



POLISH ACADEMY OF SCIENCES
Systems Research Institute

**APPLICATIONS OF INFORMATICS
IN ENVIRONMENT ENGINEERING
AND MEDICINE**

Editors:

Jan Studzinski
Ludostaw Drelichowski
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This book consist of the papers describing the applications of informatics in environment and health engineering and protection. Problems presented in the papers concern quality management of the surface waters and the atmosphere, application of the mathematical modeling in environmental engineering, and development of computer systems in health and environmental protection. In several papers results of the research projects financed by the Polish Ministry of Science and Information Society Technologies are presented.

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CHAPTER 3

Informatics and Economy in Environment and Health Protection



ANALYSIS OF ACTIVITY OF THE PROVINCIAL FUND FOR ENVIRONMENTAL PROTECTION AND WATER MANAGEMENT IN TORUN OVER 2000-2004 IN THE KUJAWY AND POMORZE PROVINCE

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The present papers covers results of the analysis of financial assistance for the environment and water management improvement provided by the Provincial Fund for Environmental Protection and Water Management in Torun in 2000-2005. Indices for measuring dynamics of absolute and relative value increase as well as indices of individual and aggregate dynamics were used in the study. In order to express the dynamics of changes, the mean-period rate of changes analysis was applied. The Fund resources are allocated towards financing environmental protection and water management to follow sustainable development principles, especially tasks connected with ecological education, water management, and protection of the atmosphere and water pollution control as well as the protection of the earth surface. It has been assumed that the financial assistance will be decreasing over the next three years.

Keywords: Environmental Protection, Grants, Water Management, Annual Average Rate of Change.

1. Introduction

The European Union gives a priority to issues concerned with the protection of the environment in the European Union and so the regulations concerning environmental protection are factored in throughout the EU policies, program documents as well as in the Draft Treaty establishing a Constitution for Europe. In Section 5 'Environment' (Art. III – 129) clauses 1 –2 provide for:

1. Union policy on the environment shall contribute to pursuit of the following objectives:

- (a) preserving, protecting and improving the quality of the environment;
- (b) protecting human health;
- (c) prudent and rational utilization of natural resources;
- (d) promoting measures at international level to deal with regional or worldwide environmental problems.

2. Union policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Union.

Operating in the structures of the European Union, Poland must follow the harmonization with strict environmental protection rules which are given priority in the EU policy. It is a great financial challenge for the country as only some inputs come from the aid funds of the European Union. Financing environmental protection enterprises is a relatively new yet dynamically developing area of activity. Here ecological funds play a special role, operating as earmarked funds. These are institutions which serve financing a clearly-defined group of objectives from public finance. Their revenues include, e.g. pollution charges paid by economic entities and pollution fines levied for excessive discharge of pollutants. They co-finance, in a form of grants and preferential loans, enterprises connected with the enhancement of the condition of the natural environment. Besides they support the implementation of principles of a sustainable development of the country allowing the implementation of modern technologies eliminating or inhibiting the pollution of the natural environment.

2. Aim, method and scope of research

The aim of the present paper was to carry out the analysis of area tasks executed by the Provincial Fund for Environmental Protection and Water Management PFEP & WM in Torun over 2000 – 2004. The data were obtained from reports drawn up by the Provincial Fund for Environmental Protection and Water Management. By 1998 49 provincial funds (Swiderska, 2001) were operating in Poland. After an administrative reform, as of January 1, 1999 provincial funds were liquidated in those provinces which ceased to exist (Stefanski, 2004). Pursuant to Act of October 13, 1998, the tasks and funds of the liquidated funds were transferred to the other 16 provincial funds whose seats were located in cities being seats of the authorities of provincial local governments (Act of October 13, 1998). In the Kujawy and Pomorze Province there operates the Provincial Fund for Environmental Protection and Water Management in Toruń, established from three provincial funds: Bydgoszcz, Torun and Wloclawek Funds.

The present paper uses the meters of dynamics of phenomena, which includes statistical indices: absolute and relative value increases, and dynamics indices: individual and aggregate (Sobczyk, 2000). If we use the previous period as a moment of reference, then the increases (and indices) are referred to as chain indices, and in case of a fixed base – fixed base indices. The increases show a difference in the value of the feature researched, while the indices are obtained by dividing the volume of the phenomenon researched over the period researched to the base period. The chain index defines the ratio of the amount of the grant in a given year to the amount in the previous year. The index value over 100% shows an increase in the amount of grant. In order to express the dynamics of changes also annual average rate of changes was used, namely the geometric mean of chain indices.

3. Sources of financing environmental protection – earmarked funds

The finances to be allocated towards environmental protection come from various sources and assume different forms. There exist public funds from the state, city and communal budgets. The same group includes non-budgetary public institutions. Public sources are still an essential part of the financial market of the environmental protection and are used to support the implementation of the ecological policy of the state and regional and local programs of environmental protection. As part of the Polish system of financing environmental protection, the following financial institutions can be referred to: Ecological Earmarked Funds, Foundations, Banks, leasing institutions, Investment Funds and foreign funds. The funds are the most known source of grants and preferential loans for entities taking up activities for environmental protection.

In Poland there operate three main ecological earmarked funds: the Fund for Environmental Protection and Water Management, which consists of the funds of four levels: the National Fund for Environmental Protection and Water Management, 16 Provincial Funds for Environmental Protection and Water Management PFEP & WM, 373 Poviats Funds for Environmental Protection and Water Management, 2,489 Communal Funds for Environmental Protection and Water Management. Besides there also exist the Fund for Farmland Protection and Forest Fund. It is the National Fund for Environmental Protection and Water Management which is the most important ecological fund, independently managing public finance allocated towards environmental protection and water management. The other Funds support the implementation of the ecological policy of the state based on public tasks, both provincial and local.

4. Analysis of the operation of PFEP & WM in Torun

Provincial Funds for the Environmental Protection and Water Management have become legal persons pursuant to Act of April 3, 1993. Their activities are compliant with the country's program of municipal wastes management and the plan of wastes management, tasks defined in the program of the development of the Kujawy and Pomorze Province by 2010, environmental protection program, the Kujawy and Pomorze Province wastes management and the strategy of the Kujawy and Pomorze Province development (Report on the activity, 2004). The area priorities of PFEP & WM include: control of water pollution and water management, air protection, conservation of nature and landscape, ecological education, monitoring, extraordinary threats to the environment, atmosphere protection, and protection of the earth surface. The Provincial Fund, while selecting the enterprises, follows the criterion of the ecological, economic and technical effectiveness as well as the criterion of formal and territory requirements.

PFEP & WM in Torun grants loans and provides grants following the directions of ecological policy of the state and the principle of sustainable

development. Over the years analyzed over 2000-2004 there was submitted a total of 4.166 applications for co-financing investments concerning the environmental protection at a total amount of PLN 1.070.284 thousand, out of which: 2.874 applications for co-financing in a form of grants at a total amount of PLN 357,899 thousand and 1.292 applications for co-financing, in a form of loans, at the amount PLN 712,385 thousand. Over the research period one can observe a decrease in the number of applications submitted from 1.161 in 2000 to 707 in 2004. Also the number of contracts entered into has decreased from 472 in 2000 to 287 in 2004 (Fig. 1).

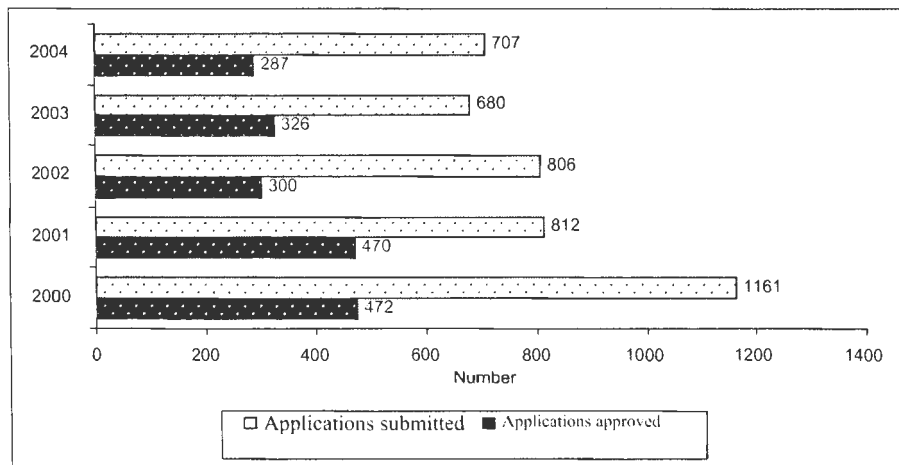


Figure 1. Comparative analysis between the number of applications submitted and the number of applications approved over 2000-2004

Source: Own elaboration based on data from financial reports of PFEP & WM in Toruń over 2000 – 2004.

The comparative analysis shows that the greatest number of applications has been filed which pertained to water pollution control – 942; ecological education – 939; atmosphere protection – 793, conservation of nature – 714. (Fig. 2).

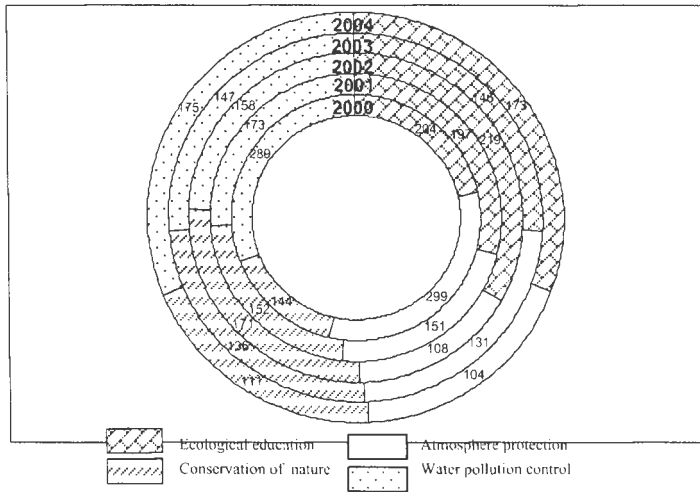


Figure 2. Applications submitted representing dominant categories of activities over 2000-2004

Source: Own elaboration based on financial reports from the activity of PFEP & WM in Toruń over 2000–2004.

The greatest number of applications approved over 2000-2004 concerned the co-financing of water pollution control tasks – 343; ecological education – 389; atmosphere protection – 358 and conservation of nature – 351 (Fig. 3).

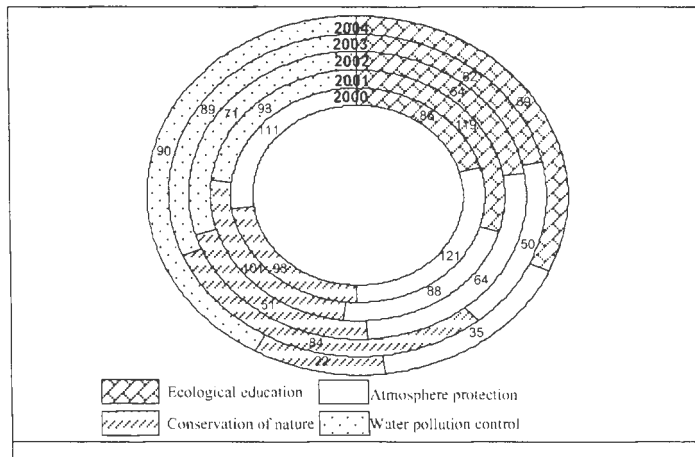


Figure 3. Approved applications of dominant categories of activities over 2000-2004

Source: Own elaboration based on financial reports from the activity of PFEP & WM in Toruń over 2000–2004.

Most finance was allocated to water pollution control – PLN 221.667 thousand; atmosphere protection – PLN 63.838 thousand and protection of the surface of the earth – PLN 48.730 thousand.

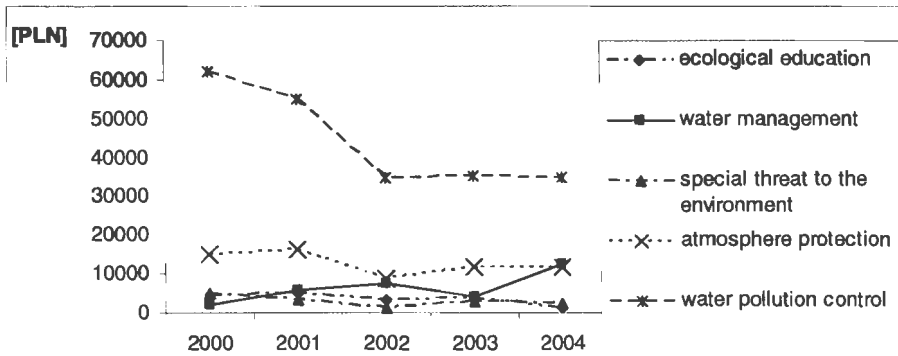


Figure 4. Expenditure [thousand PLN] factoring in dominant categories of activities over 2000-2004

Source: Own elaboration based on financial reports from the activity of PFEP & WM in Torun over 2000–2004.

The Provincial Fund for Environmental Protection and Water Management in Torun addresses the financial assistance to local government units, budget entities, business entities and other units, namely funds, clubs, associations. These institutions are obliged to provide a confirmation that an ecological effect has been achieved, issued by the Provincial Inspectorate of Environmental Protection. According to the management staff of PFEP & WM, the number of entities in arrears with pollution charges and pollution fines levied for excessive discharge of pollutants is increasing. Local government units frequently address the Fund for assistance with filling in the applications. The revenues of PFEP & WM in Torun over 2000-2004 amounted to PLN 509,365 thousand; in 2000 – PLN 111.224 thousand, in 2001 – PLN 96.478 thousand, in 2002 – PLN 82.018 thousand, in 2003 – PLN 104.293 thousand, and in 2004 – PLN 115.352 thousand, respectively. The greatest share in the total revenues was attributed to pollution charge which over the period studied amounted to PLN 188,176 thousand, which accounts for 36.9% of the total revenues. The allocation of the assistance provided over 2000-2004 according to beneficiaries is given in Table 1. It is seen that the greatest financial assistance was given to local government units.

Table 1. Funds used by beneficiaries over 2000-2004 [thousand, PLN]

| Beneficiaries | 2000 | | 2001 | | 2002 | | 2003 | | 2004 | |
|------------------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | PLN | % | PLN | % | PLN | % | PLN | % | PLN | % |
| Local government units | 66.981 | 63,17 | 67.670 | 70,93 | 51.765 | 72,09 | 38.845 | 51,10 | 44.271 | 62,41 |
| Budget entities | 17.003 | 16,04 | 11.460 | 12,01 | 12.443 | 17,33 | 10.522 | 13,84 | 8.364 | 11,79 |
| Business entities | 7.444 | 7,02 | 10.978 | 11,51 | 5.791 | 8,06 | 15.999 | 21,05 | 16.670 | 23,50 |
| Other | 14.605 | 13,77 | 5.301 | 5,56 | 1.807 | 2,52 | 10.651 | 14,01 | 1.628 | 2,30 |
| Total | 106.033 | 100,00 | 95.410 | 100,00 | 71.806 | 100,00 | 76.017 | 100,00 | 70.933 | 100,00 |

Source: Own elaboration based on reports by PFEP & WM in Torun

The analysis of absolute fixed base and chain increases shows that in general in 2000 local government units were provided with PLN 66,981 thousand to co-finance environmental protection tasks. In 2001 there was observed an increase in the financial assistance provided by PLN 689 thousand, namely by 1%, while in successive years of the analysis there was noted a decrease in co-financing provided, except for 2004 in which there was recorded an increase, as compared with the respective amount in 2003, by PLN 5.426 thousand, namely 14 % (Table 2).

Table 2. Absolute increases and indices calculated for local government units

| Year | Grant-in-aid in total [thousand, PLN] | Absolute increases | | indices | |
|------|---------------------------------------|-------------------------|---------|-------------------------|-------|
| | | Fixed base (2000 = 100) | chain | Fixed base (2000 = 100) | chain |
| 2000 | 66.981 | 0 | 0 | 100.0 | 0 |
| 2001 | 67.670 | 689 | 689 | 101.0 | 101.0 |
| 2002 | 51.765 | -15.216 | -15.905 | 77.3 | 76.5 |
| 2003 | 38.845 | -28.136 | -12.920 | 58.0 | 75.0 |
| 2004 | 44.271 | -22.710 | 5.426 | 66.1 | 114.0 |

Source: Own elaboration based on PFEP & WM reports

Table 3 presents an average rate of changes in the financial assistance provided for local government units over 2000-2004. The results obtained show that from 2000 to 2004 the financial assistance for local government units allocated towards environmental protection tasks has decreased. The greatest decrease is observed in conservation of nature by an average of 58% and ecological education - by an average of 47%. However, in general, the financial assistance for local government units over the period analyzed decreased by an average of 9% each year.

Table 4 presents a 2007 financial assistance forecast for local government units. The forecast period covers 3 years.

In general the forecasted financial assistance for 2007 for local government units will be lower than in 2004. One can conclude, therefore, that a general value of financial assistance provided by PFEP & WM in Torun will be decreasing in successive years.

Table 3. Annual average rate of changes of financial assistance provided for local government units over 2000-2004 in all the categories of activities

| Ecological education | Water management | monitoring | Serious breakdowns | Atmosphere protection | Conservation of nature | Water pollution control | Protection of the surface of the earth | other | total |
|----------------------|------------------|------------|--------------------|-----------------------|------------------------|-------------------------|----------------------------------------|-------|-------|
| -0.47 | - | - | - | -0.16 | -0.58 | -0.30 | -0.29 | -0.19 | -0.09 |

Source: Own elaboration based on reports by PFEP & WM in Torun

Table 4. Financial assistance forecast for 3 years (2007) in thousand (PLN)

| Ecological education | Water management | monitoring | Serious breakdowns | Atmosphere protection | Conservation of nature | Water pollution control | Protection of the surface of the earth | other | total |
|----------------------|------------------|------------|--------------------|-----------------------|------------------------|-------------------------|----------------------------------------|-------|---------|
| 14.7 | - | - | - | 1777.8 | 2.5 | 9722.0 | 746.1 | 133.0 | 32440.0 |

Source: Own elaboration based on reports by PFEP & WM in Torun

5. Conclusions

WFOAS i GW follows one of the strategic priorities of the regional development activity, namely a protection and enhancement of the natural environment. Here the Fund becomes an important partner for local governments, budget entities, companies and other entities executing environmental protection and water management enterprises. The funds are allocated to financing environmental protection and water management to follow the principle of sustainable development, mainly the tasks of ecological education, water management, atmosphere and water pollution control as well as the protection of the surface of the earth. The funds allocated towards grants and loans are decreasing due to outstanding pollution charges and pollution fines levied for excessive discharge of pollutants. It is forecasted that the amount of financial assistance for local government units over three years will be decreasing.

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