THE EFFICIENCY OF FINANCIAL SUPPORT FOR WATER INFRASTRUCTURE IMPROVEMENT IN BULGARIA

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ABSTRACT

Environmental challenges related to water resources lead to a change in water distribution. This will cause a change in water infrastructure which will need financial support. This article proposes an analysis of the efficiency of financial support for water infrastructure improvement in Bulgaria. The aim of the article is to describe state of the population's access to water infrastructure and financial support for the development of the water infrastructure and based on the statistical data to analyze the effectiveness of the financial support under OPE 2007-2013 and OPE 2014-2020, axis Water for the development of water infrastructure. The parts of the article are as follows: 1) Introduction, presenting the theoretical views on the financing for the improvement of the water infrastructure; 2) Research methodology 3) Analysis of the effectiveness of financial support for the development of water infrastructure (correlation and DEA analysis); 4) General conclusions.

Introduction

Environmental challenges related to water resources such as floods, droughts, pollution lead to a change in water distribution. These challenges are expected to increase due to climate change, socio-economic development and increasing water consumption (EIP Water, 2014). All these processes will cause a change in water infrastructure to meet the needs of all stakeholders who depend on this natural resource. Significant investments are necessary to build, operate, maintain and adapt water infrastructure. In many areas, further initiatives are expected to meet basic water and sanitation needs. Interventions in water infrastructure are necessary if environmental and social problems arising from the water crisis have to be solved (NIC, 2018).

The growing occurrence of extreme events intensifies the need of use new planning technologies, that will answer the question how and where to be rebuild existing or build new infrastructure with greater resilience (US Environmental Protection Agency of Water, 2014). Pathirana et al. (2021) add that operation and management initiatives would not lead to good results if funding and investment in the water sector are limited.

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Frone & Frone (2014) point out that in the last 20 years the main driver of water supply is not the need to expand the services provided, but rather the necessary for capital-intensive investments in water infrastructure because of the new standards and requirements or the need for new research and development initiatives. The authors share that despite the very large investments made in the last 25 years related to European environmental legislation, significant new investments are still needed to achieve a “good state” of water infrastructure. That investment needs will continue to increase because the environment is constantly changing.

A number of studies examine the benefits of financial support for improving water infrastructure. From an economic point of view, the benefits of improved water infrastructure are associated with efficient water use, as the cost of damage and repairs to obsolete water infrastructure are reduced (Dworak et al., 2007). Also, the inclusion of new agglomerations in the water network helps to improve and expand the access of various economic sectors and industries to water services. A research conducted by the US Water Alliance (2017) states that investments in water infrastructure generate quality jobs, increase business competitiveness and lead to financial stimulation of economic activity. In the long run, all economic sectors will benefit from improvements and efficiency gains in water systems. Pattanayak et al. (2005) explore how investment in water infrastructure can lead to improved well-being, especially in the less developed and poorer regions of the world, by describing the benefits of avoided health risk. Stoyanova and Todorova (2018) conclude that increasing investment in the water sector generates benefits in socio-economic and environmental aspects. Investments in the improvement and construction of water infrastructure and project implementation has a direct impact on socio-economic and environmental aspects of sustainable development.

Materials and methods

The aim of the article is to describe state of the population’s access to water infrastructure and financial support for the development of the water infrastructure and based on the statistical data to analyze the effectiveness of the financial support under OPE 2007-2013 and OPE 2014-2020, axis Water for the development of water infrastructure.

The methodological framework of the research includes: 1) Introduction, presenting the theoretical views on the financing for the improvement of the water infrastructure; 2) Research methodology 3) Analysis of the effectiveness of financial support for the development of water infrastructure (correlation and DEA analysis); 4) General conclusions.

The analyses in the paper are limited to the financial support for the water infrastructure development under OPE 2007-2013 and OPE 2014-2020, axis Water.

The tools used in the paper are data analysis, correlation and data envelopment analysis (DEA).

The analyzes are based on data from the: 1) National statistical institute in particular The annual statistical monitoring for water supply and sewerage for the period 2010-2018 and Macroeconomics statistic for the period 2010-2018; 2) The Information system for management and monitoring of EU funds in Bulgaria and own calculations.

Correlation analysis was chosen to determine the strength of the connections between quantitative indicators related to the water sector, which is an appropriate statistical method for the purposes of the paper. In the study, we assume that we work with a probability of 5%, ie. α-error equal to 0.05, as this is the most commonly used error rate for socio-economic research. The coefficient of determination is also calculated and interpreted in term to be defined what percentage change in one variable affects the other variable.

The realized correlation analysis determines the strength of the connections between:

- ✓ The financing under the procedure for improvement and development of the infrastructure for drinking and waste water and access to sewerage in 2013.
- ✓ The financing under the procedure of improvement and development of the infrastructure for drinking and waste water (OPE 2007 – 2013, axis Water) and Gross value added in 2013.
- ✓ Funding under the procedure for improvement and development of drinking and wastewater infrastructure (OPE 2014 – 2020, axis Water) and access to sewerage in 2017.
- ✓ The financing under the procedure of improvement and development of the infrastructure for drinking and waste water (OPE 2014 – 2020, axis Water) and Gross value added in 2017.

Data envelopment analysis is a method that is widely used in research in the water sector. Lambert and Dichev (1993) performed a comparative evaluation of the efficiency of private and public water supply companies. The DEA analysis was used to calculate the performance results of 238 public and 32 private enterprises. Shreekant et al. (2006) assessed the efficiency of the urban water supply system in 27 selected Indian cities. The authors apply DEA analysis as an analytical tool for measuring technical efficiency. De Witte (2008) uses the DEA to compare the efficiency of the drinking water sector in the Netherlands, England and Wales, Australia, Portugal and Belgium. The results show that regulatory incentive schemes have a significant positive effect on effectiveness.

The DEA analysis is appropriate for the purposes of the article, as it can provide an opportunity to evaluate and compare indicators with different units of measurement and to be able to identify business operations, processes or objects that are subject to comparative evaluation. DEA analysis uses "decision units" (DMUs), and for each DMU there is a set of corresponding input and output parameters that can allow to compare the performance of the units (Charnes, Cooper, Rhodes, 1978). The method is applied by comparing all units and determine the best working ones. In recent study is applied

Output oriented DEA analysis. It assumes one level of efficiency for optimal. The optimal level is defined as 100% efficiency and all units are compared with it. This method was chosen in order to determine the coefficient of efficiency of financial support under OPE 2007 - 2013 and OPE 2014 - 2020, Water axis and the obtained GVA (district level), produced production, population connected with public sewerage, population connected with public water supply and population connected with wastewater treatment plants in 2013 and 2018. The following output-oriented DEA models are constructed:

- ✓ Input - the financial support under the procedure for improvement and development of the infrastructure for drinking and waste water (OPE 2007 - 2013, Water axis) by district level and Exits - the received GVA by districts, the produced production, the population connected with public sewerage, the population connected with public water supply and the population connected with wastewater treatment plants, 2013.
- ✓ Input - the financing under the procedure of improvement and development of the infrastructure for drinking and waste water (OPE 2014 - 2020, axis Waters) by district level and exits - the received GVA by districts, the produced products, the population connected with public sewerage, the population connected with public water supply and the population connected with wastewater treatment plants, 2018.

The results in the article are part of a study related to the sustainable management of the water sector in Bulgaria (Stoyanova, 2021).

Results and discussions

Analysis of the population's access to water infrastructure

To present the state of the population's access to water services, it is necessary to analyze and evaluate some of the indicators connected with this issue.

Bulgaria has a well-developed water supply system, which at the end of 2017 provides water to 98.6% of the country's population *(Table 1)*.

According to NSI data, the water supply network is 75,000 km long. The districts of Kardzhali and Smolyan have low share of population's access to water supply for 2017 (86.9% and 91.9%), and the increase for the period 2010 - 2017 is by 6% for the district of Kardzhali and 1% of Smolyan. Blagoevgrad also has a lower share of the population with assess to water supply compared to other districts in the country, where the percentage of population with access to water supply is over 95%. Montana district has about 1% less population with assess to water supply than the national average. The districts of Pleven, Razgrad, Ruse, Silistra, Varna, Shumen, Yambol, Sofia, Sliven and Plovdiv have 100% population with assess to water supply. In the districts of Vratsa and Targovishte there is a preservation of the share of the population with access to public water supply, and in Montana there is a slight decrease of 0.1% compared to 2010. In all other districts in the country there is an increase in the share of the population with access to public water supply from 0.1 to 5.3%.

Table 1. Share of the population with access to public water supply, %

District	Share of the population with access to public water supply		Change	
	2010	2017	%	
Bulgaria	98.1	98.6	0.5	↑
Vidin	98.5	99.3	0.8	↑
Vratsa	99.5	99.5	0.0	=
Lovech	99.6	99.7	0.1	↑
Montana	97.4	97.3	- 0.1	↓
Pleven	100.0	100.0	0.1	=
Veliko Tarnovo	99.2	99.6	0.0	↑
Gabrovo	98.1	98.4	0.4	↑
Razgrad	100.0	100.0	0.3	=
Ruse	100.0	100.0	0.0	=
Silistra	100.0	100.0	0.0	=
Varna	100.0	100.0	0.0	=
Dobrich	99.7	99.8	0.0	↑
Targoviste	99.8	99.8	0.1	=
Shumen	100.0	100.0	0.0	=
Burgas	99.6	99.9	0.0	↑
Sliven	99.9	100.0	0.3	↑
Stara Zagora	97.5	98.8	0.1	↑
Yambol	100.0	100.0	1.3	=
Blagoevgrad	92.7	96.7	0.0	↑
Kiustendil	96.0	96.1	4.0	↑
Pernik	95.8	96.3	0.1	↑
Sofia	99.0	99.5	0.5	↑
Sofia city	100.0	100.0	0.0	=
Kardzhali	81.6	86.9	5.3	↑
Pazardjik	99.6	99.8	0.2	↑
Plovdiv	100.0	100.0	0.0	=
Smolyan	90.8	91.9	1.1	↑
Haskovo	98.4	98.8	0.4	↑

Source: NSI - annual statistical survey for water supply and sewerage (2010, 2017) and own calculations

In 2017, the share of the population with access to public sewerage was 64.2%. In the districts of Kardzhali, Targovishte, Silistra and Razgrad the constructed sewerage network covers less than 50 % of the population *(Table 2)*.

The districts with the highest share of the population covered by sewerage are Sofia-city (96.4), Gabrovo (85.5%), Sofia (83.7). For the period 2010 - 2017 the share of the population with access to public sewerage in the districts of Vidin, Montana, Silistra, Kyustendil, Kardzhali, Plovdiv and Haskovo has decreased. In other districts, the share increases. For the different districts the change in the share of the population with access to sewerage varies from 28.2% decrease in Silistra district to 11.6% increase in Blagoevgrad district.

The share of the population connected with Wastewater treatment plants (WWTPs) is increasing from 47% (2010) to 63% (2017), as number of WWTPs increases from 79 in 2010 to 170 in 2018. WWTPs with secondary treatment and post-treatment also increase from 50 to 91 and from 16 to 75. The number of treatment plants with primary water treatment decreases from 16 to 4.

There were 169 existing municipal wastewater treatment plants in 2017. In 2010 only 47.8% of the Bulgarian population was connected with WWTP. As a result of national and European funding, the connection of the population with the WWTP reaches 64% in 2018.

Table 2. Share of the population with access to public sewerage, %

District	Share of the population with access to public sewerage		Change	
	2010	2017	%	
Bulgaria	64.7	64.2	-0.5	↓
Vidin	75.5	64.7	-10.8	↓
Vratsa	54.0	-	-	-
Lovech	62.5	66.4	3.9	↑
Montana	77.1	59.8	-17.3	↓
Pleven	58.1	68.0	9.9	↑
Veliko Tarnovo	56.4	58.9	2.5	↑
Gabrovo	84.4	85.5	1.1	↑
Razgrad	41.9	42.4	0.5	↑
Ruse	74.9	76.1	1.2	↑
Silistra	72.9	45.7	-27.2	↓
Varna	59.1	62.2	3.1	↑
Dobrich	63.2	67.3	4.1	↑
Targoviste	47.6	48.1	0.5	↑
Shumen	60.9	62.1	1.2	↑
Burgas	64.0	66.1	2.1	↑
Sliven	53.4	57.3	3.9	↑
Stara Zagora	61.7	62.2	0.5	↑
Yambol	56.5	59.5	3.0	↑
Blagoevgrad	66.4	78.0	11.6	↑
Kyustendil	77.0	60.7	-16.3	↓
Pernik	53.2	59.2	6.0	↑
Sofia	80.7	83.7	3.0	↑
Sofia city	94.3	96.4	2.1	↑
Kardzhali	42.2	38.4	-3.8	↓
Pazardjik	80.3	81.0	0.7	↑
Plovdiv	70.9	71.5	0.6	↑
Smolyan	65.4	68.7	3.3	↑
Haskovo	68.6	63.1	-5.5	↓

Source: NSI - annual statistical survey for water supply and sewerage, (2010, 2017) and own calculations

Analyses of the financial support for the development of the water infrastructure under OPE 2007 - 2013 and OPE 2014-2020, axis Water

Projects financed under OPE 2007-2013 related to the improvement and development of drinking and wastewater infrastructure supported activities in 26 municipalities. The largest financial support is received by the municipalities of Ruen, Pernik, Gabrovo, Vratsa, Veliko Tarnovo, and the lowest is the support for Targovishte, Kazanlak, Gorna Oryahovitsa, Varshets. In the municipalities of Straldzha and Kaolinovo there is contracted financing, but there is no final one. The average share of final financing in Bulgaria is 60 % from the contracted. The highest share of the final amount of funding contracted is in Primorsko and Ruen - about 89 %, and the lowest in Gorna Oryahovitsa, Tundzha and Targovishte, respectively 20%, 27% and 27% *(Table 3)*.

Table 3. Contracted and final amount of funding for projects under the procedure for improvement and development of drinking and wastewater infrastructure under OPE 2007-2013

Municipality	Amount of the contracted financing from OPE 2007-2013, BGN	Final amount of funding from OPE 2007-2013, BGN	Share of final amount of funding from contracted, %
Beloslav	21127709	16901772.09	79.9
Blagoevgrad	14468169.51	11548616.62	79.8
Бургас	13558465.81	7515185.26	55.4
Бургас	5363499.63	5276173.17	98.4
Veliko Tarnovo	43560616.79	29142766	66.9
Vratza	123523616	32146572.65	26
Valchi dol	9193164.31	8072873.85	87.8
Varshetz	5707900	4154355.56	72.8
Gabrovo	117447251.2	34343143.38	29.2
Glavinitsa	9582865.04	7631488.86	79.6
Gorna Oriahovitsa	9235929.97	1847186	20
Kavarna	8196187.09	7,041,322	85.9
Kazanlak	6128896	4020133.99	65.6
Kaolinovo	21952569.8	0	0
Loznitsa	20069602.46	6723612.17	33.5
Pernik	33561592.58	25882671.38	77.1
Popovo	10017512	7117651.97	71.1
Primorsko	19172935	17036972.32	88.9
Ruen	32168747.49	28573303	88.8
Sopot	17750564.63	14021839.3	78.9
Sofia	10561037	8324769.37	78.8
Straldza	2163155	0	0
Troyan	7889673.25	5087231.59	64.5
Tundza	24583723.33	6812189.88	27.7
Targoviste	15858922.54	4433728	27.9
Hisarya	22200038.28	14701970.13	66.2
Yambol	9773972.68	6927419	70.9
Total	511294700.4	308243625.5	60.3

Source: OPE 2007 - 2013, (2014). List of beneficiaries under procedure BG161PO005 / 08 / 1.10 / 01/02 improvement and development of drinking and waste water infrastructure and own calculations

During the second programming period, under OPE 2014 - 2020 under the procedure Second phase of projects for construction of water supply and sewerage structure, the implementation of which has started under OPE 2007 - 2013, eight projects were financed at a total value of BGN 272 399 249.88. The share of self-financing varies from 18 to 32%. The paid amounts are from 34% in the municipality of Vratsa to 95% in Radnevo *(Table 23)*.

Table 4. Beneficiaries and financing by procedure - Second phase of projects for construction of water supply and sewerage structure, the implementation of which has started under OPE 2007 - 2013

Municipality	Total amount, BGN	Financial support, BGN	Share of self-financing, %	Share of amount paid, %
Bansko	33 170 034.99	25 925 510.62	22	86
Varna	37 150 155.07	28 658 890.06	23	73
Vidin	19 505 984.15	15 632 301.53	20	90
Vratza	114 506 125.63	78 246 103.33	32	34
Radnevo	7 411 571.06	5 319 850.47	28	95
Tervel	6 199 965.60	4 898 642.95	21	88
Shumen	13 149 478.47	9 812 748.29	25	65
Yambol	41 305 934.91	33 883 824.36	18	59

Source: Information system for management and monitoring of EU funds in Bulgaria (2020) and own calculation

Under the procedure Construction of water supply and sewerage structure, eleven projects were financed at a total value of BGN 1 020 254 030.37. The relative share of self-financing under this procedure varies from 24 to 30% *(Table 5)*.

Table 5. Beneficiaries and financing by procedure - Construction of water supply and sewerage infrastructure, OPE 2014-2020

District	Total amount, BGN	Financial support, BGN	Share of self-financing, %
Varna	138 372 401.80	96 760 214.66	30
Ruse	131 783 167.65	95 873 605.70	27
Sliven	133 326 939.91	95 563 025.22	28
Vidin	23 653 635.80	17 937 564.47	24
Plovdiv	137 830 825.33	97 480 851.19	29
Silistra	79 364 379.48	59 442 622.45	25
Kardzhali	67 762 390.21	49 750 793.17	27
Pernik	104 913 130.63	78 591 375.19	25
Stara Zagora	121 996 236.26	89 667 233.65	27
Yambol	31 231 619.65	23 241 530.29	26
Vratza	50 019 303.65	36 347 360.66	27

Source: Information system for management and monitoring of EU funds in Bulgaria (2020) and own calculation

The efficiency of financial support for water infrastructure improvement in Bulgaria (Correlation and DEA analysis)

The correlation between funding under the procedure for improvement and development of drinking and wastewater infrastructure for the period 2007-2013 and access to sewerage in 2013 is relatively weak at the district level. The correlation coefficient is 0.364 with a significance coefficient of 0.08. The coefficient of determination is 0.133, which means that 13% of the change in project funding is related to the change in access to sewerage.

The correlation between the funding under the procedure for improvement and development of drinking and wastewater infrastructure for the period 2007-2013 and GVA in 2013 at the district level is high, which means that with the increase of funding related to drinking and wastewater infrastructure, GVA in the districts also increases. The correlation coefficient is 0.701 with a significance coefficient of 0. The coefficient of determination is 0.492, which means that 49% of the change in project funding is related to the change in GVA by districts.

The correlation between the funding under the procedure for improvement and development of drinking and wastewater infrastructure for the period 2014 - 2020 and access to sewerage in 2017 is relatively weak at the district level. The correlation coefficient is 0.36 with a significance coefficient of 0.24. This result can be approached with reservations due to the fact that one of the conditions of the correlation analysis is not fulfilled; the level of significance is less than the permissible error.

Similar to the previous programming period, the correlation between the funding under the procedure for improvement and development of drinking and wastewater infrastructure for the period 2014 - 2020 and GVA in 2017 at the district level is high, which means that with the increase of funding for drinking infrastructure and wastewater increases and GVA at district level. The correlation coefficient is 0.647 with a significance coefficient of 0.009. The coefficient of determination is 0.418, which means that 41% of the change in project funding influence on the change in GVA by district.

The data from the DEA analysis regarding the financing under the procedure for improvement and development of the drinking water and wastewater infrastructure under OPE 2007-2013 and OPE 2014-2020 by districts (independent variable) and the obtained GVA by districts, produced production, population related to public sewerage, the population related to public water supply and the population related to wastewater treatment plants (dependent variable) in 2013 and 2018 show the effect of funding on the dependent variables by districts *(Table 6).*

Funding during the first programming period (2007-2013) is most effective in the districts of Ruse, Haskovo and Dobrich. These districts are the benchmarks for efficiency. The lowest coefficient of efficiency is calculated in the districts of Sofia, Plovdiv, Burgas, Kardzhali, where the coefficient is below 0.1 points. The other areas have an efficiency ratio from 0.1 to 0.5. During the second programming period (2014-2020), the financing under OPE 2014 - 2020 is most effective in the districts of Burgas, Shumen, Blagoevgrad and they are those that are the benchmark for efficiency. The lowest efficiency ratio is reported in the districts of Silistra and Sliven, where the efficiency ratio is below 0.15 points. The other districts have an efficiency ratio from 0.15 to 0.5.

Table 6. Coefficient of efficiency of the financial support under the procedure of improvement and development of the infrastructure for drinking and waste water under OPE 2007 - 2013 and OPE 2014 - 2020 on district level

District (DMUs)	2013		2017	
	Coefficient	**Rank**	**Coefficient**	**Rank**
Blagoevgrad	0.1158	18	0.69	3
Burgas	0.0862	21	1.00	1
Varna	0.3017	6	0.30	6
Veliko Tarnovo	0.1006	19	-	-
Vidin	0.1853	10	0.30	5
Vratza	0.0426	24	0.10	15
Gabrovo	0.1367	15	-	-
Dobritch	0.5084	3	0.15	12
Kardjaly	0.0954	20	0.18	8
Lovech	0.1521	12	-	-
Montana	0.1423	14	-	-
Pazardjik	0.116	17	-	-
Pernik	0.2544	8	0.17	10
Pleven	0.2274	9	-	-
Plovdiv	0.0786	22	0.18	7
Razgrad	0.1198	16	-	-
Ruse	1	1	0.16	11
Silistra	0.2763	7	0.11	14
Sofia	0.0743	23	-	-
Sliven	0.4193	4	0.11	14
Stara Zagora	0.345	5	0.31	4
Targoviste	0.1446	13	-	-
Haskovo	1	1	-	-
Shumen	0.1644	11	1.00	1
Yambol	0.1158	18	0.18	9

Source: own calculations

Conclusions

Based on the performed data analysis, correlation and DEA analysis, the following general conclusions related to the efficiency of financial support for improvement of water infrastructure in Bulgaria could be drawn:

- ✓ Bulgaria has a well-developed water supply system, which at the end of 2017 provides water to 98.6% of the country's population. There are districts (Pleven, Razgrad, Silistra, Varna, Shumen, Sliven, Yambol, Sofia, Plovdiv, Ruse) in which 100 % of the population have access to water supply. There is an increase in the share of the population with access to public water supply in all other districts in the country.

- ✓ The access of the population to the sewerage network in the country for the period 2010 - 2017 is increasing. In some of the districts (Kardzhali, Targovishte, Silistra, Razgrad) the constructed sewerage network covers less than 50% of the population. For the period 2010 - 2017, the share of the population with access to public sewerage in some districts (Vidin, Montana, Silistra, Kyustendil, Kardzhali, Plovdiv, Haskovo) decrease, in others it has increased. The districts with the highest share of the population covered by sewerage are Sofia - city, Gabrovo, Sofia district.
- ✓ There is an increase in the constructed WWTPs between 2010 and 2017, but there are still many settlements without a sewerage network.
- ✓ The average final amount of financing compared to the contracted for the projects under the priority axis Water related to the improvement and development of the infrastructure for drinking and waste water during the first programming period is 60 %. During the second programming period, under OPE 2014 – 2020, procedure Second phase of projects for construction of water supply and sewerage structure, the implementation of which has started under OPE 2007 - 2013 the relative share of self-financing varies from 18 to 32% and the amounts paid are in the range of 34% to 95%.
- ✓ The correlation between the financing under the procedure for improvement and development of the drinking and waste water infrastructure 2007-2013 and the access to sewerage is low. For the analyzed period, 13% of the change in funding for water projects at the district level leads to a change in access to sewerage.
- ✓ The correlation between the financing under the procedure for improvement and development of the infrastructure for drinking and wastewater 2007 - 2013 and GVA is high, as 49% of the change in the financing by projects influence on the change of GVA on district level.
- ✓ The correlation between the financial support under the procedure for improvement and development of drinking and wastewater infrastructure 2014 - 2020 and GVA in 2017 at the district level is high. 41% of the change in project funding influence on the change in GVA.
- ✓ The conducted DEA analysis showed that the financing during the first programming period 2007-2013 is most effective in the districts of Ruse, Haskovo and Dobrich and is most inefficient in the districts of Sofia, Plovdiv, Burgas, Kardzhali. During the second programming period, the financing under OPE 2014 - 2020 is most effective in the districts of Burgas, Shumen, Blagoevgrad and most inefficient in the districts of Silistra and Sliven.

In conclusion, the challenges facing water resources require construction, operation and maintenance of sustainable water infrastructure. This force the realization of infrastructural projects in the sector and the implementation of innovations that need financial support. In this regard an approach that takes into account all specific sector requirements in legislative, environmental, technological, technical, investment and information aspects have to be applied.

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The results in the article are part of a study related to the sustainable management of the water sector in Bulgaria (Stoyanova, 2021).

Conflict of interests

The authors declare no conflict of interest.

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