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## IMPLEMENTATION OF PRINCIPLES UNDERLYING POLISH SUSTAINABLE DEVELOPMENT STRATEGY WITHIN HEALTH PROTECTION IN COMPARISON WITH SELECTED EU MEMBERS

#### 1. INTRODUCTION

Beside economic and social problems, an important issue in the modern world is finding correct relations between human health and the condition of the natural environment.

Outcomes of many worldwide epidemiological surveys indicate that the quality of environment in which humans spend their lifetime is one factor that determines their health. As a result, one of the European Commission's priorities is implementation of the sustainable development principles under "Environment and Health", as an element of the European integration process. (Kalinowska 2000).

The concept of sustainable development was first formulated at the turn of 1960s and 1970s in the second report of the Club of Rome "Mankind at the Turning Point" (Mesarovic, Pestel 1978, p. 12). It was proposed to put into effect theory of limited growth, which growth would take into account the need to offset economic and social inequalities between countries and comply with the environment preservation principles.

The "sustainable development" concept was introduced in 1972 at a UN conference in Stockholm and approved in the Stockholm Declaration. In the course of international discussions, the notion of a society implementing the concept of sustainable development was then defined (Machowski 2003, p. 101). According to the definition, the society:

· recognizes the superiority of environmental requirements,

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• can self-direct its development in order to maintain homosynthesis and symbiosis with nature,

- · respects economy of production and consumption,
- · respects recycling of waste,
- · considers future consequences of today's actions,
- takes into account the needs and health issue of future generations.

In the following years, the definition was repeatedly redeveloped and extended in many international documents.

As a result of worldwide discussions and activities, sustainable development was recognized as an economic and social development policy and strategy harmless for the environment and public health.

The environmental protection policy addressing the health protection issues requires orchestrated actions that have to be supported by funds, material resources and relevant laws.

This paper focuses on health protection and improvement of the quality of life in Poland and selected EU member states in view of the implemented sustainable development principles.

The comparative analysis is based upon pertinent statistical data derived from publications released by the GUS (Central Statistical Office), OECD and Eurostat. The ultimate result of the analytical work is assessment of Poland's position  $vis-\dot{a}-vis$  other member states and identification of the distance between Poland and the EU with respect to public health.

#### 2. SPECIFICITY OF HEALTH PROTECTION AND THE GOALS OF ECODEVELOPMENT

The interest in health issues exploded in the second half of the  $19^{\text{th}}$  c. and the next century made health one of the central problems of modern societies (Kemm, Close 1995, pp. 14–15). Beside the preservation and improvement of the environment's quality, protection of human health has become today one of the three main goals laid down in the Treaty of Rome (amended in 1978) and pursued by the European Community (Jarosińska 2000).

Since the EU establishment, its environmental policy has respected various aspects of human health. For instance, a great deal of attention has been paid to this issue by the European Environmental Agency (EEA) and the World Health Organization (WHO) that indicated the complexity of relationships between the environment and health.

The European Commission developed an integrated approach to the intricate environmental health problems and announced it in the European Strategy "Environment and Health". The main goals of the strategy are following:

#### Implementation of Principles Underlying Polish

• reducing morbidity induced by environmental factors in the member states,

• identification and prevention of new health hazards caused by environmental factors.

The Polish document addressing the sustainable development and health protection principles is "Poland 2025 – the Long-Term Strategy for Sustainable Development" (www.mos.gov.pl). The strategy was approved for execution by the Council of Ministers on 26 July 2000.

Its directions take into account valid international obligations to the year 2025. Some of them affect Poland's nationwide and regional policies dealing with health and environmental protection. In addition, Poland's policy of national development is expected to allow for economic, environmental and social aspects.

This long-term strategy assumes a direct application of Principle 1 laid down in the Declaration of Rio de Janeiro.<sup>1</sup>

The Principle states that "human beings are entitled to a healthy and productive life in harmony with nature" and that they are "at the centre of concerns for sustainable development".

In the Polish circumstances, sustainable development has its social dimension, which encompasses "guaranteed protection against negative effects on health and life and mainly against the toxic effects of pollutions produced by economic activities, noise and vibration, ionizing and non-ionizing radiation, against the impacts of genetically modified organisms". The guarantees of active health protection should be implemented through:

- appropriate conditions of medical treatment,

- preventive measures,
- counteracting social diseases.

For social guarantees to be realized, the State must help create the potential for action and support particular projects. The relevant tools in this area are integrated policies and sectoral programs. Special importance is ascribed to appropriately formed policies targeting the social, financial and fiscal areas, health care, education, labor and pay, as well as the development of science and technology.

Because the guarantees require favourable economic conditions to be implemented, the Strategy 2025 has a built-in economic dimension to ensure:

- safety,
- hygiene and protection of health,
- environmental protection in the workplace.

<sup>&</sup>lt;sup>1</sup> Sustainable development principles laid down in the Declaration on Environment and Development at the Earth Summit in Rio de Janeiro, June 1992.

Implementation of the guarantees is secured by relevant sections in public finance, as well as social security and health institutions.

The environmental dimension of the Strategy assures that every national or regional land use program should include measures protecting environment, health, cultural assets, biodiversity and monuments of nature. As before, the guarantors are public administration, public finance, social security and health sectors, local governments and agencies dealing with European integration.

From the above it follows that the long-term<sup>2</sup> goals of the Strategy require an integrated approach to the environmental health problems, as well as joint (scaled) efforts to protect human health that pay special attention to the most vulnerable social groups as recommended by the sustainable development principles.

The general short-term goals<sup>3</sup> are expected, *inter alia*, to reduce the negative effects of so-called "hot spots" (that include some of the most heavily industrialized areas and urbanized areas) on health and environment.

The above suggests that the paramount strategic goals include improving population's health status and the related quality of life by modifying human lifestyles, forming health-friendly environment and compensating for health inequalities.

For the goals to be realised the pertinent ministries have to cooperate, proportionally to their competencies and scopes of responsibility. Health hazards induced by environmental factors and represented by the resulting morbidity and death cases are only exceptionally subject to routine registration. As a consequence, international statistics providing an overall picture that allows making comparisons in time and space cannot be overrated.

## 3. INDICATORS, TENDENCIES AND EFFECTS OF IMPLEMENTING SUSTAINABLE DEVELOPMENT PRINCIPLES IN HEALTH PROTECTION IN POLAND AND THE EU MEMBER STATES: A TIME-SPATIAL ANALYSIS

In order to assess the degree of implementation of the sustainable development principles in the health protection area, the health status of the Polish society was compared with data on 21 member states. The investigation used statistical data made available on the EUROSTAT web site and in statistical

<sup>&</sup>lt;sup>2</sup> Strategic and long-term goals were formulated in the Report summarizing the sustainable development decade in Poland: Agenda 2.1 in Poland 1992–2002 – 10 Years After Rio, Warsaw, July 2002.

<sup>&</sup>lt;sup>3</sup> The short-term goals of the Polish strategy were formulated in the following documents: II Environmental Policy of the State for the Years 2000–2003, and III Environmental Policy of the State for the Years 2003–2006.

yearbooks covering the period 1990–2003. For the purpose of this paper, the following integral health status indicators were applied: 1) life expectancy – measured by the years of males and females' anticipated lifespan at birth, 2) infant deaths per 1,000 of liveborns, 3) incidents of tuberculosis per 100,000 of residents, and 4) early mortality. This information was used to build aggregated measures of development.

In the first stage of the analysis, measures of development were sought by applying the model development method to the 21 countries in years 1990–2003, for which complete sets of statistical and comparable data were available.

The use of the life expectancy variable and its significance for the analysis certainly calls for some clarification. Namely, the length of human life is the function of person's overall living conditions, i.e. work done, diet, housing, the quality of the natural and social environments. The variable's value changing in time indicates that a person's standard of living is either rising or dropping.



Graph 1. Males' life expectancy in Poland and the EU, in years

Source: Based on statistical data available on the EUROSTAT website.



Graph 2. Females' life expectancy in Poland and the EU, in years

Source: Based on statistical data available on the EUROSTAT website.

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Values of males and females' life expectancy in Poland and the EU illustrated in Graphs 1 and 2 show that it improved between 1990 and 2003. The distance between males and females in Poland and in the member states is slowly, but systematically decreasing, which suggests that the living conditions and the quality of life of the populations are catching up.

Another measure frequently used in international comparisons is the number of infant deaths per 1,000 of births. This measure is classified as a negative health status indicator. Data represented in Graph 3 indicate a distinct downward trend, similar to that in the member states.



Source: Based on statistical data available on the EUROSTAT website.

Despite some positive changes, the 2003 value of the indicator for Poland is almost 1.5 times as high as in the Community.

The rate of tuberculosis (TB) cases can be another measure instrumental in assessing the health status of a population. It represents the number of new TB incidents per 100,000 of population recorded in a certain period of time.

In the analysed period of 13 years, until the year 2002, the number of new TB cases was slowly declining (Graph 4), both in Poland and across the EU.

In Poland, the number of TB cases has been dropping for years, but this does not necessarily evidence considerable effectiveness of the prohealth measures. Reorganization of the healthcare system after 1999 and economic transition that abolished the general and obligatory lung examinations may make the number of new TB cases resurge (after 2002). The same worrying situation can be observed in the member states. In 2003, the states returned to a similar rate they had at the beginning of the analysed period, i.e. in 1990. Those unfavourable developments may also suggest an unsatisfactory implementation of the sustainable development principles addressing the protection of health and natural environment.



Graph 4. TB morbidity in Poland and the EU years 1990-2003

Despite the downward trends revealed by the summary measures of the Polish population's health status and considerable improvements in the natural environment in the years 1990–2003, the adversary effects of health-impairing factors are still substantial and it is beyond the question that resources offered by the natural environment must be managed rationally.

Because of that, specialists in various fields are taking joint efforts to define indicators (standards) instrumental in identifying the degree to which the sustainable development principles have been implemented.

The comparative analysis of the health status of populations in Poland and the member states presented in this study provides a starting point for investigating the implementation of the sustainable development principles in the health protection sphere. One tool such an investigation can apply is taxonomic methods that allow to construct measures of development and Euclidean distances between the development model and antimodel (Grabiński, Wydymus, Zeliaś 1989, p. 105).

Prior to seeking the measures of development, all variables were organized so that all examined attributes of all analysed objects in a given period could be taken into account. Then variables in each year underwent the normalization process. Owing to this approach, variables are absolute numbers and subject to standardized normal distribution, which makes it much easier to interpret the results. To define the development model and antimodel, the diagnostic variables were divided into stimulants (i.e. high values permit classifying a given object, here investigated phenomenon, as superior, i.e. life expectancy) and destimulants (high values justify classifying an object as being inferior i.e. number of infant deaths per 1,000 of liveborns, TB cases per 100,000 of population, early deaths).

S o u r c e: Based on statistical data available on the EUROSTAT website.

Country	1990	Country	1991	Country	1992	Country	1993	Country	1994	Country	1995	Country	1996	Country	1997	Country	1998	Country	1999	Country	2000	Country	2001	Country	2002	Country	2003
Р	1.64	Den.	1.62	Den.	1.62	Den.	1.59	Den.	1.30	Den.	1.39	Den	1.49	Den.	1.58	Den.	1.32	Den.	1.36	Den.	1.32	Den	1.10	Den.	1.41	S	3.09
Ger.	2.02	Р	1.96	Р	1.96	Р	2.02	Р	1.88	Р	2.01	Р	2.24	Р	2.21	P	2.16	Ire.	2.23	S	2.05	Ire.	1.69	S	2.15	Slv.	3.22
Neth.	2.18	It.	2.1	It.	2.10	S	2.36	It.	2.01	It.	2.10	S	2.41	S	2.35	S	2.17	S	2.26	Slv.	2.17	Slv.	1.79	Slv.	2.20	N	3.38
Fr.	2.53	Ire.	2.47	Ire.	2.47	It.	2.36	S	2.16	S	2.15	Slv.	2.55	Ire.	2.43	Ire.	2.18	Р	2.28	Ire.	2.26	Ger.	1.93	Ire.	2.35	SI.	3.46
S	2.53	S	2.51	S	2.51	Ire.	2.49	Ire.	2.23	Ire.	2.24	It.	2.63	It.	2.48	Slv.	2.26	Slv.	2.35	Р	2.41	Lux.	1.94	Р	2.51	Ire.	3.54
It.	2.60	Slv.	2.56	Slv.	2.56	Slv.	2.56	Swe.	2.31	Swe.	2.30	Ire.	2.63	Slv.	2.51	Wł	2.48	Ger.	2.47	Ger.	2.69	S	1.94	Lux.	2.58	It.	3.59
Belg.	2.65	Hung.	2.57	Hung.	2.57	Swe.	2.64	Sl.	2.34	SI.	2.56	Hung.	2.76	Belg.	2.68	Ger.	2.53	SL	2.64	Lux.	2.71	Hung.	2.18	Hung.	2.68	Den.	3.63
Lux.	2.67	Swe.	2.59	Swe.	2.59	Hung.	2.69	Belg.	2.35	Belg.	2.57	Belg.	2.81	Ger.	2.79	S1.	2.58	Belg.	2.71	SL.	2.75	P	2.18	Ger.	2.69	Swe.	3.73
UK	2.72	SI.	2.88	SI.	2.88	SI.	2.71	Hung.	2.45	Hung.	2.59	Swe.	2.84	Hung.	2.86	Hung.	2.62	Hung.	2.72	Hung.	2.75	SI.	2.56	SI.	2.70	Р	3.80
Den.	3.02	Ger.	2.94	Ger.	2.94	Belg.	2.79	Lux.	2.49	Lux.	2.59	Ger.	2.85	Swe.	2.92	Belg.	2.72	Lux.	2.73	Belg.	2.90	Swe.	2.77	Swe.	2.93	Lux.	3.94
Aus.	3.03	Belg.	3.04	Belg.	3.04	Ger.	2.79	Slv.	2.52	Slv.	2.61	Lux.	2.93	Lux.	2.96	Swe.	2.76	It.	2.86	It.	2.99	It.	2.87	lt.	3.06	Neth.	3.98
Ire.	3.31	Aus.	3.17	Cz.	3.17	Lux.	2.84	Ger.	2.57	Ger.	2.63	SI.	2.98	SL.	2.97	Lux.	2.77	Swe.	3.06	Swe.	3.02	Fin.	3.06	Belg.	3.49	Fin.	3.98
Fin.	3.33	Cz.	3.17	Aus.	3.17	Aus.	3.06	Aus.	2.75	Aus.	3.11	Aus.	3.43	Cz.	3.39	Cz.	3.49	Cz.	3.64	Cz.	3.86	Aus.	3.10	Cz.	3.64	Belg.	4.03
Gr.	3.37	Lux.	3.18	Lux.	3.18	Cz.	3.36	Cz.	3.12	Cz.	3.18	Cz.	3.47	Aus.	3.50	Aus.	3.49	Aus.	3.79	Aus.	3.88	Lith	3.41	Aus.	3.65	Pol	5.06
Slv.	4.65	Fin.	4.5	Fin.	4.50	Fin.	4.44	Fin.	3.98	Fin.	3.97	Fin.	4.23	Fin.	4.33	Lith.	4.02	Fin.	3.85	Lith	4.12	Neth.	3.79	Fin.	3.84	Aus.	5.23
Cz.	5.59	Lith	5.22	Lith.	5.22	Lith.	4.63	Lith.	4.26	Lith.	4.36	Lith	4.45	Lith.	4.61	Neth.	4.35	Lith.	4.08	Neth.	4.13	Cz.	3.87	Neth.	3.94	Lith	5.24
Swe.	5.86	Neth.	5.74	Neth.	5.74	Neth.	5.17	Neth.	4.80	Neth.	4.65	Neth.	4.82	Neth.	4.63	Fin.	4.65	Neth.	4.50	Fin.	4.17	Fr.	5.47	Lith	4.04	Cz.	5.46
SL.	6.27	Fr.	6.35	Fr.	6.35	Fr.	5.53	Fr.	5.42	Fr.	5.53	Fr.	6.01	Fr.	6.15	Fr.	6.18	Fr.	5.96	Pol.	6.31	Belg.	5.59	Fr.	5.72	Hung.	5.54
Lith.	7.31	UK	7.78	UK	7.78	Pol.	7.38	UK	6.89	UK	6.81	Pol	7.22	Pol.	6.78	Pol	6.38	Pol.	6.88	Fr.	6.34	PoL	5.60	Pol	6.12	Fr.	6.02
Hung.	7.77	Pol.	7.83	Pol.	7.83	UK	7.46	Pol.	7.14	Pol.	6.81	UK	7.42	UK	7.52	UK	7.31	UK	7.54	UK	7.83	UK	6.27	UK	7.16	UK	6.87
Pol.	7.99	Gr.	7.91	Gr.	7.91	Gr.	9.21	Gr.	9.48	Gr.	9.96	Gr.	9.60	Gr.	9.82	Gr.	9.91	Gr.	9.71	Gr.	9.61	Gr.	8.88	Gr.	10.39	Gr.	7.67

Table 1. Measure of the Euclidean distance between objects and the development model (years 1990-2003)

List of abbreviations: Swe. – Sweden. Den. – Denmark. Lux. – Luxembourg. Fr. – France. Fin. – Finland. Neth. – the Netherlands. Ger. – Germany. It. – Italy. UK – the United Kingdom. Belg. – Belgium. Gr. – Greece. S. – Spain. Aus. – Austria. Ire. – Ireland. Sl. – Slovenia. Cz. – Czech Republic. P – Portugal. Pol – Poland. Slv. – Slovakia. Lith. – Lithuania. Hung. – Hungary.

Source: Calculated by the authors using Microsoft Excel spreadsheet.

Values of relevant measures enabled identification of distances between the development model (the best object) and a given object. The shorter the distance between a country and the model, the higher value of the examined phenomenon. Table 5 presents measures of the Euclidean distance between objects and the development model. The values are arranged starting with countries that are closer to the model regarding the level of the examined phenomenon in each year.

Analyzing the distance between Poland and the model of development, we need to note the positive downward trend showed by the integral health indicators. In 1999, the Euclidean distance between Poland and the model of development measured 7.99, but in 2003, its value went down to 5.06.

Despite this, data in Graph 6 reveal slight stability of the Euclidean distance between the development model and antimodel to the year 2000.





Source: Own calculations.

However, in years 2001–2002 the distance lengthened, which may suggest a deteriorating general health status of the population. It shrank again in 2003, indicating positive effects of the prohealth and environmental policies pursued in the country.

Information about the Euclidean distance between a given object and the model and about the distance between the development model and antimodel allowed to construct a summary development measure that made it possible to present an object by means of many attributes. Because the aggregated development measures for each analyzed object are produced using the same design, they are directly comparable and allow to classify objects into homogenous groups.

Country	1990	Country	1991	Country	1992	Country	1993	Country	1994	Country	1995	Country	1996	Country	1997	Country	1998	Country	1999	Country	2000	Country	2001	Country	2002	Country	2003
Port.	0.83	Den.	0.82	Den.	0.82	Den.	0.84	Den.	0.87	Den.	0.86	Den.	0.85	Den.	0.84	Den.	0.87	Den.	0.86	Den.	0.86	Den.	0.89	Den.	0.87	S	0.67
Ger.	0.79	Port.	0.78	Port.	0.79	Port.	0.79	Port.	0.81	Port.	0.80	Port.	0.77	Port.	0.78	Port.	0.78	Ire.	0.77	S	0.79	Ire.	0.83	S	0.79	SI.	0.65
Neth.	0.77	It.	0.77	It.	0.77	S	0.76	It.	0.79	It.	0.79	S	0.75	S	0.76	S	0.78	S	0.77	SI.	0.78	SI.	0.82	SI.	0.79	Ger.	0.63
FR	0.73	Ire.	0.73	Ire.	0.73	It.	0.75	S	0.78	S	0.78	SI.	0.74	Ire.	0.75	Ire.	0.78	Port.	0.77	Ire.	0.77	Ger.	0.81	Ire.	0.78	Slv.	0.63
S	0.73	S	0.72	S	0.73	Ire.	0.74	Ire.	0.77	Ire.	0.78	It.	0.73	It.	0.75	SL	0.77	SL	0.76	Port.	0.75	Lux.	0.81	Port.	0.76	Ire.	0.62
It.	0.72	S1.	0.72	SL	0.72	SL	0.73	Swe.	0.76	Swe.	0.77	Ire.	0.73	SL.	0.75	Wł	0.75	Ger.	0.75	Ger.	0.72	S	0.81	Lux.	0.75	It.	0.61
Belg.	0.72	Hung.	0.72	Hung.	0.72	Swe.	0.73	Slv.	0.76	Slv.	0.74	Hung.	0.72	Belg.	0.73	Ger.	0.74	Slv.	0.73	Lux.	0.72	Hung.	0.79	Hung.	0.74	Den.	0.61
Lux.	0.72	Swe.	0.72	Swe.	0.72	Hung.	0.72	Belg.	0.76	Belg.	0.74	Belg.	0.71	Ger.	0.72	Slv.	0.74	Belg.	0.72	Slv.	0.72	Port.	0.79	Ger.	0.74	Swe.	0.60
Den.	0.68	Slv.	0.68	Slv.	0.69	Slv.	0.72	Hung.	0.75	Hung.	0.74	Swe.	0.71	Hung.	0.71	Hung.	0.74	Hung.	0.72	Hung.	0.72	Slv.	0.75	Slv.	0.74	Port.	0.59
Aus.	0.68	Ger.	0.68	Ger.	0.68	Belg.	0.71	Lux.	0.74	Lux.	0.74	Ger.	0.71	Swe.	0.70	Belg.	0.73	Lux.	0.72	Belg.	0.70	Swe.	0.73	Swe.	0.72	Lux.	0.58
Ire.	0.65	Belg.	0.67	Belg.	0.67	Ger.	0.71	SI.	0.74	SI.	0.74	Lux.	0.70	Lux.	0.70	Swe.	0.72	It.	0.71	It.	0.69	It.	0.72	It.	0.71	Neth,	0.57
Fin.	0.65	Aus.	0.65	Cz.	0.66	Lux.	0.71	Ger.	0.74	Ger.	0.74	Slv.	0.69	Slv.	0.70	Lux.	0.72	Swe.	0.69	Swe.	0.69	Fin.	0.70	Belg.	0.67	Fin.	0.57
Gr.	0.64	Cz.	0.65	Aus.	0.66	Aus.	0.68	Aus.	0.72	Aus.	0.69	Aus.	0.65	Cz.	0.66	Cz.	0.65	Cz.	0.63	Cz.	0.60	Aus.	0.70	Cz.	0.65	Belg.	0.57
SI.	0.51	Lux.	0.65	Lux.	0.66	Cz.	0.65	Cz.	0.68	Cz.	0.68	Cz.	0.65	Aus.	0.64	Aus.	0.65	Aus.	0.61	Aus.	0.60	Lith.	0.67	Aus.	0.65	Pol.	0.45
Cz.	0.41	Fin.	0.50	Fin.	0.51	Fin.	0.54	Fin,	0.59	Fin.	0.60	Fin	0.57	Fin.	0.56	Lith.	0.59	Fin.	0.60	Lith.	0.58	Neth.	0.63	Fin.	0.63	Aus.	0.44
Swe.	0.38	Lith	0.43	Lith.	0.44	Lith.	0.52	Lith.	0.56	Lith.	0.56	Lith.	0.54	Lith.	0.53	Neth.	0.56	Lith.	0.58	Neth.	0.58	Cz.	0.62	Neth.	0.62	Lith	0.44
Slv.	0.34	Neth.	0.37	Neth.	0.38	Neth	0.46	Neth.	0.51	Neth.	0.53	Neth.	0.51	Neth.	0.53	Fin.	0.53	Neth.	0.54	Fin.	0.57	Fr.	0.46	Lith	0.61	Cz.	0.41
UK	0.26	Fr.	0.30	Fr.	0.31	Fr.	0.43	Fr.	0.45	Fr.	0.44	Fr.	0.39	Fr.	0.37	Fr.	0.38	Fr.	0.39	Pol.	0.35	Belg.	0.45	Fr.	0.45	Hung.	0.40
Lith.	0.22	UK	0.14	UK	0.16	Pol	0.24	UK	0.29	UK	0.32	PoL	0.26	Pol.	0.31	Pol.	0.36	Pol.	0.29	Fr.	0.35	Pol.	0.45	Pol.	0.41	Fr.	0.35
Hung.	0.18	Pol.	0.14	PoL	0.15	UK	0.23	Pol.	0.27	Pol	0.32	UK	0.24	UK	0.24	UK	0.26	UK	0.22	UK	0.20	UK	0.38	UK	0.32	UK	0.26
Pol.	0.15	Gr.	0.13	Gr.	0.14	Gr.	0.05	Gr.	0.03	Gr.	0.00	Gr.	0.02	Gr.	0.00	Gr.	0.00	Gr.	0.00	Gr.	0.01	Gr.	0.13	Gr.	0.01	Gr.	0.17

Table 2. Measures of development for Poland and EU member states (years 1990-2003)

Swe. - Sweden. Den. - Denmark. Lux. - Luxembourg. Fr. - France. Fin. - Finland. Neth. - the Netherlands. Ger. - Germany. It. - Italy. UK - the United Kingdom. Belg. - Belgium. Gr. - Greece. S - Spain. Aus. - Austria. Ire. - Ireland. Sl. - Slovenia. Cz. - Czech Republic. Port. - Portugal. Pol. - Poland. Slv. - Slovakia. Lith. - Lithuania. Hung. - Hungary.

Source: Calculated by the authors (for abbreviations see Table 1).

Besides, the development measure takes values in interval (0;1). The higher value of a complex phenomenon, the higher value of the measure. In our case, the more advanced implementation of the sustainable development principles, the higher value of the summary measure.

As for the examined attributes (the health status of population), Denmark and Portugal were the most advanced as regards implementation of sustainable development in the health protection area. As for Denmark, values of the measures ranged from 0.89 (2001) to 0.61 (2003) and in most years of the examined period they were the highest among all the surveyed member states.

On the other hand, Poland, Greece and the UK were the least advanced in implementing the sustainable development principles.

In Poland, the lowest value of the development measure for the examined phenomenon could be observed in 1991 (0.14) and the highest in 2003 - 0.45. This evidences Poland's progress in her endeavours to implement the sustainable development principles and higher effectiveness of actions targeting the natural environment and, indirectly, improving the health status of the population.

The final outcome of the presented taxonomic measures is the ranking of member states implementing sustainable development principles in health protection. From information provided in Table 2 it follows that Poland's position among the European countries was steadily improving.

In 1990, being the first year of the analysis, Poland was ranked the last (21), but in 2003 she was already 18<sup>th</sup> and outdistanced France, the UK and Greece.

The analysis of the empirical material allowed to answer the question, whether the distance dividing Poland and the member states regarding implementation of the sustainable development strategies decreased over the 13 years. The primary application of findings arising from the study should be provision of an environment, in which stimulated development processes present a possibly limited risk for the environment.

The existing analyses show that all the investigated member states implemented the sustainable development principles affecting health protection to a different degree. Appropriate methods help cluster the countries, starting with a one-object cluster, through a cluster containing the most similar countries, and ending with one grouping all the investigated objects. As a result, the similarities and variations between the countries' attributes can be illustrated graphically on a dendrogram.

To group the objects a cluster analysis using the nearest-neighbor method was applied to one chosen year (2003).

Specification	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1	Swe.	Den.												
2	Den.	Slv.	Slv.	Lux.	Belg.	Lux.	Belg.	Belg.	Ire.	Lux.	Lux.	Lux.	Lux.	Cz.
3	Lux.	It.	Belg.	Belg.	Lux.	Ger.	Lux.	Lux.	Port.	Ire.	SI.	Cz.	Cz.	Lux.
4	Fr.	Port.	Ire.	Slv.	Port.	Slv.	Port.	Ire.	Lux.	S	Ire.	S1.	Port.	Hung.
5	Fin.	Ire.	Lux.	Port.	Ire.	Ire.	Slv.	Port.	Belg.	Port.	S	Lith.	Ire.	Lith.
6	Neth.	S	Port.	Ire.	Slv.	Port.	Ire.	It.	S	Ger.	Lith.	Port.	Hung.	Aus.
7	Ger.	Cz.	It.	S	It.	It.	Hung.	Cz.	Slv.	SI.	Port.	S	S	Ire.
8	It.	Swe.	Swe.	It.	Swe.	S	S	Ger.	It.	Slv.	Cz.	Ire.	Lith.	S
9	UK	Lux.	Cz.	Swe.	Cz.	Ger.	Ger.	S	Sl.	Belg.	Hung.	Hung.	SI.	SI.
10	Belg.	Hung.	S	Ger.	Aus.	Swe.	It.	S1.	Hung.	Lith.	Slv.	Belg.	Ger.	Port.
11	Gr.	Ger.	Hung.	Cz.	S	S1.	Cz.	Slv.	Lith.	Hung.	Belg.	SI.	Slv.	Belg.
12	S	SI.	Aus.	Hung.	Hung.	Hung.	Swe.	Hung.	Ger.	Cz.	It.	It.	It.	Slv.
13	Aus.	Aus.	Ger.	Aus.	Ger.	Cz.	S1.	Swe.	Swe.	It.	Ger.	Ger.	Fin.	It.
14	Ire.	Belg.	SI.	S1.	S1.	Fin.	Fin.	Aus.	Cz.	Swe.	Swe.	Fin.	Swe.	Ger.
15	S1.	Fin.	Lith.	Fin.	Fin.	Aus.	Aus.	Lith.	Aus.	Fin.	Aus.	Swe.	Aus.	Fin.
16	Cz.	Lith.	Fin.	Lith.	Lith.	Lith.	Lith.	Fin.	Fin.	Aus.	Fin.	Aus.	Neth.	Swe.
17	Port.	Neth.	Belg.	Neth										
18	Slv.	Fr.	Poland											
19	Lith.	UK	UK	UK	UK	UK	UK	Poland	Poland	Poland	Poland	Poland	Poland	Fr
20	Hung.	Gr.	Poland	Poland	Poland	Poland	Poland	UK						
21	Poland	Poland	Gr.	Gr	Gr	Gr								

Table 3. Poland's rank among EU member states implementing sustainable development principles in health protection

Source: Own calculations. For abbreviations see Table 1.

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### Implementation of Principles Underlying Polish

Graph 6. Dendrogram - similarities in implementing sustainable development principles in health protection in EU member states in 2003

Diagram for 21 countries. Single link. Euclidean distances



Distance of a cluster:

PL - Poland; WB - Great Britain; W - Hungary; N - Germany; AU - Austria; SZ - Sweden: SŁ - Slovakia; WŁ - Italy; P - Portugal; LUX - Luxembourg; IRL - Ireland; H - Spain: B - Belgium; D - Denmark; LI - Lithuania; SŁW - Slovenia; F - Finland; FR - France; CZ - Czech Republic; NDR - the Netherlands; GR - Greece.

Source: Own calculations.

Because the successive clusters include neighboring objects, the latter show very similar levels of development and distances from the development model in the period in question. The first assembled cluster contained Hungary, Germany, Austria, Italy, Slovenia, Portugal and Ireland. The countries were the most similar in terms of the investigated attributes, i.e. the distances illustrating their implementation of the sustainable development principles in health protection were the shortest.

Spain was the second cluster, Belgium was the third, Denmark the fourth. Lithuania the fifth, Slovakia, Finland and France the sixth, and the seventh cluster comprised the Czech Republic. The Netherlands was cluster nine and Greece, being the most remote from the other countries, was the last cluster -10.

Poland and the United Kingdom were grouped into cluster eight, which means that they were very similar as regards the investigated phenomenon, but quite distant from the leading countries in 2003.

#### 4. FINAL COMMENTS

One of the main goals of the European Community laid down in the Treaty of Rome is protection of human health, together with the preservation, protection and improvement of the environment's quality and rational consumption of natural resources. The action plan for health and sustainable development set up by the European Union is expected to prevent diseases induced by a polluted natural environment. The recommended actions address three main issues: reduction of hazardous substances at source, limiting human beings' exposure to hazardous factors, counteractions to the unfavourable effects of the existing exposures.

To prove the thesis of the distance dividing Poland and the member states regarding implementation of the sustainable development strategies decreased over the 13 years there were used taxonomic methods. These methods allow to construct measures of development and Euclidean distances between the development model and antimodel. Information about the Euclidean distance between a given object and the model and about the distance between the development model and antimodel allowed to construct a summary development measure that made it possible to classify objects into homogenous groups. To group the objects a cluster analysis using the nearest-neighbor method was applied to one chosen year (2003). The investigation used statistical data made available on the EUROSTAT web site and in statistical yearbooks covering the period 1990–2003.

That is why it is so important and beneficial for Poland, being a new member state, to strive to implement standards and guidelines incorporated in the European Commission's programmes. Such efforts not only improve people's health and the quality of their natural environment, but also take Poland closer to other member states in the field of the standard of living.

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## Jadwiga Suchecka, Elżbieta Wiszniewska

## REALIZACJA ZAŁOŻEŃ STRATEGII ZRÓWNOWAŻONEGO ROZWOJU W POLSCE W ZAKRESIE OCHRONY ZDROWIA NA TLE WYBRANYCH KRAJÓW UNII EUROPEJSKIEJ

Głównym celem autorek artykułu jest przybliżenie problematyki zagadnień ochrony zdrowia i podnoszenia jakości życia człowieka, w myśl realizacji w Polsce założeń zrównoważonego rozwoju. "Środowisko i zdrowie" jest jednym z priorytetowych działań Komisji Europejskiej. Polityka ochrony środowiska w aspekcie ochrony zdrowia publicznego jest ważnym elementem procesu integracji.

Stan środowiska, w którym człowiek przebywa w okresie swojego życia jest jedną z determinant zdrowia człowieka.

W celu udowodnienia tezy mówiącej o systematycznie malejącym dystansie, dzielącym Polskę od pozostałych krajów Unii Europejskiej, pod względem implementacji zasad strategii zrównoważonego rozwoju, zastosowano szereg metod taksonomicznych. Wyznaczone zostały mierniki rozwoju oparte na odległości Euklidesa pomiędzy określonymi obiektami – państwami, czyli odpowiednio wyznaczonym wzorcem i antywzorcem rozwoju. Następnie skonstruowano syntetyczne miary rozwoju (opierając się na wyznaczonych już euklidesowych miarach dystansu), co pozwoliło na odpowiednie pogrupowanie krajów reprezentujących podobny poziom proekologicznego rozwoju. Wyniki aglomeracji dla roku 2003, metodą najbliższego sąsiedztwa, przedstawiono w postaci dendrogramów. Badanie empiryczne zostało przeprowadzone na podstawie danych statystycznych dla okresu 1990–2003, pochodzące ze strony Eurostatu i roczników statystycznych.

W artykule ukazano zatem podejmowane w Polsce działania w zakresie zdrowia środowiskowego, w tym głównych tendencji w dziedzinie czynnej ochrony zdrowia, na podstawie wielkości integralnych wskaźników zdrowia, na tle wybranych krajów Unii Europejskiej.