

Evaluation study "Impact of EU financial interventions in the area of water and sewage management on improvement of the natural environment and on the social and economic development"

Summary

1. Introduction

The main objective of the study was to evaluate the impact of EU financial interventions in the area of water and sewage management on improvement of the natural environment and on the social and economic development.

The study covered the projects (completed and under way) aimed at the protection of the natural environment (including water and sewage management projects) financed under the National Development Plan for 2004-2006 (analyzed as of 30 December 2007). The study was carried out between June and October 2008.

2. Description of the methodology

The evaluation included the examination of **secondary data** (including the analysis of the database for environmental protection interventions, in-depth analysis of the documentation of selected projects, analysis of the results of water quality monitoring at 22 monitoring points of the river basin, review of the documentation of the projects selected for case studies) and the **field studies** (case study based examination of selected projects (8) and gminas (6), in-depth interviews with the representatives of three national parks). Analytical work has allowed to establish a database which contains information on intended and achieved outputs and results of 299 largest water and sewage management projects. A map of water and wastewater management projects by basins, water regions and a map of the largest projects versus protected areas were also prepared. Additionally, a map of regional arrangement of the Cohesion Fund projects was prepared with the division into river basins.

3. Environmental impact of the water and sewage management projects

Analysis of the scale of interventions in water and sewage management area over the period concerned (2004-2007) shows that several thousand various projects were launched at that time, including almost 160 projects of particular importance for the environmental improvement which were intended to reduce pollutant loads discharged into the surface waters from around 100 largest conurbations and 54 industrial plants.

In the case of projects implemented under the **Cohesion Fund**, it is worth pointing to very low construction and modernisation rates of waste water treatment plants (work progress of 7.3%; out of 23 facilities none has been completed so far). It seems that the beneficiaries of the Cohesion Fund concentrated their efforts primarily on the development of sanitary sewage system network (a group of the most advanced projects; almost 9 000 km of the sanitary sewage pipelines and 888 km of stormwater drainage pipelines are to be laid ultimately), water supply system network (13.5% completed; 2077 km to be built) and water treatment plants.

The planned result indicators show that the impact of the Cohesion Fund projects on the environment and on the social and economic development should be significant. New water supply networks will deliver water to over 650 000 users. The capacity of new and

modernised waste water treatment plants will ensure treatment of additional 887 000 m³/d of waste water, i.e. over 36% of waste water (however, this an estimate for 49 projects only) that was treated before the analysed projects were implemented.

Work progress within the individual projects under the **Integrated Regional Operational Programme (IROP)** is considerable (the majority of projects have been completed, and the achieved output indicators already exceeded 90% of the planned target value). The length of newly laid water supply pipelines is 651.22 km, and the length of new sanitary sewage system (109.98 km of network were modernised) and new stormwater drains is 2095.5 km and 60.08 km, respectively. The new waste water management facilities include 711 pumping stations, 2 wastewater separators and 24 waste water treatment plants (besides, 21 such facilities were modernised).

With the IROP result indicators the performance ranges from 64.2% in the case of planned number of persons having access to the sewerage system (the new/modernised sewerage system will collect from 260 659 users) to over 99% in as for the number of people supplied with tap water (a target of over 521 000) and the number of households/buildings connected to the water supply system (a target of over 188 000).

The environmental effect (particularly surface water quality improvement) of water and sewage interventions under the Cohesion Fund and IROP is still difficult to measure and will become fully visible a few years after these projects are completed. The effect will primarily occur after the projects associated with construction, expansion or modernisation of the waste water treatment plants under the Cohesion Fund are completed.

However, it should be emphasized that the major part of municipal waste water volume is already treated and the EU financed measures help improve the situation. The projects consisting in establishment of a totally new waste water discharged system are in a minority since over 92.1% of waste water is treated in some way following the investment efforts made by local governments and industry after 1990 (in 1990 it was 67.4%). However, it should be noted that the indicator of waste disposal system coverage is significantly higher in towns than in rural areas. Although in recent years (between 2003 and 2007), sewer system coverage in rural areas, in terms of the number of inhabitants connected to the systems, increased by 5.4% (only by 1.6% in urban areas) but in 2007 it still amounted merely to 21.3%.

Treatment of larger volumes of waste water following the extension of sanitary sewage systems will also have a positive environmental effect. This concerns mainly urban areas where the largest projects are implemented under the Cohesion Fund. However, it is hard to tell anything about positive environmental effects in the case of water supply projects intended to increase the number of customers connected directly to the water supply system or provided with better quality water. These projects are mainly intended to improve the quality of life of the population.

The scale of projects implemented under **INTERREG** (similar to the IROP projects) was significantly smaller and their "ecological effect" is therefore important mainly at the local level. In the case of INTERREG projects, all 11 largest projects were completed and the output indicators were achieved in 100%. The result indicators show, however, that not all projects are operated to the planned extent, e.g. waste water treatment plants.

The "ecological effect" of projects implemented under the **Improvement of Competitiveness of Enterprises Sectoral Operational Programme (ICE SOP)** was

assumed to be negligible, because these projects were intended in particular to adjust the existing industrial facilities to the requirements of the *best available technologies* (through the increase in raw material, material and energy effectiveness) which translated into the improvement of their competitiveness. The contracts under the projects involved mainly construction or modernisation of waste water pre-treatment plants (19).

The effects of water and wastewater projects implemented under the **Agricultural Sectoral Operational Programme (Agricultural SOP)** may be presented mainly as a sort of "awareness leverage" whose most visible and beneficial result will consist in dissemination of information about practical methods of environmental impact reduction in the agricultural holdings and agri-food processing plants in rural areas. Under 20 projects subject to detailed analysis, construction/modernisation of 10 waste water treatment plants, 6 waste water pre-treatment plants and 1 water treatment plant was planned.

Environmental effect of the projects implemented under the ICE SOP and Agricultural SOP is and will be relatively small (additional volume of waste water treated will be many times lower than in the case of projects implemented under the Cohesion Fund). However, at the local level the impact of interventions on the reduction of negative environmental impact of the existing industrial, agricultural and technical activities is significant on the scale of individual projects. An in-depth case study of selected ICE SOP projects (investment in the electroplating company Galwa-Kor in Płock) and Agricultural SOP projects (Tymbark processing plant in Olsztynek) showed that the load of individual specific pollutants was reduced to a much lower level than that required by the national and EU legislation. The volume of treated waste water and the volume of economized water also increased.

Apart from the basic environmental effect, i.e. surface water quality improvement, there are other indirect effects, which are not less important for the environment, associated with **improvement of effectiveness** of municipal and industrial waste water collection and treatment systems achieved as a result of:

- Separating sanitary sewage and stormwater: hydraulic relief of waste water treatment plants (stormwater treatment is not so complicated as that of sanitary or industrial waste water), specific economic effect (capacity of waste water treatment plants where waste water from the combined sewage system is collected must be much higher than in the case of sanitary sewage alone);
- Rationalization of water management: effects in the form of water loss reduction and rational water management will be measurable (e.g. Warsaw – the planned increase in water savings by 28%). However, it should be emphasized that a complete water supply monitoring system, which would allow to manage effectively each national water supply company, does not practically exist ;
- Reduction of the pollutant loads in the industrial waste water to a level well below that required by the national and EU regulations.

From among 299 projects selected for in-depth analysis, 201 projects are on the agglomeration list enclosed in the Update to the National Programme for Municipal Waste Water Treatment (*Aktualizacja Krajowego Programu Oczyszczania Ścieków Komunalnych - A-KPOŚK*). From among 98 analyzed projects under which the tasks listed in A-KPOŚK are not carried out, there are 58 ICE SOP projects and 20 Agricultural SOP projects. The

remaining 21 projects are associated with only water management (water supply system or water treatment plants) for which there was no requirement of for formal notification in the National Programme for Municipal Waste Water Treatment. It should also be emphasized that the investments carried out under the analysed projects are only a part of investments envisaged in KPOŚK with regard to individual conurbations. This regards mainly a number of smaller projects to be implemented for conurbation of 2000 to 15 000 ENI. The analyses provided in 2003 KPOŚK show that only in 162 conurbations of 2000 to 15 000 ENI had collective waste water discharge system was not available. In any conurbation exceeding 15 000 ENI such shortage was found.

4. Impact of interventions on the changes in surface water quality

A number of regularities may be observed in the spatial distribution of the largest of water and sewage management projects:

- A significant number of projects (185 out of 299, i.e. 62%) are implemented in southern part of Poland;
- The majority of projects is concentrated around the largest cities, in particular there is a large number of projects of the highest values located in the Warsaw and Upper Silesia conurbations;
- An overwhelming majority of projects was implemented in the basin of the upper Vistula (from the source to the point past Sandomierz) – in all 224 projects. The Warta basin is next with 101 projects, followed by the upper Oder basin (from the source to the point past Opole) and the Narew basin with 72 investment projects each.

Comparison of the distribution of the major projects shows that they are largely implemented in the regions with the least developed sewerage systems and waste water treatment plants, i.e. in the Upper Oder Region and the Little Vistula Region. It seems that allocation of a large amount of aid to those regions has a positive effect and should significantly contribute to the resolution of water and waste water management problems in those regions in the nearest future (following the completion of the project).

Environmental impact of the projects, in particular waste water management projects, may be generally analysed in terms of two aspects:

- Reduction of anthropopressure on the environment and/or its resources;
- Changes in the quality of individual environment elements and/or condition of its resources (following the reduction of anthropopressure).

The indicators connected with the first aspect (reduction of anthropopressure) include first of all the **reduction of the pollutant load** discharged into the surface and/or ground waters. This is achieved by discharging municipal waste water to a treatment plant through a collective sewage system.

The analyses show that the projects implemented under the Cohesion Fund, IROP and INTERREG, and to some extent also ICE SOP projects are the main contributors to the above indicator.

In the second group of indicators (effects resulting from the reduction of anthropopressure), **water quality monitoring indicators** are of the utmost importance. An attempt was made to evaluate the environmental impact of the water

quality improvement in selected 22 monitoring points “encircling” the basins where the largest number from among 299 projects subject to in-depth analysis were implemented.

There is only a limited possibility to explicitly estimate the environmental impact of the UE financial interventions on water and sewage management (in particular the flowing water environment) because of complex natural structures subject to anthropopressure and their relationships, as well as a number of other conditions and factors. Nevertheless, there are visible changes in the individual indicators in selected monitoring points.

One of the analysed parameters was **electrolytic conductivity of water** which tells the level of water mineralization (salinity). This parameter exhibits a decreasing tendency in 11 monitoring points located mainly on smaller rivers. It is the most visible in the points located on the Barycz, Bzura, Dunajec, Nida, San and Wisłoka rivers. In measurement points located on the abovementioned rivers, not only is the conductivity decreasing but also such parameters as **COD, BOD-5, TSS, total nitrogen and total phosphorous** are reduced or at least they do not grow (except for the San where a slight TSS increasing tendency was observed). All the above parameters depend to a greater or smaller extent on the volume and quality of waste water discharged into water.

5. Impact of interventions on protected and vulnerable areas

Some of the analysed projects (299) were implemented on the areas protected according to the Act *on the Nature Protection* of 16 April 2004. The impact of such projects on protected areas should be examined from two points of view. Firstly, the worst stage of **water supply and sewage** pipeline projects, which interferes with the environment, is the pipe laying process mainly due to the distortion of ground water balance. The operation itself of such infrastructure facilities does not affect significantly the environment, and with the efficiently operating system the environment condition even improves in many cases, in particular in the case of sewage networks.

The second aspect is that of **waste water treatment plants**. Such facilities are deemed to be harmful for the environment both at the stage of construction and operation. With the present legislation in force, it is very difficult to locate a new waste water treatment plant directly in a protected area, and it is impossible in the national parks or nature reserves. However, it is possible to build a new or to modernize an existing waste water treatment plant within the national park buffer zone. Under the present study no adverse impact of the waste water treatment plant projects in the buffer zones of 3 national parks (Magurski, Kampinoski and Pieniński national parks) on the protected areas was found.

The impact on vulnerable areas is connected with nitrates from **agricultural sources**. One of the most important task to be implemented with the EU funds and in order to improve the environment conditions (in particular with regard to the surface and ground waters) consisted in construction of the manure tanks and pads to collect and store manure and the facilities for domestic waste water treatment (under Measure 1.1. of Agricultural SOP - not included in the study). Therefore, the projects selected for in-depth analysis under the present evaluation study hardly affect the factors used as a basis to count these areas among vulnerable zones.

6. Evaluation of social and economic effects of interventions

The evaluation of social and economic effects of the interventions was based mainly on the results of in-depth analyses at the level of the projects (8 case studies: 4 projects under the Cohesion Fund (Poznań, Warsaw, Olsztyn, Toruń), 2 projects under IROP, and

the gminas where the projects were implemented (rural gmina of Złota and the whole powiat in order to examine the links between other projects implemented by the gminas – Ostróda powiat), one project under Agricultural SOP (Tymbark processing plant in Olsztynek) and one project under ICE SOP (Galwa-Kor electroplating company in Płock).

The investments have or will have an impact on the **improvement of the living standards and the quality of life**. Construction and modernization of water supply networks (3677 km in total) and construction or modernization of 150 water treatment plants will contribute to the improvement of tap water quality. The impact will be proportionate to the scale of projects. As the water supply systems accounted for 17% of all projects and the water treatment plants only for 5%, the overall result in the form of the improved water quality will not be significant.

The water and sewage management projects are related to the measures which are not a direct result of a project but a consequence of its implementation, e.g. elimination of cesspools (the so-called septic tanks) as a result of waste water network construction. The majority of tasks carried out under the 299 largest projects include construction/modernization of the sanitary sewage system - a total of 521 projects, i.e. 55% of all projects in total. A new sanitary sewage system is provided for in 170 projects (Cohesion Fund, IROP, INTERREG) and covers a total of 12 919.37 km of pipelines. Therefore, in view of the scale of total of interventions, the impact of such projects may be expected to be the most important.

The water and sewage management projects often involve **implementation of other projects**. This includes e.g. construction of new street pavements where water supply or sewage pipelines were laid so that better communication between the areas covered by the impact of the project is achieved (e.g. in Toruń).

The case studies show that the water and sewage management projects directly affect the **housing development**. The availability and low cost of water supply and sewage collection services may be certainly considered a "city-forming" factor. Almost in every analyzed town/city there are areas where the development of housing could not have been possible without such projects. Examples may include the planned housing estates in Warsaw (Białołęka), Toruń, Olsztyn and Poznań, as well as the extension and modernization of housing infrastructure in Warsaw (Wawer), Legionowo or Toruń (Wrzosey housing estate). The projects may also directly affect the development of housing in **rural areas** (prevention of the outflow of young people and a motivation to settle down and invest), e.g. projects implemented by rural gminas in the Ostróda powiat help develop housing estates.

The interventions will certainly impose financial burden on the inhabitants due to the higher prices of water supply and sewage collection services. However, it was not found the planned price increase to exceed the socially acceptable threshold (at the level of 4% of the available income of a household). These forecasts do not include however the poorest groups of inhabitants who will suffer more the price increases.

The interventions have a direct impact on the gmina budgets with regard to the current and forecast level of indebtedness of the gmina and water supply and sewage collection companies in connection with the project implementation. The study did not identify any case where financial problems would lead to discontinuation of the project and loss of creditworthiness of local government units. The in-depth analyses show that the gminas bear a significant financial burden related to the project costs. However, the

costs were calculated so that the smooth implementation of the statutory tasks of local governments is not at risk. The durability of projects will be determined mainly by the **financial condition** of the water supply and sewage collection companies.

The extent to which project implementation may contribute to an **increase in investment opportunities for the services sector and the industry** is associated with the increase in investment attractiveness of a given area along with the availability of water supply and sewage collection services. In-depth studies show that there is a direct link between the development of water supply and sewage collection infrastructure and the development of entrepreneurship. The representatives of local governments emphasized two main areas of business development: **construction** (the result of the impact on the development of housing) and **tourism**.

The "ecological effects" of interventions should in longer term induce the **development of the tourism business** (hotels, agro-tourism, sports and water infrastructure, as well as catering infrastructure). In the examined cases places may be identified where the tourism and recreation development activities are planned (rehabilitation of river bank areas in Olsztyn, Toruń, Poznań and Warsaw, construction of hotels in Toruń, planned cultural and sports events). In Złota gmina located in a particularly attractive area for tourists, the programme *Ecodevelopment of Ponidzie* is implemented. The regulation of the water and sewage management in the gminas located alongside the Nida river is complementary to this programme.

The in-depth examination of the study cases showed that it was impossible to measure the impact of interventions on such issues as:

- **Migration level** (in theory, a link between the two may be assumed; migration to the locations with better quality of water supply and sewage collection services may be deemed possible);
- **Hygienic and sanitary conditions** (impact of interventions on the improvement of hygienic and sanitary conditions in the cities is insignificant, since the water quality standards are met there; however, it is important in backward rural areas – connection of households to the collective water supply and sewage collection system allows to eliminate water wells and cesspools and to build houses and rooms equipped with sanitary appliances);
- **Human health**, e.g. the illness rate (it is rather a decreased risk of illness than a measurable decrease in the illness rate. None of the examined projects, even those implemented in rural areas, dealt with elimination of dangerous substances, which pose a direct risk to the human life and health, from sewage).

7. Recommendations

The study allowed to formulate **recommendations** on the most important directions of water and waste water infrastructure development, as well as on the indicators of environmental, social and economic results. The recommendations were also formulated with regard to the most important problems related to the performance of this evaluation study.

The analysis along with the assessment of the impact of the interventions in the field of water and sewage management on environment and on the social and economic development, (the extent of pressure drop, surface water quality improvement) **should be repeated** after the accounts of projects implemented under the Cohesion Fund are

settled, however, not earlier than in 2011. The environmental impact (in particular with regard to the surface water quality improvement) of the water and waste water interventions in the period 2004-2006 is still difficult to measure and it will become visible only within a few years after the projects are completed.

It is recommended that the database of the Ministry of Regional Development should include the **system of project classification** according to main areas (environmental protection, transport, etc.) and type of intervention (assignment of key words to a specific project), e.g. under the environmental protection projects: waste, water, wastewater, etc.). The only variable which is currently used to define the scope of a project is the title of the project.

It is necessary to **standardise and specify in detail the indicators** describing the outcome and results of the projects, e.g. in the form of accessible definitions and descriptions of indicators. The extension of the list of indicators estimated at the stage of calculating the ecological effect should be considered. The current data deficits and inconsistencies of key material indicators do not allow for explicit and full quantitative assessment of ecological effect of the analysed projects using the outcome and result indicators. The standardised list of indicators should apply to all groups of projects implemented between 2007 and 2015.

The outcome and result indicators prepared for IROP should provide a basis for the verification of the reporting scope both for the projects financed under the Infrastructure and Environment Operational Programme for 2007-2013 and the Regional Operational Programmes for 2007-2013. Reporting and scope of indicators to be used under the IROP projects allow a relatively best assessment of the obtained results.

It is recommended to maintain the activities which help improve the quality of life and the environment at the local level, as well as those which **raise awareness and promote desirable behaviours** in respect of the resource management. The projects implemented between 2004-2006 under Measure 1.5 of Agricultural SOP are examples of good practice in this respect.

The future the **activities should be undertaken to formalize the system of collecting data on the social and economic development** through the establishment of a development indicator list, the EU, national and regional database and a system to process and aggregate social and economic development data. The Contractor recommends the use of the Self-government Analysis System run by the Association of Polish Cities.