



The impact on the environmental protection of the Regional Operational Programme for the environment and infrastructure for the Lower Silesia Voivodeship for 2007-2013

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Abstract:

The state of the environment and environmental infrastructure is one of the factors determining the quality of life of residents in a given territory. The main objective of the Regional Operational Programme for the Lower Silesia voivodeship for 2007-2013 (ROP) was to increase the standard of living in Lower Silesia, and to improve the competitiveness of the region while respecting the principles of sustainable development. Implementation of this objective was to be achieved through the implementation of the specific objectives assigned to individual priorities. The aim of the priority IV Environment and Ecological Safety was the improvement of the environment, the prevention of its degradation, the conservation of the biodiversity and natural assets of Lower Silesia, as well as the improvement of safety in the region through counteracting natural and technological risks and through eliminating their effects and supporting the activity of emergency services.

Objective

The objective of this study is to show how the implementation of projects funded under Priority IV contributed to the improvement of the state of the environment and the infrastructure for environmental protection.

Survey method

In the paper the desk research method were used. The results of completed projects will be compared to statistic data concerning the state of the environment and environmental infrastructure in the region. I will analyse the environmental components that correspond to the topics of the various activities carried out under Priority IV. The analysis will therefore be conducted in the area of waste, water and wastewater management, air quality, flood protection infrastructure, restoration of degraded land, protection of the environment from natural and technological risks and conservation of the biodiversity.

Conclusions

The carried out analysis shows that analysed projects contributed greatly to improve waste management in the voivodeship and to improve water and sewerage infrastructure. The analysed projects had little impact on improving air quality in the voivodeship, improvement in flood protection infrastructure.

Originality

The article presents the results of the author's research. The results helped to identify the impact of the investments on the environment in the voivodeship.

Keywords: Regional Operational Programme, environment, Lower Silesia Voivodeship

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Introduction

The term environment is understood very widely. Because of that the components of this term are person, fauna, flora, soil, water, air, climate, landscape, as well as material resources, cultural heritage, natural environment and natural resources, and water resources. The concept of the environment also includes elements of the social environment of man, social conditions of life of the individual and society [Kenig-Witkowska: 2011, s. 19]. Therefore, an important issue is to identify the resources from European funds contribute to improving the environment but also environmental protection infrastructure. Such analysis may in fact show that the provision of support contributes to the achievement of specific objectives set in the individual operational programs, and consequently has an impact on the environment in a given area. In this paper an attempt is made to determine the impact on the basis of the ROP for the Lower Silesian voivodeship.

The main objective of Regional Operational Programme for the Lower Silesian voivodeship for 2007–2013 was: to improve the quality of life of Lower Silesia inhabitants and to increase

the region's competitiveness while respecting principles of sustainable development [Lower Silesia Marshal's Office 2008]. The Programme had also three detailed objectives:

1. To increase the economic activity based on knowledge and innovation.
2. To develop an infrastructure that facilitates the improvement in the quality of the environment, investment conditions and running business activity.
3. To improve the living conditions of the inhabitants and the growth of competitiveness of the region through modernisation and development of the social infrastructure.

From the environmental point of view the second objective was the most important. ROP support was granted under 10 thematic priorities. One of them, Priority four: *Improvement of the Natural Environment and Improvement of Ecological and Flood Safety in Lower Silesia* was connected to the environmental protection.

This priority was divided into seven actions. The implementation of each of them should have contributed to the achievement of specific objectives (tab.1).

Table 1. Objectives of each action under Priority IV

Action	Objective
4.1 Waste management	To improve the environment and prevent its degradation by re-organizing the waste management operation.
4.2 Water and sewage infrastructure	To improve the environment and living conditions by organizing water and wastewater infrastructure and expanding water supply.
4.3 Improvement of air quality	To improve air quality by reducing emissions from utilities.
4.4 Flood and drought prevention	To reduce the risk of flood, to prevent drought and to combat its effects by supporting the construction and modernizing the necessary infrastructure.
4.5 Reclamation of degraded areas	To improve the quality of the environment through the rehabilitation of degraded areas (mainly post-industrial and post-military), which consists in converting them into nature conservation and recreational areas or using them in the green economy.
4.6 Support for institutions dealing with environmental protection	To increase protection against the effects of natural and technological hazards, to remove their effects, to restore the environment's conditions and to strengthen the selected elements of the environmental management system.
4.7 Biodiversity conservation and environmental education	To preserve the environmental potential of the region.

Source: [Lower Silesia Marshal's Office 2008].

A very important question to answer will therefore be: how the projects implemented under the ROP contributed to the regeneration of the environment, as well as to the improvement of the environmental infrastructure in the voivodeship. The analysis will allow us to identify the areas where the impact was very important, but also those in which the effects were insignificant, and thus further support should be provided in the next financial period. The restoration of the environment and the improvement of the infrastructure for environmental protection are achieved thanks to many different sources of investment. Some of them are national (investors' own funds, earmarked funds) but others are foreign [Bartniczak, Ptak 2009: 61-145].

The funds from the European Union have become the main external source of financing the environmental infrastructure in recent years. Many Local Governments decide to invest

once financial support has been granted. The amount of financial sources, however, are severely restricted. Therefore, it is very important to identify the areas in which thanks to the granted support we will notice a significant improvement, and those in which such support should continue to be granted.

It should also be noted that providing support in environmental protection can be achieved a number of additional effects. Reduce environmental pollution, improve air and water quality can affect the decrease in morbidity, mortality reduction of society, reducing expenditures, for example on repairs to buildings, but also on the growth of tourism [Mazur-Wierzbička: 2008]. The identification the impact of funding from the Structural Funds on the environment is important both from a practical point of view, but also has a scientific aspect. Implementating of any operating program the entity responsible for managing it is obliged

to carry out analyzes of both ex-ante and ex-post of his influence on a specific sphere. Thanks to this analysis, it will be possible to assess from the point of view of the five evaluation criteria, ie. relevance, efficiency, effectiveness, impacts and sustainability [Beck:2006]. Conducting such an evaluation therefore has direct benefits for the managers program, but also benefits information for the direct recipients of the program. The scientific aspect can be considered from the point of impact of a program to improve the environment. This allows for an indication of the relationship between the size and the scope of investments and achieved improvement of the environment.

The funds from the European Union are granted under several programs implemented at both the national and regional level. The line of demarcation indicates which projects are implemented under the various programs and at what level [Ministry of Infrastructure and Development 2015]. The result is that in some areas the support may be granted only at the national level which means that the

intervention at the regional level is very limited.

In years 2007-2013, 221 projects have been granted support under priority IV RPO (tab.2.). Within those projects nearly 24% were connected to water and sewage infrastructure and more than 22% were linked to biodiversity conservation and environmental education. The total value of supported projects was more than 822 mln PLN. The funding from European Union was more than 523 mln PLN. The share of the support of the European Union amounted to more than 63%. Nearly 49% of support was granted to projects involving water and sewage infrastructure and nearly 20% in areas of waste management.

The purpose of this article is to show the changes in the environment, as well as changes in the environmental infrastructure in Lower Silesia in 2007-2013. The next step will be to analyze the effects of the projects co-financed by the ROP. This will allow us to identify areas where intervention of ROP had the greatest impact on the environment restoration and environmental infrastructure.

Table 2. Basic information about supported projects under priority 4

Action	Number of projects	The total cost of the projects (PLN)	The amount of funding with the European Union (PLN)
4.1 Waste management	35	179 106 055,56	102 114 525,22
4.2 Water and sewage infrastructure	53	404 033 444,72	255 675 015,72
4.3 Improving air quality	12	5 966 832,96	4 551 428,91
4.4 Flood and drought prevention	18	87 415 316,99	61 537 625,79
4.5 Reclamation of degraded areas	29	12 382 533,60	9 457 850,81
4.6 Support for institutions dealing with environmental protection	25	69 717 682,38	46 082 624,51
4.7 Biodiversity conservation and environmental education	49	64 131 290,99	43 789 140,73
Total	221	822 753 157,20	523 208 211,69

Source: Own elaboration based on Ministry of Infrastructure and Development 2015.

ROP impact on the environment and environmental infrastructure in Lower Silesia voivodeship in 2007-2013

Effects in terms of waste management

I will analyze the waste management first as the generation of waste is a growing worldwide problem due to the growth of population, the increase in the production of consumer goods and the technological progress [Ekoportal 2015]. Table 3 presents basic information on waste management in the Lower Silesia voivodeship in 2007-2013.

Over 6.5 million tonnes of waste were collected in the voivodeship in 2007-2013. More than 6,1 million tons were mixed waste, and just less than 0.5 million tons were collected selectively [Local Data Bank 2015].

We should note as positive the fact that the proportion of waste collected selectively in relation to the total waste has been increasing. This share was higher by 6,2 percentage points in 2013 compared to 2007. A downward

trend can be observed in the amount of waste generated and recovered during the year. Also the share of the waste recovered out of all the waste generated during the year decreased in about 5,6 percentage points. The number of the operational landfill sites, on which municipal waste is being treated, had been cut down by over 60% in 2009-2013. At the same time, the area of operational landfill sites, on which municipal waste was treated, had been reduced by more than 40%. In the years 2008-2013 more than 2500 unauthorized dumps were eliminated [Local Data Bank 2015].

The improvement of the situation in the area of waste management was accomplished thanks to projects which were realised under action 4.1 ROP. The implementation of these projects made it possible to recover more than 34,3 thousand tons of waste per year [Lower Silesia Marshal's Office 2014] covering the separate collection of waste for more than 58 thousand people [Lower Silesia Marshal's Office 2015]. This will also contribute

Table 3. Basic information on waste management in the Lower Silesia voivodeship in 2007-2013

Specification	2007	2008	2009	2010	2011	2012	2013
Waste collected during the year (thous. t)	975,7	928,5	990,1	994,4	914,9	902,4	853,7
Mixed waste collected during the year (thous. t)	929,2	867,5	912,5	923,7	849,4	828,8	760,1
Waste collected separately during the year (thous. t)	46,6	61	77,6	70,8	65,5	73,6	93,7
Waste collected separately in relation to the total waste (%)	4,8	6,6	7,8	7,1	7,2	8,2	11,0
Waste generated during the year recovered (with the exception of municipal) (thous. t)	25 020,2	23 883,6	22 804,8	23 163,1	24 196,0	23 581,8	23 268,5
Share of waste recovered in waste generated during the year (%)	72,9	70,8	68,5	69,0	69,0	68,3	67,3
Operational landfill sites on which municipal waste are treated (pcs)	.	.	79	51	42	39	30
Area of operational landfill sites on which municipal waste are treated (ha)	.	.	290,0	234,7	209,0	200,6	168,7
Number of unauthorized dumps (pcs)	.	390	350	456	414	382	513

Source: Own elaboration based on Local Data Bank 2015, <https://bdl.stat.gov.pl/BDL/dane/temat#>.

to the increase in the amount of waste collected selectively, and thus in the increase of the share of waste collected selectively over the total waste. More than 204 thousand people have been covered by the waste management system, which makes it possible to collect waste in a selective way [Lower Silesia Marshal's Office 2014]. The purchase of 162 containers and a vehicle for selective waste collection was another improvement made in this area. Seventy-four out of the 2505 unauthorized dumps were cleaned out thanks to these projects [Lower Silesia Marshal's Office 2014]. The implementation of the projects made possible the construction of 6 composting plants and 5 sorting plants as well as the modernisation of 4 existing sorting plants. Also, 5 waste transfer stations were built and the capacity of the landfills increased in about 460

thousand m³ [Lower Silesia Marshal's Office 2014].

Effects in terms of sewage and water infrastructure

Another very important area of conducted research is water and sewage infrastructures. Water is one of the renewable raw materials which carries a number of very important functions in the economy. The importance of these functions implies that water must be protected from contamination and should be used rationally and economically. Protection of both qualitative and quantitative water resources is an integral part of environmental protection [Chief Inspectorate of Environmental Protection 2014]. Basic information on water and wastewater management in the Lower Silesia in 2007-2013 is presented in table 4.

Table 4. Basic information about water and wastewater management in the Lower Silesia voivodeship in 2007-2013

Specification	2007	2008	2009	2010	2011	2012	2013
The length of the water supply network(km)	13 604,6	13 888,3	14 110,8	14 429,5	14 345,2	14 681,4	15 127,1
Population using the water-line system (people)	2 622 028	2 625 512	2 629 053	2 668 184	2 672 697	2 679 347	2 679 644
Share of population connected to the water supply network (%)	91,1	91,3	91,4	91,5	91,6	91,9	92,1
Length of working sewerage network (km)	7 201,3	7 584,0	7 918,9	8 248,6	8 733,2	9 290,4	9647,4
Population connected to the sewerage network (people)	1 924 740	1 940 651	1 950 600	1 986 325	2 021 539	2 044 359	2 058 871
Share of population connected to the sewerage network (%)	66,9	67,5	67,8	68,1	69,3	70,1	70,8
The number of municipal wastewater treatment plants (pieces)	201	203	209	208	217	224	230
Population using municipal wastewater treatment plants (people)	2 168 458	2 185 429	2 181 935	2 215 199	2 240 268	2 250 679	2 263 230
Share of population connected to the municipal wastewater treatment plants (%)	75,3	76,0	75,9	75,9	76,8	77,2	77,7
Size (capacity) of wastewater treatment plants by project(m ³ /24 h)	772 150	798 667	789 839	794 474	869 105	840 621	840 956
Discharged treated wastewater during the year(dam ³)	100 685,7	97 911,6	99 450,2	102 064,3	102 219,4	101 331,1	102 796,8

Source: Own elaboration based on Local Data Bank 2014, <https://bdl.stat.gov.pl/BDL/dane/temat#>.

The length of the water supply network has increased systematically from year to year. This increase was of more than 1522,5 km, which is more than 11,1%. The number of people using the water-line system also have increased. Share of population connected to the water supply network increased by 1 percentage point. The length of working sewerage network also has been increasing from year to year. Its length has increased by 2 446,1 km. The population connected to the sewerage network increased systematically, rising by 3,9 percentage points in the years 2007-2013. The number of municipal wastewater treatment plants increased in 29. The population using municipal wastewater treatment plants reached about 95 thousand, increasing in about 2,4 percentage points. The size (capacity) of wastewater treatment plants grew almost 9%. The amount of discharged treated wastewater in 2013 was higher by 102,8 dam³ in comparison to 2007. Analysis of these data allows us to draw a clear conclusion about the vast improvement of the situation in the area of water and wastewater management in the voivodeship [Local Data Bank 2015].

The projects implemented under RPO had a very significant impact on the situation in the area of water and wastewater in the voivodeship. 218 km of water supply network were built, which amounts to 14% of the network built between 2007 and 2013. 13 682 people were connected to the water supply network. There was nearly 24% increase in the number of people using the water supply network. 282 km of sewerage network was built. It can therefore indicate that one in ten kilometers built in the voivodeship was built by the beneficiaries of the ROP. 17 037 people were connected to the newly built or upgraded sewage system. The number of people using the sewerage network in 2007-2013 increased by

134 131 people, so nearly 13% were connected through the implementation of the analyzed projects. The projects will help to discharge 2 254 490 m³ of sewage. 6 municipal wastewater treatment plants were built. 10 municipal wastewater treatment plants were renovated. 8 water treatment plant were built and 9 were renovated. More than 2,5 thousand m³ of wastewater have possibly been treated. The information contained in the studies conducted so far shows the representatives of environment related institutions believe that a significant progress in the area of water and wastewater have been made. In the opinion of the representative Regional Fund for Environmental Protection and Water Management Wroclaw water and sewage is one of the areas where the greatest improvement is noticeable. There are municipalities in the voivodeship where the indicator of the share of the population using the sewerage system is close to 100%. Representatives of environmental inspection indicated that the amount of waste water treatment plants in these communities, as well as their capacity is sufficient and there is no need for a further measures in this area. On the other hand, it is necessary to build sewerage network in rural areas. Financial support should be directed where there are gaps in the infrastructure in terms of both the construction of the sewerage system and the modernization of the sewerage treatment plants. In rural areas, we should consider the benefits of building domestic sewerage treatment plants. Representatives of environmental inspection also highlighted the improvement of the technical condition of the water supply network, which contributed to the reduction of water losses.

Effects in terms of air quality

Another area subjected to analysis was air quality. The primary objective

of activities related to the protection of the air should be to maintain air quality in areas where it is good and to improve it in other areas [Voivodship Inspectorate of Environmental Protection 2012]. Such activities are very important due to the fact that air pollution have very significant impact on human health and on nature. Public statistic office provides very limited information on emissions because this information is limited only to the emissions from the so-called plants especially noxious to air purity. In 2013 in the voivodeship there were 146 of them. Information about emissions of air pollutants from plants especially detrimental to air purity are shown table 5.

Emissions of gaseous pollutants were on average at the level of 16,1 million tonnes per year. Emission of particle

pollutants was on average at the level of almost 5,0 million tons per year. Emissions of gaseous pollutants show downward trend. It is worth noting that almost all particle pollutants are retained or neutralised in pollutant reduction systems. The level of gas pollutants retained or neutralised in pollutant reduction systems was nearly 90% [Local Data Bank 2015].

The impact of industrial plants on air pollution is significant. However studies carried out for many years show that emissions from municipal and residential sectors, for example low emissions and road transport, have the greatest impact on the occurrence of exceedances of air quality standards. The main reason is the combustion of low-quality fuel (eg. bad quality coal, not seasoned wood and coal silt), and also burning waste in furnace. This

Table 5. Emissions of air pollutants from plants especially noxious to air purity in 2007-2013

Specification	2007	2008	2009	2010	2011	2012	2013
Emission of air pollutants-gases (thous. t/year) including:	16 677,1	16 958,6	15 466,6	16 343,7	15 942,2	16 039,6	15 286,4
carbon dioxide	16 578,6	16 870,7	15 381,2	16 260,9	15 866,4	15 963,1	15 222,8
sulphur dioxide	60,9	54,1	54,9	54,2	48,4	48,1	38
nitrogen oxides	20,9	19,0	18,5	19,2	18,7	18,9	16,3
carbon oxides	11,1	9,3	7,9	7,8	7,1	7,4	7,1
methane	4,0	4,2	2,9	0,2	0,2	0,2	0,1
Emission of air pollutants - particulates (t/year)	6,7	6,4	5,2	5,2	4,1	4,0	3,7
Pollutants retained or neutralised in pollutant reduction systems - particulates(thous. t/year)	2408,9	2428,5	2204,3	2745,7	2812,4	2811,3	2554,8
Pollutants retained or neutralised in pollutant reduction systems – gases (thous. t/year)	860,9	830,7	781,9	825,8	913,4	628,9	608,7
Pollutants retained or neutralised in pollutant reduction systems in percent of pollutants generated - particulates	99,7	99,7	99,8	99,8	99,9	99,9	99,9
Pollutants retained or neutralised in pollutant reduction systems in percent of pollutants generated - gases	89,7	90,4	90,2	90,9	92,3	89,2	90,6

Source: Own elaboration based on Local Data Bank 2014, <https://bdl.stat.gov.pl/BDL/dane/temat#>.

contributes to air pollution with PM10 and benz(A)pyrene. While car traffic is responsible for the emission of nitrogen dioxide and fine dust [Voivodship Inspectorate of Environmental Protection 2012].

The air quality observations in Lower Silesia Carried out in the last twenty years showed a significant improvement in air quality mainly in relation to sulfur dioxide, nitrogen dioxide and particles. Reduction of these emissions was mainly the result of the investment in industrial sector [Voivodship Inspectorate of Environmental Protection 2012]. Low emissions and emissions from transport remain to be problem. Air protection is one of the areas where there is still much to do. Support should be especially directed towards the elimination of low emissions.

The analyzed projects had small impact on the improvement of air quality because only 8 heat sources were modernized. Yearly emissions were reduced by 6,98 t of sulfur dioxide, 0,58 t of nitrogen oxides and 742,3 t of carbon dioxide. These projects, however, helped to improve air quality by reducing emissions and concentration of pollutants in areas where they were implemented.

The research carried out so far [Lower Silesia Marshal's Office 2014] have shown poor air quality in the voivodeship. The exceedances of the acceptable level of concentration of pollutants tend to occurs during the winter. The main problem is the low emissions and the burning of waste in household stoves. Actions which will be taken in the near future should concentrate on encouraging the population to join the collective heating network. One of the factors which limits pollution in the cities is the construction of bypasses. This contributes to reducing the problem of environmental pollution caused by emissions from transport means. Therefore, the biggest challenge in the

coming years will be the elimination of low emissions.

Effects in terms of flood infrastructure

Because of the risk of flooding in the region an important area that needs to be analyzed is the implementation of projects aimed at the construction and modernization of infrastructure which reduces flood risk. Despite the importance of flood protection issues the available data on the state of the infrastructure is very limited. It could be only indicated that there are 1 326,5 km of embankments and 3005 different types of hydraulic structures in the voivodeship (storage reservoirs, tanks dry, relief channels, pumping stations, etc.) [Lower Silesia Board of Amelioration and Water Structures in Wroclaw].

The anti-flood infrastructure still requires a lot of attention which could indicate that the implementation of projects financed through the ROP contributed little to reduce the threat of flood and combating its effects.

More than 59 thousand residents are protected against flooding thanks to realized projects. 10_projects have been realized in the field of infrastructure related to flood prevention and drought. 16 flood protection facilities were constructed, renovated or rebuilt. 9135 hectares were covered by flood protection. More than 37 km of watercourses were modernized and more than 9 km of flood embankments were regulated. Over a 675 meters of retaining walls were built. 61,8 thousand. m³ of water were retained within the small and large retention structures [Lower Silesia Marshal's Office 2014].

Effects in terms of reclamation

The next analysed area was reclamation of devastated areas. In fact, thanks to the reclamation it is possible

to restore the natural landscape, to improve the soil or to maintain the standards laid down by law in term of substances present in the soil. This helps to restore the natural value of degraded areas and to return them to utility [City Consulting Institute 2013]. Table 6 presents data on the area of land requiring reclamation and reclaimed and managed in Lower Silesia.

In this table we have some basic information about the situation in voivodship in years 2007-2013. At the end of 2013, there was more than 6,5 thousand hectares of devastated land in the voivodeship and more than 1,7 thousand hectares of degraded land requiring reclamation. In 2013 compared to 2007 there were about 217 hectares less of land demanding reclamation. In 2007-2013 it was possible to reclaim 732 hectares and to manage 189 hectares [Local Data Bank 2015]. The implementation of projects under the ROP, allowed to reclaim and recover 72,59 ha. Among the reclaimed land 45,31 hectares were former industrial areas and 1 ha was a post-military area. 2 300 m² of green spaces were transformed into recreational areas.

The surveyed projects are improving the environment by performing the remediation work. It should be noted, however, that in the voivodeship there are very substantial needs in the field of reclamation. The result is that the completed projects contributed little to reduce the area of land requiring reclamation.

Public statistics do not provide information on the actions taken to protect against the effects of natural and technological hazards, removing their effects, restoring the environment to appropriate state and strengthening selected elements of the environmental management system.

The analysis of the results of completed projects allows us to formulate an opinion of their significant impact on increasing protection against the effects of natural and technological hazards and removing their effects. They also helped to restore the environment to an appropriate state and to strengthen selected elements of the environmental management system. 4 projects were completed in the field of prevention of threats. 47 fire engines fitted with equipment to carry out rescue and disaster recovery were purchased. 18 units of firefighters were supported. More than 1139 km² were covered by Measure Rescue Center for fire protection.

Effects in terms of environmental education

Another area subjected to analysis of the impact of ROP on the behavior of environmental potential of the region through environmental education and the creation of regional mechanisms for the protection and development of biodiversity, green spaces and special gardens. One of the factors determining the environmental potential

Table 6. The area of land requiring reclamation and reclaimed and managed in the voivodship in 2007-2013

Specification	2007	2008	2009	2010	2011	2012	2013
Devastated land requiring land reclamation(ha)	5289	5704	4755	3608	5892	5898	6569
Degradaded land requiring land reclamation(ha)	1964	1719	2276	2441	2355	2178	1747
Land reclaimed during the year(ha)	185	26	57	10	128	173	153
Land managed during the year (ha)	2	120	7	10	0	9	41

Source: Own elaboration based on Local Data Bank, <https://bdl.stat.gov.pl/BDL/dane/temat#>.

Table 7. Legal protected areas and the number of trees and bushes planted in years 2007-2013

Specification	2007	2008	2009	2010	2011	2012	2013
Legal protected areas (ha)	360 918,8	359 688,8	362 429,7	369 870,5	371 007,0	371 020,0	371 109,66
Share of legally protected areas in total area (%)	18,1	18,0	18,2	18,5	18,6	18,6	18,6
The number of trees planted (peaces)	17 204	12 231	13 301	13 651	11 921	8 221	7072
The number of bushes planted (peaces)	190 499	133 715	143 332	120 572	226 679	70 265	70839

source: Own elaboration based on Local Data Bank, <https://bdl.stat.gov.pl/BDL/dane/temat#>.

of the region is the area of protected areas. Basic information on this topic are presented in table 7.

The surface of protected areas has increased from 18,1% in 2007 to 18,6% of the total area at the end of 2013. In the period between 2007 and 2013, the province planted over 83 thousand trees and more than 955 thousand bush [Local Data Bank 2015].

Analysis of the effects of co-financed projects does not allow us to formulate a clear conclusion to what extent these projects helped to preserve the environmental potential of the region through environmental education and the creation of regional mechanisms for the protection and development of biodiversity, green spaces and special gardens. Implementation of projects contributed without doubt to increase the level of environmental awareness and knowledge of the region's population. The effects are:

- 16 environmental education centers received support,
- 79 thousand people benefited from education centers
- 18,4 thousand people benefited from the established infrastructure for environmental education,
- close to 152 thousand people benefited from the paths of nature-education
- pedestrian and bicycle paths were marked with a length of 104 km on the Natura 2000 sites

- 9 nature paths were marked with information boards
- 920 hours of educational activities were conducted
- 15 viewpoints were built [Lower Silesia Marshal's Office 2014].

Conclusions

To sum up it's possible to say, that analysed projects contributed greatly to improve waste management in the voivodeship and to improve water and sewerage infrastructure. We can say that in Lower Silesia it is not necessary to build more water and sewerage infrastructure except for rural areas. In these areas, however, we should consider whether building sewage treatment plants is a better solution than supporting the construction of deep wells. On the other hand analysed projects had little impact on improving air quality in the voivodeship, improvement in flood protection infrastructure was not enough due to a very high demand in this area. In spite of the realized projects there is still a big demand to reclaim land. In the case of air quality, the main factor contributing to its pollution is low emissions caused by the burning of low-quality coal and burning waste in furnaces. A major issue is also the pollution caused by transport. Therefore, in the coming years support should be directed to projects that contribute to the

improvement of air quality through the elimination of low emissions or reduction of the pollution caused by transport. Lower Silesia is an area at risk of flooding, which has occurred repeatedly in recent years. Therefore, despite the realization of many investments, it is necessary to continue to support flood prevention infrastructure. In the region there is also a large number of brownfield sites and old-military areas. That is the reason why significant resources should be spent

on projects aimed at the reclamation of degraded land.

It should be notice of course that this improve were possible thanks to much more factors. Part of investments were done from other financial sources than ROP. Increasing environmental awareness is next factors which lead to improve in environment. Citizens started taking care about environment and also exert pressure on local and regional authority to do something for its protections.

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Wpływ Regionalnego Programu Operacyjnego dla Województwa Dolnośląskiego na lata 2007-2013 na środowisko i infrastrukturę ochrony środowiska w województwie

Abstrakt

Stan środowiska a także infrastruktury ochrony środowiska jest jednym z czynników decydujących o jakości życia mieszkańców na danym terytorium. Celem głównym Regionalnego Programu Operacyjnego dla Województwa Dolnośląskiego na lata 2007-2013 było Podniesienie poziomu życia mieszkańców Dolnego Śląska oraz poprawa konkurencyjności regionu przy respektowaniu zasad zrównoważonego rozwoju. Realizacja tego celu miała zostać osiągnięta poprzez realizację celów przypisanych do poszczególnych priorytetów. Celem realizacji priorytetu IV Środowisko i bezpieczeństwo ekologiczne była poprawa stanu środowiska naturalnego, zapobieganie jego degradacji i zachowanie różnorodności biologicznej oraz walorów przyrodniczych Dolnego Śląska, a także poprawa poziomu bezpieczeństwa w regionie, poprzez przeciwdziałanie naturalnym i technologicznym zagrożeniom, likwidację ich skutków oraz wspieranie działań w tym zakresie służb ratowniczych. Celem opracowania będzie pokazanie jak realizacja projektów dofinansowanych w ramach priorytetu IV przyczyniła się do poprawy stanu środowiska oraz infrastruktury służącej ochronie środowiska. W tym celu porównane zostaną efekty zrealizowanych projektów z danymi statystycznymi dotyczącymi stanu środowiska i infrastruktury środowiskowej na terenie województwa. Analiza przeprowadzona zostanie w poszczególnych komponentach środowiska, które odpowiadają zakresowi tematycznemu poszczególnych działań realizowanych w ramach priorytetu IV. Analiza prowadzona będzie zatem w obszarze: gospodarki odpadami, gospodarki wodno-ściekowej, jakości powietrza, infrastruktury przeciwpowodziowej, rekultywacji terenów zdegradowanych, ochrony środowiska przed zagrożeniami naturalnymi i technologicznymi oraz ochrony bioróżnorodności.

Słowa kluczowe: Regionalny Program Operacyjny, środowisko, województwo dolnośląskie

