkovo – exactly half-way downstream .

Initially an arena for inter-community dialogue and co-operation, the Council evolved into problem-resolver and development arena particularly favoured by local authorities who abide by the Plan drawn up by the Council’s general meeting in 2001 (solving problems on a river-scale rather than a municipality-scale). Approach was stakeholder meetings and common planning, plus media presence and lobbying, plus result-driven faith in efficacy and participation. Immediate benefits included: cessation of inter-community conflict over access to water; stoppage of leakage from tailings reservoir; removing the Zlatograd rubbish dump, source of much pollution, to a safer area; a full analysis of river “hot-spots”; increased control over gravelling company activities; and defense of river against industrial plans.

A bottom-up, stakeholder-approach, based on trust and participation proved to be the key to unlocking local energies and resources, and to rapid action on shared goals. From 2001, legislation is being amended in a participatory way (involving stakeholder meetings between officials, the Council, watershed enthusiasts from other parts of the country, NGOs, local authorities and media) on the basis of full analyses of the Varbitsa experience and of the degree of fit between the 1999 Water Law and WFD 2000/60.

Lessons learned

Lessons learned include the fundamental proposition that participatory, open, citizen-friendly and bottom-up approaches are not only “friendlier”, but also more efficient than top-down administrative approaches (the latter being traditional for the country). Follow-on lessons include the understanding that when it comes to turning pilot practices to national legislation, governments usually balk at the last minute and ultimately opt for a more central, administrative and top-down approach.

Importance for IWRM

The case has become a test case for: successful practices; legislative change; convincing government that participation of communities and local authorities is a resource for efficiency rather than a risk. The case illustrates both the advantages (in terms of collecting and focusing unused energies) and the difficulties (in terms of “selling” the participatory result to a central government largely suspicious of local initiative) of an NGO-initiated, bottom-up local approach to IWRM.

Main tools used

- B1.4 River basin organisations
- B1.9 Civil society institutions and community based organisations
- B1.10 Local authorities
- B2.1 Participatory capacity and empowerment in civil society
- C2.2 Basin management plans
- C5.3 Consensus building

MAIN TEXT

1 Background and problems

Geographical economic and political context

The Varbitsa river is situated in the heart of the Kardjali region of Bulgaria – one of the country’s most interesting and challenging regions, once expected to blow up in inter-ethnic strife and destabilization. The region is populated by: ethnic Bulgarian Christians; ethnic Bulgarian Muslims; ethnic Turkish Muslims (two varieties, loosely identifiable with the Shi’ite and Sunnite schools of Islam); ethnic Roma Christians and ethnic Roma Muslims. Ethnic identity issues have been predominant for much of the 1980s and 1990s, thereby emphasising differentiation and separateness, rather than common ground and cooperation.

As a designated “border area” it was, during communism, it was cordoned off the rest of the country until 1990. The Kardjali economy is dependent on several major industrial plants which, privatised, have been recovering production and market position, in new (post-1997) businesses (mostly in meat production) and on the most heavily depressed industry in Bulgaria: tobacco. Tobacco growing had been introduced as a compulsory mono-culture industry for the rural areas of the region in the early 1960s, under Comecon “division of labour”. Through the 1990s, with the loss of the undemanding Soviet and other Warsaw Pact markets, the tobacco industry has been going to the wall, leading to higher-than-average levels of poverty and hardship.

Agricultural land is very scarce in the mountains which compose the region, and recent attempts at new agricultural crops have met with variable results. Ill-regulated and in many cases frankly illegal forestry industries have sprung up, resulting in some employment and much damage to a very fragile environment. Scientific research connected with the Varbitsa case has estimated that in the past 30 years de-forestation of the region has been very severe (compared to Greece across the border), leading to erosion and the appearance of some features of semi-desertification.

The environmental situation is further aggravated by the existence of three vast artificial open-air reservoirs, constructed by the communist regime over the 1960s and 70s, all of them situated on the Arda river between Kardjali (upstream) and Ivailovgrad (downstream, on the Turkish border). It was only after the end of the communist regime that it emerged that the reasons for the vast over-capacity of captured water (in relation to the region’s needs) had, once, definite military purposes. Under the Warsaw Pact military doctrine, the purpose of the three reservoirs was, in time of war, to flood the northern Turkish plain up to and including the garrison city of Edirne. The three reservoirs – Kardjali, Studen Kladenec and Ivailovgrad – are ill-maintained and in need of drainage, creating some desertification features around their upper ends.

Since 1995, a succession of governments have included the construction of further two dams upstream from Kardjali reservoir in their strategic plans, effectively “capturing” the river Arda a few kilometres downstream from its sources around the mountain city of Smolyan. Dubbed in 1997 “the project of the century”, the construction of the two new dams has to date (2003) been hampered by lack of finance rather than by any effective resistance. Indeed, local authorities and the impoverished population have been enthusiastic about the plans, seeing in them prospects for (albeit temporary) employment in construction, rather than a long-term problem

for sustainable development. Part of the thinking behind choosing Varbitsa, the main Arda tributary in the area for a Watershed Council was therefore to establish a forum for more mature discussion about sustainable development, the environment and integrated water resources management.

Water resource issues

The Varbitsa river, a tributary to the Arda, the main river of the Rhodope Mountains, runs through 8 municipalities, 6 of them within the region of Kardjali and 2, in the region of Smolyan, where both the Varbitsa and the Arda originate. The Varbitsa watershed area covers some 1,000 square kilometres.

Varbitsa is the lifeline of the area, providing water for industry, drinking and irrigation, and receiving refuse, sewage and industrial waste. Initially obvious problems included: the pumping of untreated industrial waste and sewage into the river; the leaking of a tailings reservoir situated on the sources of the river and the resulting severe health problems of the population in Zlatograd – the first town downstream from the reservoir, the target of a World Health Organisation investigation in the mid-1990s; the fact that Zlatograd's own rubbish dump is next to the river, and by 1999 had in fact spilled from the banks and began settling into the water stream, polluting the water further down to Kirkovo, Momchilgrad and Kardjali.

The Varbitsa is Bulgaria's most temperamental river, with volumes in the spring highs up to 5,000 times greater than in the autumn lows, with frequent massive flooding and erosion as a result. Flooding and erosion are also stimulated by forestry and gravel industries, many of them un-licensed and therefore beyond control because of corruption.

A significant water reservoir at Benkovski in the south was for decades a bone of contention between communities of Muslim Turks and Muslim Bulgarians, creating underlying tensions in the region. When the Muslim Bulgarians were in control of the reservoir (as they usually were, depending on results of municipal elections), they would irrigate the lands of their own community, leaving Turkish agricultural communities for later; when election results place Turks in control, the opposite would take place.

The Mayors of the 8 Varbitsa communities had for many years tried to find, separately, government funding to resolve the various problems along their respective parts of the river, such as funding for sewage depots and safe rubbish dumps. The Mayors had largely failed to share their problems with each other (due to competitive jealousy), with the result that the Mayors downstream had very little idea of the problems they were facing coming from upstream.

Why a Council?

Funding consistently failed to materialise for any of the Mayors but, while involved with the Varbitsa issues, mayors and communities realised that to address the issues along eight different sections of the river makes little sense (eg. placing a sewage plant down-river at Momchilgrad would not provide the Momchilgrad inhabitants with clean water if there is no treatment for the sewage of Kirkovo, which is up-river from them). Also, communities began to doubt official statistics – particularly those claiming that the Zlatograd tailings reservoir, where the Varbitsa begins, is “clean”, while WHO delivered a very worrying report on the general health of the Zlatograd population as early as the mid-1990s.

Into this situation came a German Marshall Fund project, implemented by the CSP and the NGO Centre-Kardjali, for best practice transfer from the USA in terms of river development. The aim of the project was in part, to unite all communities along its banks in the common effort to have access to clear water. There was also the consideration that, with the EU's Water Directive in the making during the late 1990s, Bulgaria would have to begin falling in line with EU practices sooner rather than later, and will be faced with the task of setting up the kinds of Watershed Councils that are most appropriate to the local situation, under the terms of the Water Framework Directive. Prior pilot hands-on experience in setting up such a Council would be an invaluable help for both legislators and the communities on the ground. Given the absence of legislation or significant levels of awareness, a US-led approach (i.e. setting up Watershed Councils bottom-up, without waiting for national legislation) was initially used.

An earlier attempt to establish a Watershed Council at Yantra, in the north of Bulgaria, had failed because, it was thought, the scope of the Yantrawas too large (137 km in length and crossing more than 20 municipalities and 3 Regions). It was decided under the project to choose a smaller river. The Varbitsa was the obvious choice not only because of its size, ideal for a pilot project, but also because of the ethnic diversity and tensions along its path.

2 Actions taken – decisions and actions

The Initiator

The Centre for Social Practices (CSP) was set up by civil society activists in 1994 with the express intention of working towards citizen empowerment in a post-totalitarian situation. One of the more durable lines of work since then has proven to be the issue of community involvement in the decision-making regarding rivers (their defence against degrading interference, resolution of conflicts arising out of access to water issues, river enhancement and development in the framework of sustainable development).

From 1998 the CSP, in partnership with local non-government organisations (NGOs), local authorities and regional media, was involved in setting up and supporting the Varbitsa Watershed Council. Since 2001 the CSP, together with staff from the Ministry of Environment, has been building on the experience in order to structure the most citizen-friendly and efficient decision-making mechanisms and statutes for Bulgaria's coming national network of Watershed Councils under the Water Law (2000) and the EU Water Directive 2000/60.

Decisions taken at the start of the action

Initially, the CSP and Kardjali NGO activists from all ethnic groups toured the length of the river in 1999-2000, meeting with all Municipal Councils and most of the Mayors to set out the practical value to the communities of a Watershed Council. Originally, the Municipal Councils of some of the more isolated communities, such as Djebel, which had no immediate river-related problems, viewed the idea with considerable suspicion. Another real difficulty was in understanding a concept that promised to address major issues outside the chain of command associated with central government. After these issues were resolved, the idea took hold in seven out of the 8 municipalities. The eighth, Djebel, was to join once the Council held its first General Meeting and began addressing the issues along the river. – on the principle of not being left out of a common effort with everyone else participating .

Ultimately, the process snowballed - i.e. starting with a small group of NGO enthusiasts, and then bringing others in as the work progressed – and the Varbitsa River Council was set up in mid-2000, and its first policy and planning session held. The Council is an entirely voluntary body and is registered as an NGO. Membership of the General Meeting includes NGOs (environmental and community-development), representatives of all 8 municipalities (including the Mayors of Kirkovo, Kardjali, Momchilgrad and Zlatograd), the major industrial polluters, the regional environment inspectorates, forestry officials, irrigation associations, two representatives of the Ministry of Environment and Waters, local media executives, business associations, environmental scientists and experts, and the Kardjali Regional Governor. The office of the Council is at Kirkovo in premises provided by the Kirkovo Municipality, which also pays for upkeep and office overheads. There is one full-time co-ordinator (Executive Director), whose salary is raised from the budgets of the participating municipalities and from development project that the Council increasingly applies for and wins.

Actions taken

The Council produced a Development and Hot Spots Action Plan in the autumn of 2000. Under the direction of a professional moderator hired by the CSP, the general meeting of members / stakeholders came to an agreement on a shared hierarchy of problems to be addressed in the short-to-medium term, with the river's "hot spots" and "crises arising" being at the top of the list. The list was amended over the next few years during the regular meetings of the Board at Kirkovo, reacting to new problems and challenges appearing. The key problems addressed – with quantifiable outcomes – over the period 2000-2002 include:

- *Lack of integrated data.* Every Municipality and every central government agency represented along the river had its own partial and fragmentary data, and no sharing had ever taken place to produce the whole picture. The entire length of the Varbitsa was mapped out and scientifically tested by independent scientists, with a full picture of problems and issues emerging.
Status: The Varbitsa remains Bulgaria’s only river to be mapped out and scientifically tested along its entire length, with results (including maps etc.) available to all municipalities, the office of the Regional Governor and the Ministry of Environment.
- *One-sided approach to water resource management* that excluded the entire deforestation / reforestation problematic. With the inclusion of regional-level Forestry officials the Council began addressing issues of re-forestation, which it had initially not included into its work.
Status: After fierce debate in the NGO-Ministry of Environment work group on Watershed Councils, it was agreed to include re-forestation issues in the new national Watershed Council network constructed under the legal provisions of the Water Law.
- *Lack of strategic thinking in fund-raising* on the part of the Municipalities involved. Municipalities down-river dropped their separate claims for funding in favour of municipalities up-river and developed a multi-year plan for sewage works (and safe rubbish dumps) to come down, town by town, from up-river to down-river.
Status: The Zlatograd and Kirkovo sewage works projects have been included into the government’s budgetary plans and await financing. The removal of the Zlatograd dump from the riverbed to a safe site in Kirkovo (a project conducted by the Mayors in the Council) has been government-approved and funded. Currently the Varbitsa Council is organising resistance against pressure from interested groups to move the dump to an unsafe place and stick to the originally designated site.
- *Leaking tailings reservoir upstream from Zlatograd.* Immediate pressure was put and within six months a second reservoir wall was completed, and the reservoir stopped leaking.
Status: The reservoir wall holds, but there is mounting concern that, with the mines privatised and back into operation, new tailings-related issues will be appearing.
- *Gravel extraction.* A “hot” issue requiring immediate reaction was the discovery, over 2002, that gravelling companies had over-gravelled up to 40 times what they were allowed to under Ministry of Environment licenses, with the result that in the town of Nedelino (member of the Council) the river bed dropped significantly and resultant landslides took with them several riverside homes and half the main street. The Council protested and put pressure on the Ministry of Environment and the Ministry of Construction to reduce uncontrolled gravel extraction and re-direct gravellers outside the riverbed. By June 2003 the issue was resolved together with the Ministry.
Status: The Ministry of Environment re-licensed some gravelling companies under much stricter parameters, disqualified others and fined others still in July 2002-June 2003.
- The Council has *raised awareness of clean water issues* – eg. it was discovered by Council inspections that, in Momchilgrad, the sewage was pumped into the river up-stream from the point from which the town extracts its drinking water – i.e. Momchilgrad has been drinking its own refuse for years but before the Council there was no awareness or interest in this. The Council also systematised health figures for Zlatograd, and the resultant picture proved beyond doubt that its inhabitants had been seriously threatened for a long time by the leaking tailings reservoir.
Status: The Momchilgrad sewage works project has been approved by the government for financing.

3 Outcomes

Varbitsa as pilot case

The Council’s general meetings over 2000-2001 decided to use the Varbitsa experience as a pilot test-case that was to be used for: a) the construction of realistic, citizen-friendly and efficient national legislation on Water Councils as privileged tools for integrated water resource management; b) the construction, once national legislation was in place, of a Council along the

entire length of the main river, Arda, with its seat in the regional centre of Kardjali, funded by the Kardjali municipality.

Using the Varbitsa experience, the National General Meeting of Environmental NGOs in Bulgaria, held in December 2001, voted a resolution to work with the government and legislators on the construction of citizen-friendly, bottom-up, effective and efficient Watershed Council-related legislation. It elected a work-group, including members of the Varbitsa Council to liaise with the Ministry of the Environment on this issue.

The Ministry initially held a its stiffly top-down philosophy, but after difficult negotiations the Ministry retreated from this and under-wrote a compromise, whereby there would be four National Watershed Councils, with legislative provisions for Sub-Councils along the 11 major rivers and Committees along their tributaries, should the local community see fit to construct such. Under this scheme the Arda would have a Sub-Council, with Varbitsa (and other tributaries' future Councils) as Committees. The compromise kept the idea of Councils as representative stakeholder bodies liaising /debating with the Watershed Directorates as executive state bodies. But when the legislation was published in March 2003 it became obvious that the government had reverted largely to its own original (top-down) position, disregarding the two-year work to reach consensus with all stakeholders. The conclusion of the Varbitsa Council, as well as of the other participants in the process was that the Council will go on as an NGO (and help others, such as the new Burgas Estuary Council, do the same), and the experience gathered would serve both for other rivers and as the basis for future legislation passed by future parliaments.

Another initiative was the *Regional Development Forum*. During 2002-2001 the leading Members of the Varbitsa Council, working together with regional NGOs and municipalities, launched a Regional Development Forum for the Kardjali region. The Forum, constructed on the Varbitsa Council model (stakeholders), held four semi-annual meetings, with the participation of the Ministers of Finance, Social Affairs, Regional Development. Development projects were approved and financed out of the state budget during 2000-2001. Unfortunately, a change in government in July 2001 brought in a Cabinet unsupportive of such forms of local civic involvement and the stakeholder approach to development issues. Central government pulled out of the Development Forum, leaving it more local-based and less effective.

Problems encountered

The lack of a civic tradition in the region and the lack of understanding, on the part of the Municipalities and the Regional Governors, of the potential for getting results outside the conventional government channels and budgets led to initial problems of implementation. These problems were overcome by the rapid production of visible results, focusing on limited local and single issues. Local stakeholders, particularly the Mayors also discovered that when acting as the representatives of a group – the Varbitsa Council – they command greater attention from funding agencies (state budget, EU-related and other project funds) and have a clear market edge over less organised localities, in terms of getting additional funding for river-related development projects. Media visibility also unlocked a certain local pride of achievement. The major problem currently is that, with the failure of the effort to include Varbitsa-type Watershed Councils into legislation, there is a serious sagging of morale. Effectively, the entire work of the Council is currently being maintained by the Board and its various allies, acting more as a pressure group and “rapid reaction force” (in relation to new problems arising, such as the Makaza-related gravelling), than as a representative forum of all local stakeholders.

Objectives achieved

The start-up objectives were mostly achieved as outlined above. The two attempts to use the momentum and be able to influence decisions at a higher level have met with different results. The inclusion of the Varbitsa Council's leading members in the regional Development Forum had an immediate impact in terms of Minister-level pledges for funding and development projects in 2000-2001. But this proved unsustainable as the government changed and the new Cabinet Ministers have demonstrated increasing distance from involvement in such locally initiated development initiatives. The other effort – to incorporate the experience into national

legislation – in essence failed, as outlined above, due to the simple fact that bodies like the Council, even when backed up by NGOs, have less capacity to stay hands-on with a problem than do bureaucrats.

Impact of the action

The impact on national level has been at several levels.

- First, due to media exposure large sections of the public have been introduced to the issues of Watershed Management and the concept of integrated water management.
- Second, with the structuring of the Varbitsa Council the problems in the watershed entered the agenda of the National Meeting of Environmental NGOs, from where it had been absent.
- Third, in spite of the ultimate failure of the legislative involvement, a core of Municipalities and Regional Governors across the country, as well as water-related government agencies in the Regions of Kardjali, Smolyan (in the south) and Gabrovo, Veliko Turnovo and Ruse (in the north of the country) have remained committed to the ideology of the bottom-up, representative approach to Watershed Councils. This forms a basis of support for renewed legislative initiative in the future when there is a friendlier government and parliamentary environment; there is also a set of ready-made policies and principles, distilled over the 2000-2003 period, that are available for use by future governments friendlier to the IWRM approach.
- Fourth, the Varbitsa has become a model for replication as witness the March 2003 Burgas initiative to set up estuary Watershed Councils on the Varbitsa stakeholder model.
- Fifth, the scientific mapping out of Varbitsa has demonstrated the effectiveness and cost-efficiency of attracting the scientific community to the problematic of integrated water management.

Winners and losers

Out of the Varbitsa experience in particular there have been no obvious losers, except possibly some central government officials who may have felt (we have no immediate evidence for this) that they have had their prerogatives related to water impinged on. This may explain the ultimate about-face by the government on the issue of incorporating the Varbitsa experience into legislation and government policy. The losers, whom we do not see as legitimately aggrieved in any event, have been the various illegal and semi-legal graveling companies, whose activities have been curtailed by the control exercised by the Council locally, as well as their clients.

Sustainability

In financial terms, the Council is able to provide the resources necessary to pay the coordinator, the office and overheads. Resources needed to resolve problems along the river are drawn from the republican budget, various agency funds and EU-related development projects.

The Varbitsa Council and such bodies are sustainable at their current level of activities: pooling interests of municipalities, coordinating development plans at municipal level, reacting to crises and situations arising, exerting pressure on specific issues on specific government agencies. This is because of the very large voluntary input on the part of the membership and the Board, and because of the relatively low overhead costs involved, which are easily covered by municipalities acting in concert. The weaknesses are the usual ones in such situations: unless included as component parts of government policy and legislation, such Councils depend ultimately on the energies and voluntary work of all involved, and on achieving tangible results periodically in order to sustain enthusiasm. Faced with a hostile – or indifferent – government and legislative environment such bodies may yet lose heart. From this point of view replication around the country, as well as media coverage, is crucial for mutual encouragement and support.

Efficiency

The extraordinarily high levels of cost-efficiency – i.e. return on finances expended – is one of the greatest “selling points” of the entire exercise. Embedded into an environment of coordinated local energies and expertise, the return on financial outlays is beyond any comparison with the top-down, state-managed efforts along the same lines. Given the

representative nature of the Council, moreover, there is no opportunity for the usual problem of pilfering of state-expended budgets.

4 Lessons learned and replicability

Relevant lessons

This is a more or less complete policy and development exercise in miniature, providing a hands-on example of the value of development work centred around an active NGO nucleus. It has been taken, in the area, as a blueprint for the future construction of a Council along the entire length of the Arda river, covering two Regions (Smolyan and Kardjali), with a centre at Kardjali.

Yet issues of effectiveness and sustainability remain, given the vast (by both NGO and small municipality standards) sums needed for the solution of Varbitsa's hot spots.

The failure to incorporate the experience firmly into government policy and legislation has inevitably meant that sustainability depends on voluntary enthusiasm and on the sense of responsibility and accountability of local government and of locally represented central government agencies. One of the aspects of the Varbitsa experience has been the realisation that, should the local authorities give up, then other stakeholders – the local businesses, the media – may become easily discouraged. This revealed relative importance of local government figures again underlines the desirability of including such models as Varbitsa into official government policy – so that Mayors, for instance, while doing their work in Council, represent not only the interests of the local communities, but also act as agents of official government policy.

Counterbalancing this is the demonstrable fact that setting up a high-profile, NGO-official-business, multi-municipal, and multi-ethnic body exerts pressure for change in itself: the second reservoir wall at the tailings reservoir was stimulated entirely by the public profile and perceived “trouble-making” capacity of communities of eight municipalities acting together in a focussed and determined way.

The bottom-up, stakeholder approach works if conducted openly and by reputable groups and individuals. Then comes the problem of convincing governments to come on board, rather than oppose or at least stay aloof from the process. Governments still seem to be worried, rather than enthused, when local-level initiatives of this sort become very successful.

Wider relevance

The Varbitsa Council is replicable and is being replicated around the country. Apart from attaining its immediate watershed-related aims, it also functions as a school for civic and stakeholder initiative, strategic planning, co-operation and result-getting, education in sustainable development and related issues.

Good will, local confidence, perceived problems and rapid results ensure the initial life of such initiatives and their replicability in localities where these factors exist. It remains to be seen whether such initiatives can survive without explicit government and legislative support for the necessary length of time to unfold their full potential and become a durable institution with a life beyond the involvement of its founders, which in Bulgaria's case would be something in the region of 8-10 years.

5 Contacts and references

Organisations and people

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Centre for Social Practices web-site: www.csp-sofia.org
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Hydrological map of the Varbitsa watershed



TABLE OF SYMBOLS

-  Spring
 -  Karstic spring
 -  Mineral spring
 -  Thermo-mineral deposit
 -  Ground water shaft well
 -  Ground water drainage
 -  Ground water pump station
 -  Shaft well pump station
 -  Tailing impoundment
 -  Artificial pond
 -  Development sites influencing ground water
 -  Borderline between different sort of ground waters
 -  Borderline between municipalities
 -  Administrative center of municipalities
 -  Outline of the Varbitsa water basin
- Groundwater types
-  Fracture water with sporadic diffusion
 -  Fracture-karst water
 -  Porous water