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European Regional Development Fund

RESEARCH ON GOOD PRACTICES TO WATER RESOURCES USE AND MANAGEMENT

Manual
TECHNICAL TRAINING BULGARIA

PROJECT OUTLINES

The association Eco Nevrokop, in partnership with the development agency Anatoliki – Thessaloniki (Greece), the Serres Development Agency Aneser (Greece), the Economic development Agency Bansko (Bulgaria) and the Agency for Economic Development High Western Rhodopes – Devin (Bulgaria), implement a project “Best Water Use” with BestU acronym under contract B2.6 F. 05 dating to 02.10.2017. The project „Best Water Use” has to encourage innovative technology aimed at improvement, conservation of environmental elements and efficient use of water resources. A survey of good practices and traditions in the overall scope of use, management and monitoring of water resources, including rational utilization of available water resources, their conservation and preservation, modern technological solutions and traditions for efficient use, consumption, reuse, recycling, purification, storage, loss minimization and transmission and analysis of the related national legal framework and effective working methods of the regulatory and Monitoring Authorities, as well as the function of public civilian control was carried out.



This is a presentation of good practices for the use, management and monitoring of water resources, and promotes integrated sustainable water management, encompassing the use of agricultural waters, and can be used as a tool by regional and interregional farmers, as well as other interested parties.

The project is co-financed by the European Regional Development Fund (ERDF) and by the national funds of the countries participating in the cooperation programme "Greece-Bulgaria 2014-2020" Interreg V-A

INTRODUCTION

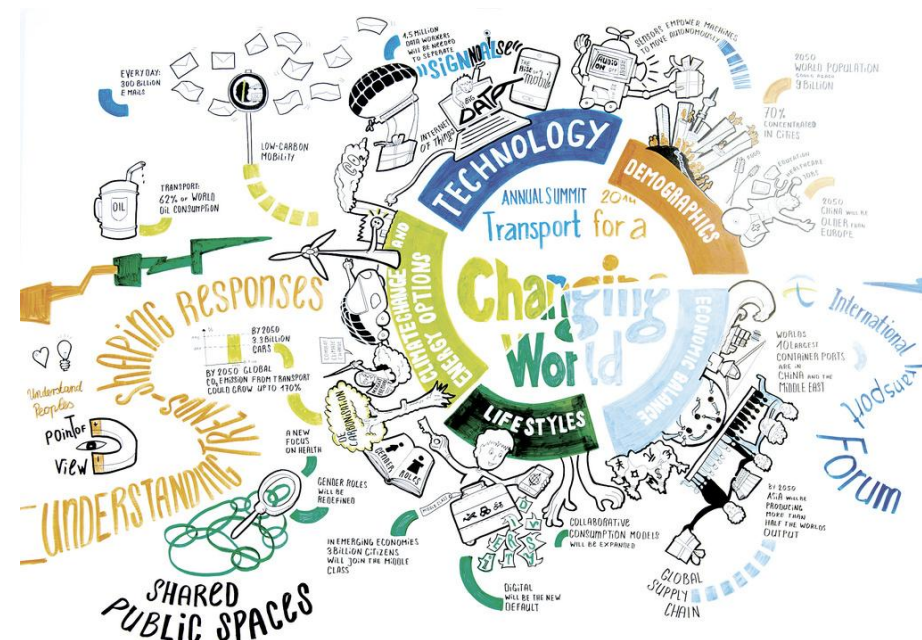
Today we live in an ever-changing world where we are increasingly having to think about the way we use our planet resources. We are increasingly having to consider it not as a land that we have inherited from our ancestors, but one that we have borrowed from our children. Water is one of the main and most important resources necessary for the existence of mankind. The project Best Water Use aims to raise public awareness of the use of water resources and to respond to various questions related to the increased interest in the field.

Most people living in the EU already have very good access to high-quality drinking water, especially in comparison to other regions of the world, thanks also to the existing European drinking water legislation for over 30 years.

Water intended for human consumption is safe and preserves the health of citizens. The main aspects of the policy are:

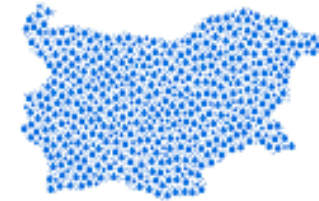
- ✓ guarantees that the quality of drinking water is controlled by standards based on the latest scientific evidence;
- ✓ ensures efficient traceability and evaluation of drinking water quality and enforcement of relevant standards;
- ✓ provides adequate, timely and appropriate information to consumers.

The revision of the Drinking Water Directive 98/83/EC was included in the Commission work programme for 2017, as a direct consequence of the Right2Water European Citizens' initiative. The proposal follows the refit evaluation of the drinking water directive and is accompanied by an impact assessment of the World Health Organisation.



Protection of Water Resources in Bulgaria

The water consumption per inhabitant per day is about 203 L. On this indicator our country ranks among the highly developed countries. In relation to other European countries Bulgaria is characterized by relatively significant fresh water resources, both in absolute volume and per capita. The water resources in Bulgaria are formed mainly by external inflow and are unevenly distributed on the territory of the country. The fresh water resources of Bulgaria are about 14 000 m³ per year. The average water volume per capita puts the country among the Top10 European countries. Nevertheless, certain regions of the country experience water scarcity due to the uneven territorial distribution of resources.



The amount of waste and cooling water generated by economic activities follows the level of consumption. An annual average of about 79% of the total water used for economic activities (2000-2013) is taken to water tanks or public sanitation. The degree of purification has improved – in 2005, with at least secondary methods, 56% of the removed effluent was treated in water bodies, and in 2013, 66%. The public sewerage system in the country is predominantly mixed and collects both industrial, domestic and stormwater. The highest proportion of the population associated with waste water stations is located in the Black Sea region and the Danube basin district, being predominantly a secondary and a tertiary purification system. During the period 1996-2018 the trend observed in recent years to improve water quality has been maintained. In 2018 the evaluation of the indicative basic physico-chemical indicators shows that a large part of the evaluated aspects fall into the category of very good quality of water. From 1993 to 2018 there has been a gradual improvement in groundwater quality in term of indicators.

Good Practices of Water Use in Households 1

One of the main problems facing access to quality drinking water is the outdated plumbing network in our country. The main uses of water in households are associated with the daily needs – hygiene, cooking, drinking and cleaning of the home, which are obligatory for all households.

Reduction of water bills by system sanitation by 35% or more %.

- ✓ Usage of only half of the water that would normally be used by a person to shower by mounting aeration shower systems.
- ✓ Reduction of electricity bills /in case of usage of electric boiler/.
- ✓ Protecting the environment: unlike fossil fuels, water resources are renewable and via reasonable use, many rivers and natural habitats, where a variety of animals live, can be preserved.
- ✓ Replacing the appliances with ones from a higher class, a significant positive effect is observed: Washing Machine (22%), Bath (9%), Dishwasher (3%), Hydrants (12%), Showers (21%), Toilet cisterns (28%), Toilet leakage (5%).

In Bulgaria there is practice using tap water for watering yards and gardens. But:

- ✓ You can choose plant species that consume comparatively less water. If you plan to have a yard with grass, e.g. such a variety may be chosen, which



Good Practices of Water Use in Households 2

Rainwater can be collected in containers and used for irrigation; Rainwater is "soft" – i.e. half-distilled, although this quality disappears while rolling on the roof. It is perfect for watering as any rain. The Rainwater collection system is a very useful facility for the yard, wherever located.

✓ As an example, a house with 150 m² roof area, in a region that gets at least 50 cm. rain a year, could potentially collect about 15 000 liters of water in a year. This water can be used for any needs and you could even make your own rain collection system and a purification system with which you can use this drinking water. Unfortunately, this variant in Bulgaria is allowed individually for each owner.

✓ Collection of "soap water"/water from baths, showers, sinks and washing machines/, also called "Grey Water" and use it for irrigation, washing vehicles and machines or for toilet cistern. The system includes a tank, filters, pipes. It is estimated that a savings of ca. 30% is quite possible after the introduction of this system in the household.

✓ The safest way to use the grey water is to bring it directly into the biologically active topsoil, where soil bacteria can quickly process it, producing nutrients that are necessary for the plants. This way of biological water treatment is much more effective than any other mechanized treatment, thus preserving and guaranteeing the quality of groundwater and surface water. One square metre of soil as a whole can absorb half a gallon of grey water each week. So, if you have a garden area of 10 m² size, you can recycle up to 50 gallons of greywater every week.

Good Practices of Water Use in Households 3

- ✓ Use the water from the sink to flush the toilet. According to the Center for Alternative Technology – a European environmental organization dedicated to the development of clean technologies for the earth, in developed countries each person uses ca. 13 000 liters of water per year for only flushing the toilet! To make water use more efficient, the water used can be used for two purposes before leaving home. Since the toilet does not need to be washed off with clean water, the plumbing pipes can be regrouped, so that the "gray water" from the sink in the bathroom fills the toilet tank.
- ✓ You can dig searching for water and then use the well, without wasting drinking water to meet your needs.
- ✓ You can increase the effectiveness of watering if you use the early morning hours or water in the evening when evaporation is less.
- ✓ You can increase the ability of the soil in your yard to retain water by adding organic ingredients – e.g. compost.

Bulgaria ranks last in a survey that studied the water resources among the Balkan States. Water is a valuable resource, and we use much more than our fair share of it – the average water consumption per person daily amounts to ca. 140 L, mainly for household use.



Good Practices in Agriculture 1

✓ Getting Started with efficient irrigation

In Greece, Italy, Portugal, Cyprus, Spain and the south of France, dry or semi-arid climates require the use of irrigation. Currently, in these areas, nearly 80% of water resources used in agriculture are spent on irrigation.

Efficiency of water use is already being implemented in Europe, both through water efficiency (the share of water taken to the field) and by the efficiency of use within the field (the water actually used by crops for the total quantity of supplied water). In Greece, there is an increase in water efficiency by 95% compared to previously used irrigation methods.



✓ Change the way you work

Training and knowledge-sharing programmes for more efficient water use. In Crete, for example, water savings of ca. 10% have been achieved through the use of irrigation consultancy services. The advisory services inform farmers on the phone when and how to irrigate crops on the basis of daily evaluations of the conditions affecting the crop.

✓ Waste water use in agriculture

Purified wastewater can provide an effective alternative to satisfying the water needs of agriculture. Purification of industrial wastewater can be close to the place of their use, which facilitates the return of the extracted valuable substances back into the production process, as well as the use of purified water within the plant.

In this case, treated water may contain known impurities which do not affect the reuse

Good Practices in Agriculture 2

✓ Choosing the right policies

The EU Water Framework Directive (WFD) has contributed to this objective by encouraging changes in agricultural practices that can improve both the quantity and quality of water in Europe, but it is still necessary further development of the common agricultural policy and of the national structures for water prices to ensure that they also support the objectives of the WFD. The plan for the protection of Europe water resources, to be published by the Commission by the end of this year, will focus on opportunities to increase the efficiency of water resources and the relevant policy options. Water management in agriculture will certainly benefit from the stronger emphasis of the common agricultural policy on resource efficiency and ecosystem services.

More efficient use of water in agriculture is just one of the steps we need to take to reduce our impact on the environment to build a sustainable future.

It is widely known what large quantities of water are used in different manufacturing processes. As an example, we can give: the manufacture of one tonne of cast iron, for which 100 m³ of water is used, for one tonne of sugar - 15 m³ of water, for one tonne of synthetic fibres - 500 cubic meters of water. Thus, mankind, on one hand, constantly increases its water needs, and on the other - this water due to its pollution is already unsuitable for use and hides a serious danger to the flora and fauna of water basins and human beings.



DETERGENTS & METALS

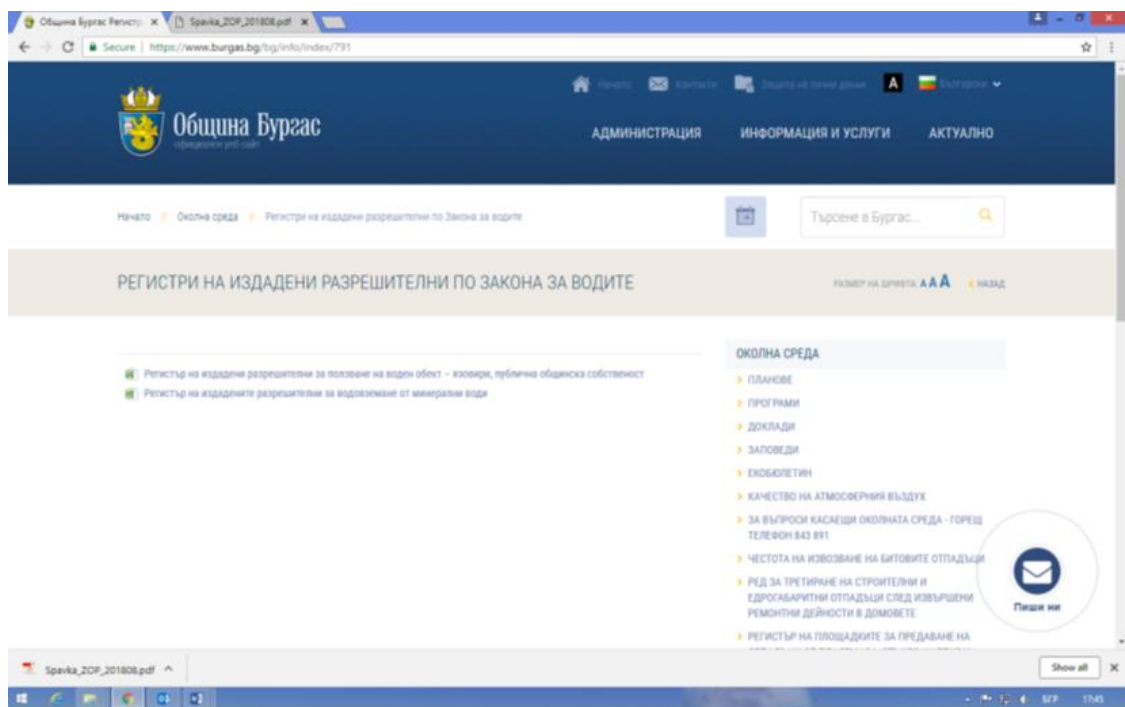
Water pollution is also due to detergents. In the last 30-40 years, they accounted for more than 2/3 of the sought washing substances. Upon receipt of chlorine from the synthesis of detergents of oil and a number of other products, mercury is used or released, which is applied in the water basins and settles at the bottom. There, under the action of some bacteria, mercury is converted into soluble mercury compounds, which the food chain reaches the fish and poisons them. The harm caused by detergents is large because they pass through the treatment facilities without modification. Their molecules do not succumb to the effects of enzymes. Detergents also contain phosphates, therefore, when they fall into the water basins, they stimulate the growth of the algae. Following the depletion of algae, aquatic ecosystems are saturated by organic substances and their oxygen balance is disrupted.

The main sewerage of contaminated waste water from industry are rivers and lakes. Rivers cause pollution of the seas and the world ocean. Polluted by industry there is a toxic impact on living organisms. Life in such waters decreases strongly, and in some cases it is completely destroyed due to oxygen disturbance. Irrigated areas and forests near the poisoned ponds are threatened by the harmful effects of contaminated waters. Established are irreversible disturbances in the genetic apparatus of some plants and animals, harmful pollution.



Good Municipal Practices

- ✓ There is a good municipal practice for keeping a public register of permits issued under the Water Act. Link to the public register of Burgas municipality.
- ✓ <https://www.burgas.bg/bg/info/index/791>



- ✓ Practice from the municipality of Plovdiv: from the municipal budget the cleaning of Maritsa River is financed – 10 km in 2018. Uses labour from temporary employment;



Interaction Between NGOs and Citizens

In 2016 the fishing association "Balkanka – 2009" held a wide public campaign to improve the awareness and understanding of the law among various groups of Dobrinishte, Dupnitsa, Kresna, Sandanski, Gotse Delchev and Breznitsa and seek their opinion and to initiate an interest in the protection of the rivers in the region of Blagoevgrad. It aimed to disseminate information on the changes in the Water Act to stakeholders from civil society and local authorities and the possibilities for separation special areas for protection. Development legislative changes, as well as recommendations of experts for protection regimes of recreation areas and water sports along rivers, as well as collected public proposals for such areas were presented at the meetings held on the ground. As a result, a public civil register of valuable river areas for 21 rivers in Blagoevgrad and Kyustendil districts was created.

Another example is a project implemented in Banya (Razlog). Razlog serves as an example of best practice on how a town can use EU Structural Funds to protect the environment and improve the quality of the life while promoting tourism and emerging sectors. One project, which illustrates this is co-financed by the ERDF "Implementation of the Small-scale Measures to Flood Prevention in Banya village, Razlog Municipality." The project was implemented over a period of 15 months in Banya. More than 500,000.00 EUR has been invested in measures to prevent floods and to build aqueducts along the river. Before the implementation of this project, the heavy rainfall led to floods in the village, which destroyed property, endangered the lives of its inhabitants, as well as the natural beauties. Thanks to this project residents, the ecosystems and the property in the village are protected against natural threats.

Regulatory, Operational and Monitoring Public Institutions

Water management of National level is carried out by the **Council of Ministers** and the Minister of Environment and Water. The National Assembly adopts National strategy for the management and development of the water sector, which sets out the main objectives, milestones, means and methods for the development of the water sector.

The State policy for water management is carried out by the **Minister of Environment and Water**, and in the cases under art. 148, para. 1 - together with the Minister of Foreign Affairs.

The Environment Executive Agency is an administration to the the Minister of Environment and Water for the implementation of managerial, coordinating and information functions in terms of control and environmental protection in the field of Republic of Bulgaria. It designs and manages the National monitoring system on the state of the components and factors of the environment for the whole country.

The agency is the National Coordination Centre of the European Agency for Environment. The European Environment Agency is the body of the European Union, set up to provide timely, targeted, relevant and appropriate reliable information on the environment of both policy makers in the EU and the public.

Regional Inspectorate of Environment and Water are administrative structures to the Minister of Environment and Water, ensuring the implementation of the environmental protection policy at regional level.



International and European Legislation

The integrated approach to water management in Bulgaria is built on the basis of three legislative frameworks – international, European and Bulgarian legislation.

✓ International legislation: it includes all international conventions and agreements in the field of freshwater which Bulgaria has officially signed and ratified. Three international documents are linked directly or indirectly to fresh water: the Danube Convention, Helzinki Convention, Ramsar Convention and in some aspects the Black Sea Convention – art. 7 and Protocol for the protection of the Black Sea environment from contamination by ground-based sources.

✓ European legislation:

The main normative documents are the European directives. The most important for water management is the Water Framework Directive 2000/60/EU, which covers all other water directives. This directive introduces some basic approaches and principles for water management, such as legal requirements in Europe, which define the milestones that each EU Member State must pass in implementing the integrated approach:

- o Basin principle of water management. Cross-border river basins require the establishment of international competent river basin management bodies.
- o Sustainable water use – long-term protection of water resources.
- o The ecosystem approach to water assessment and management is determined by biological parameters.
- o Applying “the polluter pays” principle
- o Water management requires self-financing of all activities within the river basin. The central budgetary allocation of funds shall be avoided.
- o Implementation of integrated water management in river basins.

National, Regional and Local Legislation

The following priorities have been adopted for the successful implementation of integrated water management in Bulgaria:

- ✓ Full transposition of the requirements of the Water Framework Directive 2000/60/EU into national legislation.
- ✓ Strengthening the capacity of the basin management bodies.
- ✓ Improving coordination between the institutions involved in water management.
- ✓ Inclusion in the river basin management plans of priority measures for improving the quality and sustainable use of water resources.
- ✓ Improving monitoring and control systems.
- ✓ Informing and advising the public.

The following laws have been elaborated, including amendments and additions to the:

- ✓ Water Law (additional, No. 26 of the 21.03.2014, and additional, issue 49 of 13.06.2014, No. 53 of 27.06.2014, issue 98 of 28.11.2014, in force as of 28.11.2014)

The amendments are related to protection against the harmful effects of water; specialised maps, registers and information systems for water and facilities; protection of water and water bodies;



Non-Governmental Sector and Civil Society

- ✓ Although somewhat scarce in legislative texts, non-governmental organisations are among the circle of entities that take part in the planning, the programming and proper absorption of EU funds. Through independent expertise, raising public awareness, initiating debates and monitoring the work of public authorities responsible for EU funds, the involvement of NGOs helps to ensure transparency and democratic decision-making. Solutions and helps to increase the effective use of public services and resources.
- ✓ The provisions in the legislation providing for the participation of the NGOs as a partner of the state for the most part are of a declaratory nature.
- ✓ In local legislation, the involvement of non-governmental organisations is also inadequate, with the exception of some municipalities which actively cooperate with non-governmental organisations.
- ✓ Notwithstanding the existing legal framework for partnership between the Government and the non-governmental sector in the field of ecology and sustainable development and the possibility to include non-governmental organisations as a participants when taking decisions at local level, the question arises as to whether the implementation of the partnership is a fact and whether it is a mere formality.

On the other hand, it is established that NGOs from a local government scale are often too small and unsustainable to be accepted by the administration as equal partners. Successful resolution of this conflict by intensifying cooperation between the institutions and the NGOs would demonstrate maturity and competence and in the both sides.

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FOR YOUR
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This manual has been produced with the financial assistance of the European Union. The contents of the document are sole responsibility of Eco Nevrokop and can in no way be taken to reflect the views of the European Union, the participating countries the Managing Authority and the Joint Secretariat.

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A survey of good practices and traditions in the overall scope of use, management and monitoring of water resources, including rational utilization of available water resources, their conservation and preservation, modern technological solutions and traditions for efficient use, consumption, reuse, recycling, purification, storage, loss minimization and transmission and analysis of the related national legal framework and effective working methods of the regulatory and Monitoring Authorities, as well as the function of public civilian control was carried out.

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Introduction

Today we live in an ever-changing world where we are increasingly having to think about the way we use our planet resources. We are increasingly having to consider it not as a land that we have inherited from our ancestors, but one that we have borrowed from our children. Water is one of the main and most important resources necessary for the existence of mankind. The project Best Water Use aims to raise public awareness of the use of water resources and to respond to various questions related to the increased interest in the field.

The right to access essential services prerequisite for good quality, including water, is one of the principles of the European pillar of social rights, which the Heads of State and Government unanimously supported during the Gothenburg Summit this year. The legislative proposal aims to ensure this right and is a response to the first successful European citizens' right to water initiative (Right2Water), which brought together 1.6 million. Another objective of the proposal is to step up consumers by ensuring that water suppliers provide their customers with clearer information on water consumption, cost structure and price per litre, and the latter will allow consumers to compare prices of bottled water. This will contribute to fulfilling the environmental objective of using less plastics and reducing the EU's carbon footprint, as well as achieving the sustainable development goals.

The legislation of the European Union should be modernised to increase the quality of drinking water and improve citizens' access to water supplies where it is most needed.

This proposal will facilitate the transition to a circular economy and help Member States in their efforts to effectively manage drinking water as a resource. And this implies using less energy and reducing water losses. Greater transparency will also give consumers who will have an incentive to make their consumer choices more sustainable, such as consuming tap water.

Most people living in the EU have very good access to high-quality drinking water thanks to the EU legislation that protects Europeans and guarantees their access to high-quality drinking water for many years. The Commission's aspiration is to ensure that this high quality is maintained in the long term. The rules in respect of which the Commission proposes an update will improve water quality and safety, and new ones will be added to the list of criteria for determining water safety. The extension of the list shall take into account the latest scientific data and recommendations of the World Health Organisation.

Under the new rules, Member States are required to improve access for all, especially for vulnerable and marginalised groups whose access to drinking water is difficult. In practice, this means providing equipment for access to drinking water in public places, campaigns to inform citizens about water quality, and encourage administrations and managers of public buildings to provide access to drinking water.

Thanks to another important change in legislation, the public will have comprehensible and user-friendly online information on the quality of drinking water and the water supply system in the region in question, which is expected to increase confidence in tap water quality. It is estimated that the new measures will reduce the potential health risks associated with drinking water from 4% to less than 1%.

In addition, if they reduce their consumption of bottled water, households in Europe can save more than 600 million Eur a year. When greater confidence in the quality of tap water, citizens can also contribute to reducing plastic waste generated by the consumption of bottled water, as well as to reducing falling in marine litter. Plastic bottles are the most common single-use plastic item polluting European beaches. With the update of the drinking water, the Commission is making an important legislative step forward in the implementation of the EU plastics strategy, announced on 16 January 2018.

Better management of drinking water by Member States will eliminate losses and contribute to reducing carbon footprint. The proposal will thus also make a substantial contribution to the achievement of the sustainable development goals by 2030 and the objectives of the Paris Agreement on climate change. The new risk-based approach to safety will enable checks to be carried out where risks are greater. In parallel, the Commission will accelerate its standardisation work to ensure that, within the EU's internal market, construction products in the water sector, such as reservoirs and pipes, are not a source of contamination of drinking water.

Most people living in the EU already have very good access to high-quality drinking water, especially in comparison to other regions of the world, thanks also to the existing European drinking water legislation for over 30 years. This policy ensures that water intended for human consumption is safe and preserves the health of citizens. The main aspects of the policy are:

- ✓ guarantees that the quality of drinking water is controlled by standards based on the latest scientific evidence;
- ✓ ensures efficient and effective traceability and evaluation of drinking water quality and enforcement of relevant standards;
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Protection of Water Resources in Bulgaria

Preserving the quality of natural and drinking waters is a primary task of society to ensure healthy living conditions for the individual and a high standard of public health.

The importance of the waters in our country is complex. The production of electricity by HPP is organized in the following way: only a small part of the total hydro energy reserve is utilized. The hydro-energy potential of Bulgaria is 21 Billion KW/h but technically only 14.4 kW/h are in use. A number of industries rely on water resources, with clean drinking water often used in industrial production, which is economically unjustified. The shortage of drinking water has led to the introduction of a temporary or permanent water supply regime in a number of settlements of the country. For irrigation, about 45% of total tap water is used, and about 13-15% is used for water supply of the population. The water consumption per inhabitant per day is about 203 L.

On this indicator our country ranks among the highly developed countries. Mineral waters are more and more intensively used. The waters of rivers and lakes are a prerequisite for the development of fishing. The Danube river allows the development of passenger and international freight and inland waterway transport. The water resources of the Danube river are the backbone of the project for the construction of a hydro-energy plant between Nikopol and Turnu Magurele.

A particularly topical problem for our country, and not only for it, is the protection of water from pollution. Most of the riverbanks and a number of inland reservoirs (dams and lakes) are contaminated by various economic activities – especially by industry, as most of our companies do not have wastewater treatment plants. The same applies to those settlements of the country, whose communal-domestic waters pollute the rivers. The possibilities for self-cleaning of our rivers are severely limited. Annually over 3.5 billion m³ waste water get into our rivers. Only about 1/3 of it gets purified. A system for monitoring the degree of contamination of river currents in Bulgaria was established. Among the main pollutants of water resources are mainly heavy metals, phenols, oils, petroleum products, etc.

Bulgaria has almost 20 billion m³ of water. From it fresh drinking water is only 1% and is predominantly found in lakes. Groundwater resources, which make up 40% of the total water resource, are very important, but there is a worrying trend of forest felling.

Especially these bare-seers in the watershed zones - they inflict tremendous harm on groundwater and lead to the destruction of ecosystems. Poor management of water resources is also a cause of water scarcity.

So, for example, in the region of southwestern Bulgaria, the western slopes of Rila mountain, we have the largest surplus of water, it eight times exceeds consumption, but it is strange why in the summer months a number of settlements are experiencing a shortage of drinking water. This is because there are no accumulation volumes, i.e. the construction of water reservoir to capture the water from spring. It is important for the conservation of water resources is their effective use. The share of water with drinking qualities used in the industry is above the normal (around 10% are also attributed to the loss of water due to a malfunction of the plumbing), about 10% of drinking water is used for watering in the yards. Almost twice as much water is spent by industry than the average in other EU Member States.

Water protection requires the improvement of production technologies, ways of consumption by: implementation of smart technologies; application of circular and sequential consumption systems; introduction of repeated reuse of water resources; increase the construction of more wastewater treatment plants and facilities, and increase the efficiency of existing ones. For efficient use in areas rich in water resources there is the Construction of Water-consuming Proceedings.

The improvement of irrigation systems by applying gravitational subsurface and drip irrigation will also lead to the protection of water from being contaminated. Introduction of control of water use, the quantity and quality of wastewater from different productions, etc. activities will contribute to the rational use of water.

There is also a persistent tendency of deterioration of water resources. Most often this is due to the chemical substances that the industry uses or receives in production. Main pollutants of river waters are industrial plants from pulp and paper, chemical, canning industries, wastewater from settlements and stockfarms. Fresh groundwater indicates contamination in relation to the content of chlorides, sulphates, nitrates, common mineralization.

In relation to other European countries Bulgaria is characterized by relatively significant fresh water resources, both in absolute volume and per capita. The water resources in Bulgaria are formed mainly by external inflow and are unevenly distributed on

the territory of the country. The fresh water resources of Bulgaria are about 14 thousand m³ per year. The average water volume per capita puts the country among the Top 10 European countries. Nevertheless, certain regions of the country experience water scarcity due to the uneven territorial distribution of resources. Bulgaria is among the European countries with high levels of seized water on average per capita due to the significant water volumes needed for cooling. At the same time, the water abstraction in Bulgaria does not trigger stress on the aquatic ecosystems.

The amount of waste and cooling water generated by economic activities follows the level of consumption. An annual average of about 79% of the total water used for economic activities (2000-2013) is taken to water tanks or public sanitation. The degree of purification was improved – in 2005, with at least secondary methods, 56% of the removed effluent was treated in water bodies, and in 2013, 66%. The public sewerage system in the country is predominantly mixed and collects both industrial, domestic and stormwater. The highest proportion of the population associated with waste water stations is located in the Black Sea region and the Danube basin district, being predominantly a secondary and a tertiary purification system.

During the period 1996-2018 the trend observed in recent years to improve water quality has been maintained. In 2018 the evaluation of the indicative basic physico-chemical indicators supporting the biological elements of quality within the EC shows that a large part of the evaluated aspects fall into the category of very good quality of water.

From 1993 to 2018 there has been a gradual improvement in groundwater quality in term of indicators. The percentage of points in which the average annual values exceed the groundwater quality standards shows decreasing trends for all indicators except for phosphates and nitrates, for which there is a decreasing trend, respectively.

Good Practices and Effectiveness of Water Use in Households

Within the project Best Water Use an empirical study of the target groups' attitudes towards water resources was carried out between 10th September and 10th October 2018, their conservation and efficient use and management covering 232 households, 40 farmers, 51 local business representatives / respondents.

The water supply with clean drinking water in Bulgaria is not at a good enough level. The facts are definite – 14 of 29 cities have outbreaks of drinking water contamination in Bulgaria. One of the main problems facing access to quality drinking water is the outdated plumbing network in our country.

The main uses of water in households are associated with the daily needs – hygiene, cooking, drinking and cleaning of the home, which are obligatory for all households.

☐ Other activities requiring the use of water are typical for smaller settlements in the area and are part of the maintenance of a garden, agricultural production and the rearing of animals.

☐ Unlike households, in business the use of water is linked to the specific activity of the organization. Apart from household needs, which are most frequently referred to by business representatives, probably because they cover the variety of water-requiring activities, in particular common objectives by type of activity are: cleaning of areas in services, use of water as a resource in the production and watering of agricultural production and rearing of animals in agriculture and/or livestock.

☐ The two target groups use mostly drinking water from the plumbing (92% population, 80% business) and bottled drinking water (about half of each group). Water coming directly from a natural water source also has a significant share in the companies- mainly in agriculture and livestock farming: 90% of them use natural water sources.

Directly asked if they save water, only half of household respondents inform positively – such is the proportion of targeted savings. Their demographic profile does not differ significantly from the average for the whole population – traits are the higher levels of tertiary education graduates and people aged over 45 years old.

☐ Organisations that save intentionally represent 60% of all participants. Among them, most of them are agriculture or livestock companies, and there are no representatives of craftsmen.

☒ The timely removal of leaks and damages is mentioned as the best and most common of saving practices.

☒ It turns out that nearly half of the households save water during their daily home activities – bathing, cooking, washing teeth and plates, etc., while 21% use mixers with an option for economical use.

The leading disadvantage of drinking water in Bulgaria is the presence of nitrates, bacteria and high chlorine content in it. The rate of deviation of the standards established is exceptionally high. The most numerous are cases with established high concentration of active chlorine.

76% of respondents did not have a specific recommendation to save water, but among the other respondents a leading recommendation appears to be collection of rainwater with primary purpose irrigation, as well as a substitute of tap water in the household whenever possible. In general, Bulgaria has no traditions in rainwater collection for irrigation.

However, it was possible to identify the following hot spots:

- ✓ Reduction of water bills by system sanitation by 35% or more %.
- ✓ Usage of only half of the water that would normally be used by a person to shower by mounting aeration shower systems.
- ✓ Reduction of electricity bills /in case of usage of electric boiler/.
- ✓ Protecting the environment: unlike fossil fuels, water resources are renewable and via reasonable use, many rivers and natural habitats, where a variety of animals live, can be preserved.

A shower does not save only water, but it saves also electricity, in case of electric boiler. Also, when replacing the following appliances with ones from a higher class, a significant positive effect is observed:

- ✓ Washing Machine (22%)
- ✓ Bath (9%)
- ✓ Dishwasher (3%)
- ✓ Hydrants (12%)
- ✓ Showers (21%)
- ✓ Toilet cisterns (28%)
- ✓ Toilet leakage (5%)

The flow rate of the available shower can be performed the following way: measure for how long a graduated jug is filled with exact volume and then divide to get the value per liter. The aeration of water contributes significantly to its economy in a preserved hygienic effect.

Replacing old toilet cistern with new sounds weird but it actually turns out that it's also an investment that pays out within the first year as a result of realized water savings.

Similar to the shower, a water aerator can be installed in the kitchen and the bathroom, which supply a strong stream of water sufficient for washing dishes, toothbrushes, shaving. As a rule, they pay out much faster than 1 year.

Additionally, a lever can be installed to stop the water flow or reduce the flow when we want to keep the settings of temperature.

Replacement of the washing machine with a higher class one is a nice move, but it does not need to be performed right away, especially if the old washing machine has few more years of life.

In Bulgaria there is practice using tap water for watering yards and gardens. But:

- ✓ You can choose plant species that consume comparatively less water. If you plan to have a yard with grass, e.g. such a variety may be chosen, which has lower requirements for irrigation;
- ✓ Rainwater can be collected in containers and used for irrigation; It is advisable to use tiles in the construction of a roof, not asphalt or bitumen products to avoid additional contamination. The area from which the water will be collected is most often a roof, but almost every yard has a slab, cemented landings, walkways, etc., which during the rain overflow from water. With a suitable slope, pipes and storage space, dug in the ground or placed at the lowest point – as the case may be, solves the problem. The more water, the better. Rainwater is "soft" – i.e. half-distilled, although this quality disappears while rolling on the roof. It is perfect for watering as any rain. The Rainwater collection system is a very useful facility for the yard, wherever located.
- ✓ As an example, a house with 150 m² roof area, in a region that gets at least 50 cm. rain a year, could potentially collect about 15 000 liters of water in a year. This water can be used for any needs and you could even make your own rain collection system and a purification system with which you can use this drinking water. Unfortunately, this variant in Bulgaria is allowed individually for each owner.

- ✓ Apart from everyday household activities, the renewable natural resource WATER is also used in industry. The use of rainwater as a resource in industry is an economically efficient solution that can significantly reduce production costs. This would therefore lead to a reduction in the final price of the products produced. Water is crucial to everything around us.
- ✓ Collection of "soap water"/water from baths, showers, sinks and washing machines/, also called "Grey Water" and use it for irrigation, washing vehicles and machines or for toilet cistern. The system includes a tank, filters, pipes. It is estimated that a savings of ca. 30% is quite possible after the introduction of this system in the household. Grey water includes any domestic wastewater, excluding wastewater from toilets that are known as "Black Water". Typically 50-80% of domestic wastewater is defined as grey water (the water from kitchen sinks, dishwashers, bath sinks, baths and showers).
- ✓ The safest way to use the grey water is to bring it directly into the biologically active topsoil, where soil bacteria can quickly process it, producing nutrients that are necessary for the plants. This way of biological water treatment is much more effective than any other mechanized treatment, thus preserving and guaranteeing the quality of groundwater and surface water. Water that is already used in the bath or shower is best suited for this purpose, but the water used to washing the dishes is also usable, as long as it is not too oily or containing food rests. The water can be collected manually, or with the help of drainage pipes can be redirected to a small storage tank. One square metre of soil as a whole can absorb half a gallon of grey water each week. So, if you have a garden area of 10 m² size, you can recycle up to 50 gallons of greywater every week.
- ✓ Use the water from the sink to flush the toilet. According to the Center for Alternative Technology – a European environmental organization dedicated to the development of clean technologies for the earth, in developed countries each person uses ca. 13 000 liters of water per year for only flushing the toilet! To make water use more efficient, the water used can be used for two purposes before leaving home. Since the toilet does not need to be washed off with clean water, the plumbing pipes can be regrouped, so that the "gray water" from the sink in the bathroom fills the toilet tank.
- ✓ You can dig searching for water and then use the well, without wasting drinking water to meet your needs.

- ✓ You can increase the effectiveness of watering if you use the early morning hours or water in the evening when evaporation is less.
- ✓ You can increase the ability of the soil in your yard to retain water by adding organic ingredients – e.g. compost.

Bulgaria ranks last in a survey that studied the water resources among the Balkan States. Water is a valuable resource, and we use much more than our fair share of it – the average water consumption per person daily amounts to ca. 140 L., mainly for household use.

Even in regions without centralised waste water collection system and without a treatment system, appropriate wastewater treatment and human excrement treatment can still be implemented. Modern sustainable and decentralised approaches such as split dry toilets, artificial wetlands or waste water ponds contribute to the protection of water resources.

The municipalities should be informed and should be aware of the relationship between management of public and household wastewater and pollution of water resources and choose the most appropriate solution, taking into account the available financial and human resources. Approaches to waste water management must be learned and adopted according to local environmental, social and economic conditions. In planning the operation and implementation of the waste water management system, there must be a global approach to discharges of waste water, purification and reuse.

Conserving water resources can help you save money and can certainly help save the environment. In addition to the simple rule of spending less water, there are several ways to use the same water for different purposes at home.

Good Practices in Agriculture

We need food, and for its production, clean fresh water is needed. With growing needs as a result of human activities on one hand, and climate change on the other, many regions, especially in the south, are struggling to find sufficient resources of fresh water to meet their needs. How can we continue to produce food without reducing the fresh water resources in nature? More efficient use of water in agriculture would certainly help in this regard.

One third of water use in Europe is in agriculture. Agriculture affects both the quantity and quality of available water resources. In some parts of Europe, contamination from pesticides and fertilisers used in agriculture remains the main cause of poor water quality.

Industry, lifestyles and the personal needs of a growing population also compete with nature for the use of fresh water. Climate change further increases uncertainty about the availability of water resources. Given the expected change in the nature of rainfall, some parts of Europe are likely to have more and others with less freshwater resources in the future. Faced with growing demand and climate change, many consumers, including nature, will struggle to meet their water needs. In the case of water shortages, industry and households can develop ways to use water more economically, but there is a risk of irreversible damage for water-dependent ecosystems. This would affect not only living organisms around a certain body of water. It would also affect us.

By applying proper agricultural practices and favourable policy choices, we can achieve a much more efficient use of water in agriculture, which would mean more water resources available for other uses.

A few companies participated in the empirical research conducted for the needs of the project, some practices were identified – they vary according to the type of activity – the service sector uses economical plumbing elements, the production relies on the economical elements and reuse of water, and in agriculture and livestock it is largely relied on rainwater and water directly from natural sources.

☐ Over 3/4 of the respondents find it difficult to point out an example of a practice of saving water from the past that they think is good. Among respondents, important for households and businesses is the rapid repair of damage/leakage through the plumbing system. Households mostly recommend rainwater harvesting and sparing tap water – when watering, washing and bathing.

☒ Both target groups contribute to reduced water pollution by seeking to use fewer chemicals/harmful materials in the household and in the activities of the organisation.

☒ Reuse, recycling of water, as well as decomposition of waste from production to more harmless are among the least practiced methods of reduced contamination.

✓ **Getting Started with efficient irrigation**

One of the areas where new practices and policies can have a significant impact in terms of more efficient use of water resources is the irrigation of agricultural crops. In the southern European countries, such as Greece, Italy, Portugal, Cyprus, Spain and the south of France, dry or semi-arid climates require the use of irrigation. Currently, in these areas, nearly 80% of the aquatic resources used in agriculture are spent on irrigation.

However, irrigation should not be associated with such high water consumption. Efficiency of water use is already being implemented in Europe, both through water efficiency (the share of water taken to the field) and by the efficiency of use within the field (the water actually used by crops for the total quantity of supplied water). In Greece, for example, networks with increased water efficiency and distribution have led to an increase in water efficiency by 95% compared to previously used irrigation methods.

The policy plays a key role in stimulating the agricultural sector to introduce more effective irrigation practices. In the past, for example, water pricing policies in some European countries did not necessarily require farmers to use water effectively. Farmers have rarely paid the real cost of water, reflecting the cost of the environment and resources. In addition, agricultural subsidies under the EU common agricultural policy and other measures have indirectly encouraged farmers to produce more agricultural crops in need of water by using inefficient technologies. In the province of Córdoba, for example, the efficiency of the irrigation of plantations increased by approximately 40%, after the conditionality of subsidies with cotton production was partially eliminated in 2004. The introduction of a mechanism for water prices stimulating efficient consumers and the elimination of harmful agricultural subsidies are likely to lead to a significant reduction in the amount of water used for agricultural irrigation.

✓ **Change in the way you work**

In addition to changing irrigation techniques, greater cost-efficiency and economical water use can also be achieved through training and knowledge-sharing programmes to train

farmers in practices for more efficient water use. In Crete, for example, water savings of 9 to 10% have been achieved through the use of irrigation consultancy services. The advisory services inform farmers on the phone when and how to irrigate crops on the basis of daily evaluations of the conditions affecting the crop.

The change in agricultural practices may also increase the quality of available water resources for other water users, Cost-effective Way. For example, the use of inorganic and organic fertilisers and pesticides can solve a number of problems related to water pollution from agriculture. In addition, there is considerable potential for improving water quality across Europe, without affecting or marginally affecting profitability and productivity, for example by reducing pesticide use, changing crop rotations and planning buffer belts along water basins.

✓ **Waste water use in agriculture**

By using wastewater in agriculture, more freshwater resources can be provided for other needs, including for nature and households. If the quality of reclaimed water is managed appropriately, purified wastewater can provide an effective alternative to satisfying the water needs of agriculture.

Purification of industrial wastewater can be close to the place of their use, which facilitates the return of the extracted valuable substances back into the production process, as well as the use of purified water within the plant.

In this case, treated water may contain known impurities which do not affect the reuse. In cases where water is predicted to be discharged in a water basin, it must be purified to the extent that its quality meets all sanitary and hygienic standards and, accordingly, does not create a risk of contamination of the water basin.

Regarding the method of purification of water, there are two options: **The Generative Methods** allow to be extracted valuable impurities from water that can be reused in production; **Destructive Methods** - treatment of water associated with breaking of containing impurities to achieve high degree of purification.

The use of purified wastewater in agriculture already provides significant benefits for water management in some European countries. In Cyprus, for example, the target values for recycled water for 2014 are approximately 28% of the water needs of agriculture for 2008. On the island of Gran Canaria 20% of the water used in all sectors is supplied by the treated

waste water system, including for the irrigation of 5000 hectares of tomatoes and 2500 hectares of banana plantations.

✓ **Choosing the right policies**

In order to secure a future in which there will be sufficient water resources available to meet the needs of our ecosystems, as well as sufficient resources to meet water consumption needs, we need to develop the right packages of political measures to support measures of effectiveness. The EU Water Framework Directive (WFD) has contributed to this objective by encouraging changes in agricultural practices that can improve both the quantity and quality of water in Europe, but it is still necessary further development of the common agricultural policy and of the national structures for water prices to ensure that they also support the objectives of the WFD. The plan for the protection of Europe water resources, to be published by the Commission by the end of this year, will focus on opportunities to increase the efficiency of water resources and the relevant policy options. Water management in agriculture will certainly benefit from the stronger emphasis of the common agricultural policy on resource efficiency and ecosystem services.

More efficient use of water in agriculture is just one of the steps we need to take to reduce our impact on the environment. Without this step, we cannot achieve a resource-efficient economy or build a sustainable future.

It is widely known what large quantities of water are used in different manufacturing processes. As an example, we can give: the manufacture of one tonne of cast iron, for which 100 m³ of water is used, for one tonne of sugar - 15 m³ of water, for one tonne of synthetic fibres - 500 cubic meters of water. Thus, mankind, on the one hand, constantly increases its water needs, and on the other - this water due to its pollution is already unsuitable for use and hides a serious danger to the flora and fauna of water basins and human beings.

The pollution of water by industry is primarily due to chemical substances used or received in the proceedings. Some of them hold bactericide properties and change the normal flora and fauna of the water basins. The majority of these chemical substances are toxic and dangerous to human health. The rapid pace of industrial development, adversity, the insufficient number of treatment facilities, the poor exploitation of existing ones, frequent accidents in them, the lack of reverse cycles for the use of industrial waters-these are the main reasons for increasing water pollution.

Water pollution is also due to detergents. In the last 30-40 years, they accounted for more than 2/3 of the sought washing substances. Upon receipt of chlorine from the synthesis of detergents of oil and a number of other products, mercury is used or released, which is applied in the water basins and settles at the bottom. There, under the action of some bacteria, mercury is converted into soluble mercury compounds, which the food chain reaches the fish and poisons them. The harm caused by detergents is large because they pass through the treatment facilities without modification. Their molecules do not succumb to the effects of enzymes. Detergents also contain phosphates, therefore, when they fall into the water basins, they stimulate the growth of the algae. Following the depletion of algae, aquatic ecosystems are saturated by organic substances and their oxygen balance is disrupted.

The main sewerage of contaminated waste water from industry are rivers and lakes. Rivers cause pollution of the seas and the world ocean. Polluted by industry there is a toxic impact on living organisms. Life in such waters decreases strongly, and in some cases it is completely destroyed due to oxygen disturbance. Irrigated areas and forests near the poisoned ponds are threatened by the harmful effects of contaminated waters. Established are irreversible disturbances in the genetic apparatus of some plants and animals, harmful pollution.

In recent decades, radiation has led to serious contamination of air, soil and the waters of our planet.

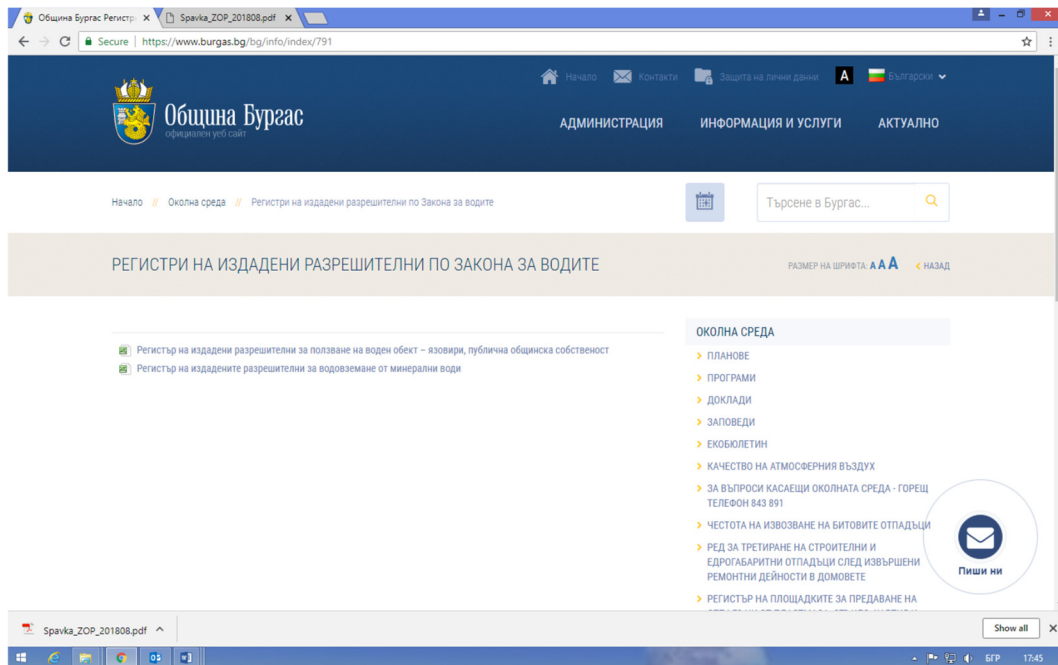
Restoring forests by planting new trees, restoring the link between rivers and overflowing areas, restoring wetlands-these are sustainable and effective ways to restore balance in the water cycle, to mitigate the effects of climate change and hence to improve human health and the quality of life in general. The availability of good quality water is of utmost importance for people, nature and economic activities. Large amounts of water are needed for the production of energy, food and everyday goods. Restoring the natural state of waterways is very important in order for fish, birds and animals to have the food and habitats they need.

Bulgaria fresh water resources are estimated at 106.7 billion. m³ per year, including the Danube (long-term average, 1961-2011) and distributed unevenly across the country. The majority of them are formed by an external inflow (84%), as well as most of the countries in the Danube basin.

Depending on climatic and hydrological conditions, water resources vary considerably between countries.

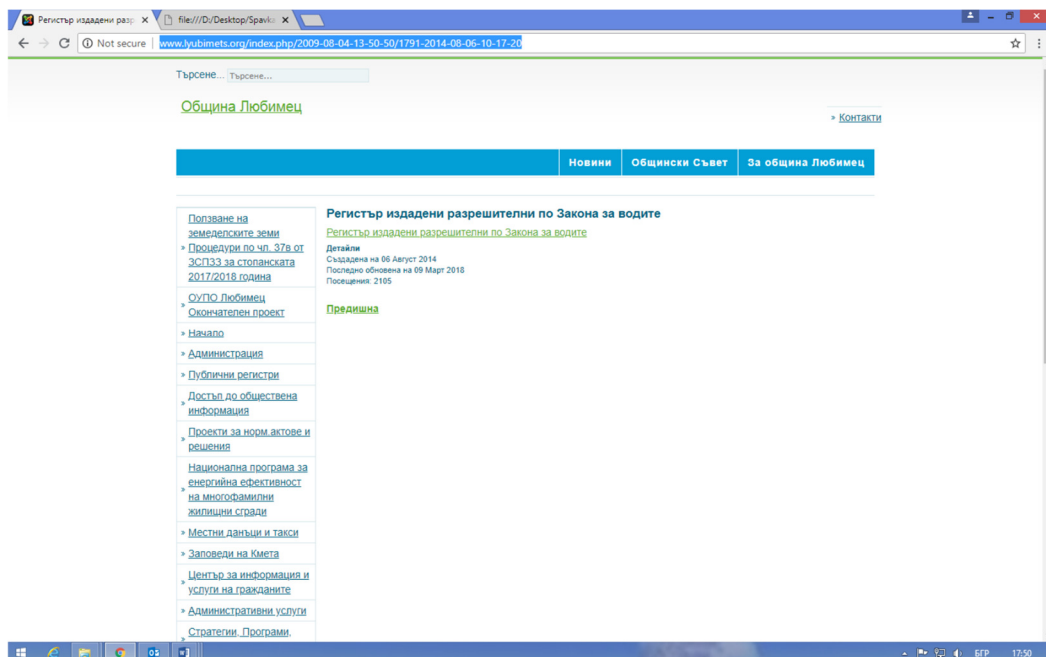
Good Municipal Practices

There is a good municipal practice for keeping a public register of permits issued under the Water Act.



Link to the public register of Burgas municipality

<https://www.burgas.bg/bg/info/index/791>



Link to the public register of Lyubimets municipality

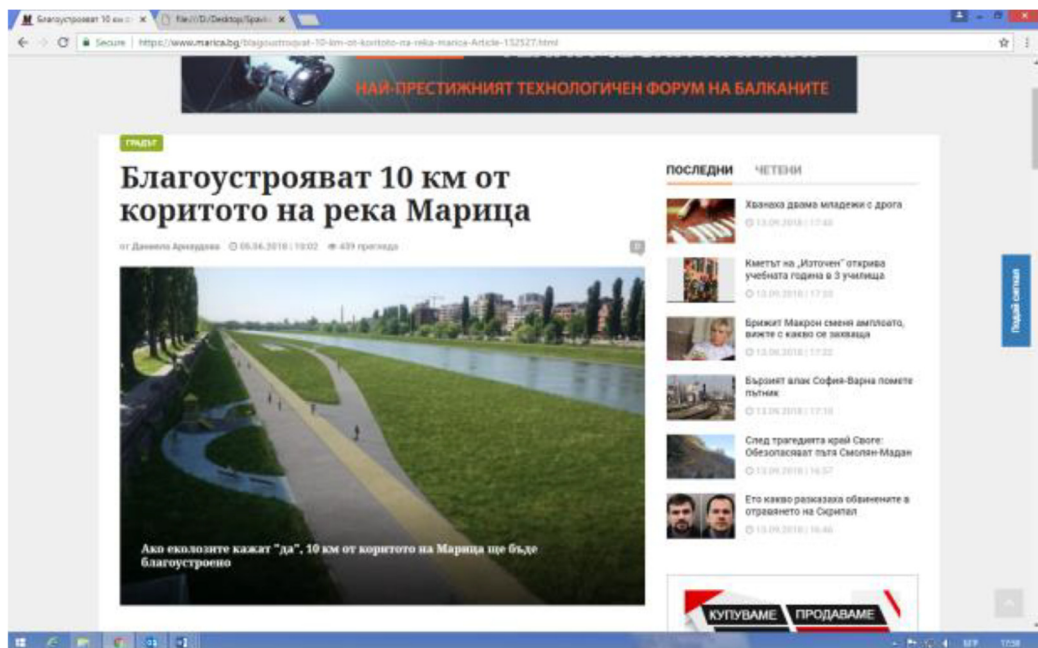
[Http://www.lyubimets.org/index.php/2009-08-04-13-50-50/1791-2014-08-06-10-17-](http://www.lyubimets.org/index.php/2009-08-04-13-50-50/1791-2014-08-06-10-17-)

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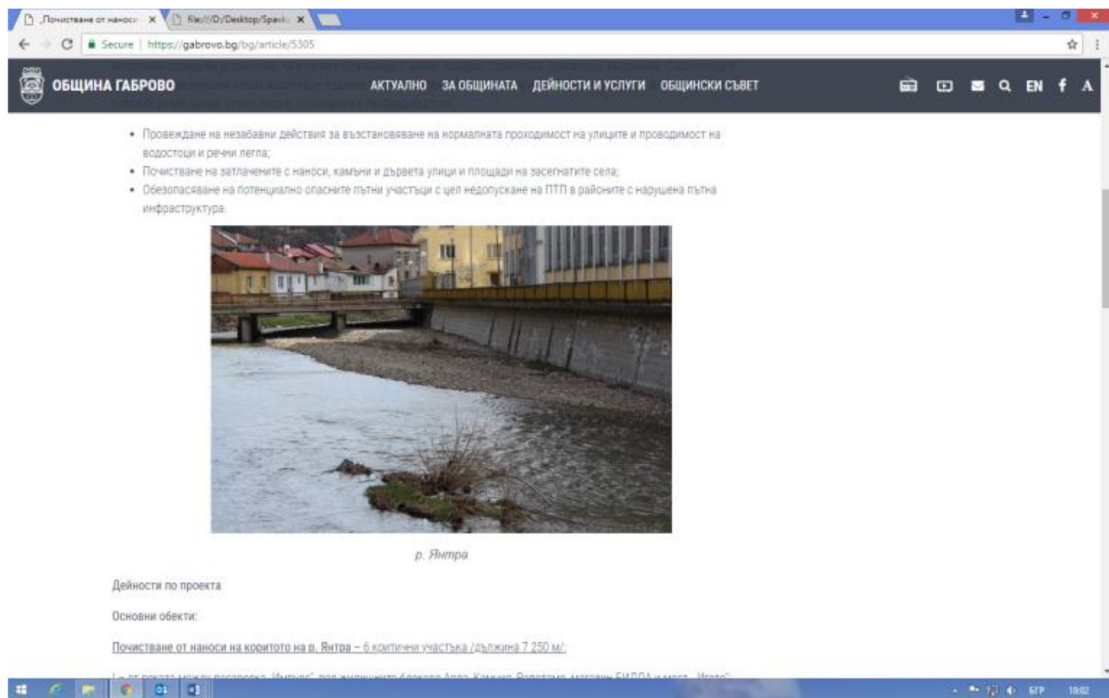
There are some good practical examples related to cleaning the river areas in the municipalities.

☒ Practice from Sofia Municipality: planned for cleaning in 2018, 85 km (every year the municipality plans cleaning of 50-100 km of river areas) – 20 km are cleaned, for 45 km the municipality finances, and for 40 km is presented in the Interministerial Commission for Assistance to the Council of Ministers. Use labour from temporary employment;

- ✓ Practice from the municipality of Plovdiv: from the municipal budget the cleaning of Maritsa River is financed – 10 km in 2018. Uses labour from temporary employment;



- ✓ Practice from the municipality of Gabrovo: funding from the European Union Solidarity Fund for the cleaning of the rivers Yantra, Sinkavitsa and Paničarka on the territory of the town of Gabrovo.



There are some good municipal practical measures for the use of geothermal heat.

- Practice from the municipality of Sapareva Banya:

Object-Kindergarten "St. Anna"

Project Description: Construction of a geothermal plant that replaces the existing boiler. Installed power-300 Kw. Operation mode-automatic control. Sealing and repair of the doors and windows. Total investment value 51 000 BGN.

Financing: 80%-confidence fund and 20%-funds from the municipal budget.

Term of redeeming of the investment: 3.8 heating seasons

Benefits: ensuring normal working conditions. Continuous learning process reducing colds. Annual economy of liquid fuels (gasoil)-21 tons.

Environmental benefits: Reduction of CO₂ to up to 70 tonnes per year

- Practice from Velingrad Municipality:

Site-"Hristo Botev" secondary school-Main building

Project Description: Construction of a geothermal plant that replaces the existing boiler. Installed power-280 Kw. Operation mode-automatic control. Total cost of investment 24000 euro.

Funding: 50%-own funds of the municipality and 50%-external donor

Term of redeeming of the investment: 2 heating seasons

Benefits: ensuring normal working conditions. Continuous learning process reducing colds. Annual economy of liquid Fuels (gasoil) - 25 tons.

Environmental benefits: Reduction of CO₂ to up to 4 tonnes per year.

Good Practices of Interaction Between NGOs and Citizens

In 2014 a new norm was adopted in the Water Act, which allowed to add a new kind of protected areas along the rivers, defined as water for recreation, water sports and bathing. And from such areas, additionally protected by a conservation regime, there is a huge need, as the rivers in Bulgaria are in very poor condition. Small HPP with walls through which no fish can pass, and at the same time seize water from them, leaving the gutters dry or with extremely reduced river runoff. There is no river, starting from Blagoevgradska Bistrica south to Sandanska Bistritsa, on all western slopes of Rila and Pirin. The same is the situation on the eastern slopes of Pirin with the rivers Byala and Cherna Mesta, Retije, Kamenitsa and others. With the changes in the law, there is already an opportunity to separate special areas for protection, but local people are not familiar with ways to discuss good and sustainable practices.

In 2016 the fishing association "Balkanka – 2009" held a wide public campaign to improve the awareness and understanding of the law among various groups of Dobrinishte, Dupnitsa, Kresna, Sandanski, Gotse Delchev and Breznitsa and seek their opinion and to initiate an interest in the protection of the rivers in the region of Blagoevgrad. It aimed to disseminate information on the changes in the Water Act to stakeholders from civil society and local authorities and the possibilities for separation special areas for protection. Development legislative changes, as well as recommendations of experts for protection regimes of recreation areas and water sports along rivers, as well as collected public proposals for such areas were presented at the meetings held on the ground. As a result, a public civil register of valuable river areas for 21 rivers in Blagoevgrad and Kyustendil districts was created.

During the meetings with experts ichthologists and hydrologists, with local fishing, hunting and fishing clubs and associations and with local authorities information about valuable rivers is gathered, which should be protected by the separation of areas for sport fishing and recreation. On their basis there are lists of proposed river areas for protection, which are included in the "public civil register for river areas for recreation and water sports". In addition, expert reports have been prepared on the necessary fishery on the acceptable ecological water minimum. They analyse the requirements for the conservation of fish fauna as a factor for the development of tourism and sport fishing, as well as the relationship between the existing norms of environmental minimum and the types of fish passages, and

also give recommendations for norms for the protection of rivers in recreation areas and water sports.

Project "Name the River – Revive the Water" of "Balkanka" is among the supported under the program "Build Change" of foundation "Eco Society", funded by Charles Stewart Mott Foundation.

Another example is a project implemented in Banya (Razlog). Razlog serves as an example of best practice on how a town can use EU Structural Funds to protect the environment and improve the quality of the life while promoting tourism and emerging sectors. One project, which illustrates this is co-financed by the ERDF "Implementation of the Small-scale Measures to Flood Prevention in Banya village, Razlog Municipality." The project was implemented over a period of 15 months in Banya. More than 500,000.00 EUR has been invested in measures to prevent floods and to build aqueducts along the river. Before the implementation of this project, the heavy rainfall led to floods in the village, which destroyed property, endangered the lives of its inhabitants, as well as the natural beauties. Thanks to this project residents, the ecosystems and the property in the village are protected against natural threats.

Razlog Municipality also cooperates closely with the Government of the Republic of Bulgaria, to improve the existing water transmission systems. In July 2017, Razlog finished a project "Reconstruction and construction of sewerage and water supply network of Razlog ". In this 7-month project, 158 000 000 EUR was invested by the Ministry of regional development and welfare in the installation of modern pipelines sewerage network, the removal of previous installations and the completion of the channels in the sewerage network. The implementation of the project led to minimising of water losses in the sewerage system of the city, improving the quality of water and improving the perspective of the city in terms of its development as a popular tourist destination.

An interesting project was carried out by a team of young ecologists that form an advocacy network for water protection in Yambol region. Usually we all complain and blame the state when the water floods the houses and fields. But the members of the "Young ecologist" club at "Skill-2003" Community Centre, Yambol are convinced that the culture of the local population is the main culprit for the state of the river and its tributaries. They have

participated in a number of volunteer actions to clean the waste from the river Tundzha, which only a week later again begins to look like a landfill.

The young naturalists promote environmental thinking among people to appreciate and keep what they have. They call their initiative "Health from the Water Spring" and through various inspiring activities attract to the cause firstly their peers to influence them, then they in their turn go ahead on with their parents and grandparents. Thus the ecoclub of the Community centre and 19 schools from the country form a youth advocacy network for water protection.

Over 200 young people from 7 schools in the municipalities of Tundzha, Straldzha, Elhovo, Bolyarovo and Yambol are involved in training seminars and field studies along rivers and dams, whose purpose is to provoke interest in nature conservation. Over 160 children, families, school classes and workshops, educational institutions and NGOs from all over the country participate in the four environmental competitions announced by the Community center.

Again, students are the main actors in the forum-theater organized on the occasion of Earth Day, which gathers in Yambol more than 100 participants from five settlements in creative workshops for recycling and eco-competitions in the open air. The program also includes awards ceremony for the winners of the four competitions. But the most important result of the event is the children' "scenarios" of advocacy campaigns for the protection of water among tourists, farmers, breeders, plant owners, as well as among their peers and parents.

In addition, a series of information campaigns are organized in the five municipalities of Yambol region. "Water is life, water is health.", say young ecologists while handing out to citizens New Year calendars to the cause and upcoming activities. And on the occasion of the water day they spread information leaflets "the way of water from the fountain to the faucet", provoking passers-by with thematic questions. They head to them and a special appeal – not to throw away their brochures, but to pass them on. Under the slogan "Health also has a coast! Keep the water springs for yourself and others!". The flash mob is passed on the occasion of the International Day of Biodiversity. Citizens and young children take home the message pinned to mini aquariums with live *Molinaesthesias* (decorative fish). With the manifesto, symbolically carried by the decorative fish, representatives of the local authorities

and various institutions responsible for the protection of water resources in the area were also informed. To attract public awareness to the problem, volunteers from the "Skill" Community Centre tell the story of the Tundzha River in an exhibition. The unique album gathers old memories and modern photos from the personal collections of the citizens from the municipalities of Yambol, Tundzha, Straldzha, Bolyarovo and Elhovo, the Water Tourism Club of Tourist Fellowship "Kabile" and the State Archives-Yambol.

Another interesting project realized in 2016 included young people from Asenovgrad. The aim was to learn to use rationally the natural resources of the Earth. This is part of a project won by the Municipal library "Paisii Hilendarski" in the town called "Stanimashki Eco-K@leidoscope for Sustainable Development". Its main objective is to teach adolescents that not everything should be thrown away, but some of the materials can be recycled through practice to create habits to protect the environment and save natural resources. For example, children learn that when brushing while rubbing teeth with the brush, it is good that the tap water does not flow. In front of students oral lectures were given and training in information literacy was realized with the primary objective summarized to how to find the necessary eco-information.

Another example of interaction between institutions, different NGOs and citizens is the seminar held from 19 to 21.09.2018 in hotel "Golden Tulip"– Varna on "Establishment and implementation of tools and best practices for management of marine litter in Bulgaria", organized under the project" BMP1/2.3/2231/2017, MELTEMI, Marine Litter Transnational Legislation Enhancement and Improvement". The following interested parties participated: representatives of Black Sea Municipalities, Ministry of Environment and Water, Black Sea Advisory Council, Black Sea Region Basin Directorate, MOEW, Water Supply and Sewerage – Varna, Bulgarian National Television, scientists from IE-BAS, Institute for Fishery Resources-AA, Black Sea NGO Network, "Zera" solutions for zero waste and reuse of waste, etc. Assoc. Prof. Dr. Violin Raykov presented the project with presentations "Improving the transnational legislation in the field of marine litter" and "Marine litter policies and realities". The activities of the IO-BAS on the project were presented by Assoc. Prof. Dr. Petya Ivanova. Dr. Aleksandar Shivarov from NGO Black Sea Network of NGOs, partner in the project presented "Evaluation of the legal framework and policies for reducing marine litter" and "Marine litter - a part of sustainable business solutions". Ing. Galia Kostova, Head of Industrial and Hazardous Waste Department, Waste Management and Soil Protection Directorate, MOEW presented lectures

on “The legislative requirements for waste management in the Republic of Bulgaria” and “Challenges, related to the need to reduce and limit the impact of waste in the Republic of Bulgaria and the European Union”. Dr. Christ Yoakeimidis (Environmental Marine Litter Expert) gave lectures on “Marine litter in the Mediterranean Sea” and “Best practices for prevention, reduction and effective management of marine litter”.

Regulatory, Operational and Monitoring Public Institutions

Water management in the Republic of Bulgaria is carried out at national and regional basin level according to art. 148 of the Water Act. River basin districts are natural location of water-drainage areas of one or several major rivers on the territory of the Republic of Bulgaria.

At the national level, the water management policy is implemented by the Ministry, assisted by the Water Management Directorate, and on the basin level by 4 Basin Directorates, and 16 Regional Inspectorate of Environment and Water carry out monitoring and control of waste water within their respective territorial scope.

Water management of **National level** is carried out by the Council of Ministers and the Minister of Environment and Water. The National Assembly adopts National strategy for the management and development of the water sector, which sets out the main objectives, milestones, means and methods for the development of the water sector.

The ministers:

- ✓ Grant a concession for the extraction of mineral waters – exclusive government property;
- ✓ Adopt national programmes in the field of conservation and sustainable use of water, annual reports and the necessary measures to implementation;
- ✓ Authorise the use of waters for the purposes of defence and security of country
- ✓ Define restrictions on the use of water in unforeseeable or unpredictable exceptional circumstances affecting individual regions of the country;
- ✓ Determine the amount of mineral water for use by hospital care facilities on a motivated proposal from the Minister of Health Care;
- ✓ Charge for fees levied on the grounds set out in the law on water;
- ✓ Propose to the National Assembly a national strategy for the management and development of the water sector;
- ✓ Adopt sectoral strategies in accordance with the main objectives set out in the strategy;
- ✓ Adopt the river basin management plans and the plans for the management.

The State policy for water management is carried out by the Minister of

Environment and Water, and in the cases under art. 148, para. 1 - together with the Minister of Foreign Affairs.

The Minister of Environment and Water:

- Implements State water management policy;
- Develops and proposes for adoption by the Council of Ministers a National strategy for the management and development of the water sector;
- Proposes for the adoption by the Council of Ministers of the management plans and flood risk management plans;
- Develops national programmes in the field of conservation and sustainable water development;
- The areas for which there is a significant potential risk of floods
- Establishes the necessary organisation, provides funding and makes proposal for a river basin management plan (2016-2021)
- Validates the operational resources of mineral water deposits and draw up their water balances;
- Coordinates the implementation of projects by the authorities under art. 10 of the Law on Regional governors, the mayors of municipalities and the scientific organisations related to the use, protection and protection of harmful impact of water;
- Determines the basin management areas that refer to the international basin management area;
- lays down the sanitary and security zones of the water intake facilities for mineral waters;
- Identifies vulnerable areas for the protection of waters against pollution by nitrates from agricultural sources;
- Identifies sensitive areas for the protection of waters against pollution by biogenic elements;
- Identifies the priority and priority list of hazardous substances;
- Validates water testing methodologies in cases where there are no Bulgarian standards, as well as methodologies for analysing data from water monitoring;
- Establishes and maintains a fee control and information system;

The Ministry of Environment and Water, through the executive Director of the Environment Executive Agency (EAEPA):

- Carry out laboratory and field studies to determine the water status;
- Conduct the monitoring of water at national level, including the methodological planning of monitoring and explaining the results;
- Maintain a geographical information system for the waters at national level;
- Prepares the status of Water yearbook;
- Issue a periodic bulletin on the state of the water resources of the Republic of Bulgaria, based on the data from the held monitoring of the environmental and chemical status of water and data on the quantity of water provided by the National Institute of Meteorology and Hydrology at the Bulgarian Academy of Sciences;
- Establish and maintain specialised databases, maps, registers and Water Information System.

The Environment Executive agency is an administration to the The Minister of Environment and Water for the implementation of managerial, coordinating and information functions in terms of control and environmental protection in the field of Republic of Bulgaria. It designs and manages the National monitoring system on the state of the components and factors of the environment for the whole country.

The agency is the National Coordination Centre of the European Agency for Environment. The European Environment Agency is the body of the European Union, set up to provide timely, targeted, relevant and appropriate reliable information on the environment of both policy makers in the EU and the public.

Regional Inspectorate of Environment and Water are administrative structures to the Minister of Environment and Water, ensuring the implementation of the environmental protection policy at regional level.

Regional inspections on the environment and water carry out their activities at the territory of one or more areas, as specified in the registered office and geographical scope of activity.

The director of RIEW:

- Organizes, manages and supervises the overall activities of the RIEW;
- Regional level of public policy. In the field of environmental protection;

- Issues penal decrees as well as administrative acts in the performance of its statutory competencies;
- Imposes fines, pecuniary sanctions and coercive administrative measures for infringements of the legislation on environmental protection;
- Empowers RIEW officials to draw up alert protocols, acts for the establishment of administrative procedures within the scope of the competences conferred on it;
- Represents RIEW in front of all ministries, departments, organizations and persons in the country and abroad.

Water management of the basin level:

The following areas for basin management of water are defined:

- **Danubian District** with center city Pleven - encompasses the drainage areas of the the rivers Iskar, Erma, Nisava, Ogosta and west of Ogosta, Vit, Osam, Yantra, Rusenski Lom and Danubian Dobrudjanski rivers and the waters of the river Danube;
- **Black Sea Region** with center city Varna - encompasses drainage areas of rivers flowing into the Black Sea from the north to the southern border, including inland waters and the territorial sea;
- **Aegean River Basin Area** with center city Plovdiv - for drainage areas of the rivers Tundzha, Maritsa, Arda, Byala Reka;
- **West-Aegean Area** with center city Blagoevgrad - for drainage areas of the corresponding rivers.

International and European Legislation

The integrated approach to water management in Bulgaria is built on the basis of three legislative frameworks – international, European and Bulgarian legislation.

✓ International legislation:

International legislation includes all international conventions and agreements in the field of freshwater which Bulgaria has officially signed and ratified. Three international documents are linked directly or indirectly to fresh water: the Danube Convention, Helzinki Convention, Ramsar Convention and in some aspects the Black Sea Convention – art. 7 and Protocol for the protection of the Black Sea environment from contamination by ground-based sources.

✓ European legislation:

The main normative documents are the European directives. The most important for water management is the Water Framework Directive 2000/60/EU, which covers all other water directives. The Water Framework directive is the most important document for water management in Europe. It should lead to a noticeable improvement in the sustainable and integrated management of water resources, as for the first time in one document all types of water and water uses are affected. This directive introduces some basic approaches and principles for water management, such as legal requirements in Europe, which define the milestones that each EU Member State must pass in implementing the integrated approach:

- Basin principle of water management. Water is managed only within the river basin. The establishment of competent authorities for basin management of water is required. Cross-border river basins require the establishment of international competent river basin management bodies.
- Sustainable water use – long-term protection of water resources.
- The ecosystem approach to water assessment and management is determined by biological parameters.
- Applying “the polluter pays” principle
- Water management requires self-financing of all activities within the river basin. The central budgetary allocation of funds shall be avoided.
- Implementation of integrated water management in river basins.

There are a large number of specialised directives related directly or indirectly to freshwater. Key elements of the European Union most important water directives are:

- ✓ Bathing Water Quality Directive (76/160/EEC)

Establishes quality standards for bathing water – fresh and marine waters – with regard to microbiological (health) and physico-chemical (aesthetic) parameters. Member States must ensure that their bathing waters are within the limits of the limit values – the minimum standards laid down in the directive, in general to 10 years after its publication.

- ✓ Directive on the Quality of Drinking Water (80/778/EEC) and its processing (98/83/EC)

- ✓ Urban Waste Water Treatment Directive (91/271/EEC)

- ✓ Water Directive 2000/60/EC establishes an innovative approach to water management based on river basins, natural geographical and hydrological units and sets specific deadlines within which EU Member States must achieve ambitious environmental objectives for aquatic ecosystems.

National, Regional and Local Legislation

Bulgaria applies the Water Framework Directive, and the recommended schedule of official EU manuals.

- ✓ Designation of the river basin as the basic unit for joint management of surface water and groundwater by quantity and quality to achieve sustainable water use and protection of water and aquatic ecosystems.
- ✓ Respecting the principle of solidarity and the public interest by ensuring cooperation at all levels of government: Municipal administration, water users and environmental organisations.

The following priorities have been adopted for the successful implementation of integrated water management in Bulgaria:

- ✓ Full transposition of the requirements of the Water Framework Directive 2000/60/EU into national legislation.
- ✓ Strengthening the capacity of the basin management bodies.
- ✓ Improving coordination between the institutions involved in water management.
- ✓ Inclusion in the river basin management plans of priority measures for improving the quality and sustainable use of water resources.
- ✓ Improving monitoring and control systems.
- ✓ Informing and advising the public.

The following laws have been elaborated, including amendments and additions to the:

- ✓ Water Law (additional, No. 26 of the 21.03.2014, and additional, issue 49 of 13.06.2014, No. 53 of 27.06.2014, issue 98 of 28.11.2014, in force as of 28.11.2014)

The amendments are related to protection against the harmful effects of water; specialised maps, registers and information systems for water and facilities; protection of water and water bodies;

Amendments to the Water Act also provide for:

- ✓ Issuance of regulation of water consumption norms in order to protect the quantity of water and ensure their effective use;

- ✓ Development by the Ministry of Health, together with MOEW and MRDPW of the National Action Plan for improving water quality for drinking and domestic water supply.

In 2014, amendments to Regulations were adopted and promulgated in relation to the rectification of inaccuracies and incompleteness transposition of European legislation:

- ✓ Ordinance No 1 of the 11.04.2011 for water monitoring (issue 60, 22.07.2014, in force since 22.07.2014)

The amendments relate to the methods used for monitoring the type of indicative qualitative parameters/elements that need to be aligned with international CEN/ISO standards or with such national or international standards, which provide data of an equivalent scientific quality and comparability.

- ✓ Ordinance N-4 of the 14.09.2012 for characterisation of surface water (issue 79 23.09.2014, in force since 23.09.2014)

The amendments relate to the setting of reference conditions for the types of surface water bodies, as well as the classification and presentation of surface water status.

Non-Governmental Sector and Civil Society

The European Union environment policy aims at the promotion of sustainable development and the protection of the environment for present and future generations. It builds on the integration of conservation environmental protection in other community policies, preventive actions, implementation of the polluter pays principle, combating environmental damage and environment at source and shared responsibility. The European Union includes around 200 legal acts, including the directives, regulations, decisions and recommendations covering the horizontal legislation, water and air pollution, waste management and chemicals, biotechnology, nature conservation, industrial pollution and risk management, noise protection and radiation protection.

The beginning of the democratic changes in Bulgaria was related to the problems provoked by the ecological state of the country. In this context, the society was to respond to the Chernobyl information vacuum, the poisonous air in Rousse, the contaminated soils of the lead-zinc industrial complex, etc.

The current Bulgarian legislation does not have a single normative document that regulates the mechanisms for participation of NGOs in the process of decision-making at national and local level, the procedures for establishing partnership between the State and non-governmental organisations, as well as the forms interaction between them.

The possibility for citizens to participate in the public administration of the State is guaranteed by the Constitution of the Republic of Bulgaria since 1991, whose art. 19, para. 2 is stipulated that the law “creates conditions for cooperation and other forms of association of citizens and legal entities in order to achieve the economic and social progress”.

Special value is given to “the right to opinion” (art. 39), “the right to free association” (art. 44) and “the right to freedom of information” (art. 41), which outlines the constitutional frameworks for civil and participation in the decision-making process and the management of environment.

In current practice, this involvement is regulated under the framework Environmental Protection Act, which governs general principles (EIA, Integrated pollution prevention and control, the right to public access to environmental information, economic regulators) and through the Ordinance No1 for environmental impact assessment (SG 73/1995), according to

which the discussion of the presented results is organised with the participation of the local administration, public organisations, the public and the natural and legal persons concerned.

With regard to the need for a partnership between the state (central and local government) and NGOs generally exist consensus that it is necessary and of great importance for each of the partners and for society as a whole.

As a result, the following conclusions can be drawn:

- ✓ Although somewhat scarce in legislative texts, non-governmental organisations are among the circle of entities that take part in the planning, the programming and proper absorption of EU funds. Through independent expertise, raising public awareness, initiating debates and monitoring the work of public authorities responsible for EU funds, the involvement of NGOs helps to ensure transparency and democratic decision-making. Solutions and helps to increase the effective use of public services and resources.
- ✓ The provisions in the legislation providing for the participation of the NGOs as a partner of the state for the most part are of a declaratory nature.
- ✓ In local legislation, the involvement of non-governmental organisations is also inadequate, with the exception of some municipalities which actively cooperate with non-governmental organisations.
- ✓ Notwithstanding the existing legal framework for partnership between the Government and the non-governmental sector in the field of ecology and sustainable development and the possibility to include non-governmental organisations as a participants when taking decisions at local level, the question arises as to whether the implementation of the partnership is a fact and whether it is a mere formality.

On the other hand, it is established that NGOs from a local government scale are often too small and unsustainable to be accepted by the administration as equal partners. Successful resolution of this conflict by intensifying cooperation between the institutions and the NGOs would demonstrate maturity and competence and in the both sides.

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