ZOFIA WYSOKIŃSKA

Impact of Environmental Standards on Sustainable Competitiveness in Foreign Trade. The Case of Poland as a Country in Transition

Abstract

From a review of studies published concerning the relationship between trade and environmental protection, it can be concluded that the effects of this relationship may be either positive and negative. Generally speaking, two distinct opinions can be portrayed. The traditional approach is that environmental standards limit the competitiveness of companies which are forced to adopt these standards and as a result limit their export potential. The more contemporary opinion is that the implementation of appropriate environmental standards has long-term benefits which should improve the competitive position of complying companies in the long run.

The goal of the paper is to present the relationships between attainment of sustainable competitiveness and a systematic implementation of international standards of environmental protection using Poland as a country of systemic transformation, admitted next to the OECD and applying for admission to the European Union.

In the 1990s, Poland made a huge effort in pro-ecology policy conducive to implementing the norms and recommendations of supranational organisations, mainly the EU, WTO and OECD, which yielded significant changes in production and foreign trade towards a reduction of the share of products harmful for the natural environment and imports of technologies supporting the development of "cleaner" production.

The evaluation covered two basic groups of products in Polish foreign trade, i.e **goods supporting preservation of the natural environment** and **goods harmful to the environment.** The trends in total Polish exports and imports as well as in trade with the EU and the OECD were surveyed for both the groups of products analysed according to the International Harmonised System (HS) classification.

1. Introduction - theoretical framework

International trade becomes a significant contributing factor in effecting strategies of stable development among participating countries when raw material resources are effectively utilized in production and when the cross-border movement of environment-friendly products and technology is encouraged. Trade and free trade policies regarding the movement of goods have a significant impact on the environment and should be closely connected with the basic standards of environmental protection policies. In countries with high environmental protection standards, losses resulting from environmental destruction have been assessed at 1-2% of the GNP, while in countries with much lower standards of protection, these losses have been known to reach 3-5% of the GNP[1].

Applicable regulations regarding environmental protection standards may encompass both the protection of indigenous natural resources as well as bans on the import of goods that may be harmful to the environment (such as large vehicles with excessive emissions that pollute the air, products containing heavy metal compounds such as lead, very noisy vehicles or machines and devices or fuels that may be harmful to the environment)[2].

The effects of raising environmental protection standards in a given country's foreign trade practices become especially visible in the following sectors of the economy: agriculture, forestry, fishing, transport, as well as in „heavy" industry sectors such as mining, metallurgy and „heavy" chemical production. These effects are usually two-sided; on the one hand the trade of goods harmful to the environment is limited (these goods usually belong to the above-mentioned industrial sectors and are known as „raw material absorbent" - they have a negative impact on the flow of imports and exports taking place between a country and its foreign trade partners), while on the other hand the raising of standards can cause a trend towards cleaner technological production through the reallocation of production resources, which will be closer to meeting international standards (which in turn will translate into more effective competition on foreign markets and an improvement in competition among enterprises in foreign as well as domestic markets, and will in the long run stimulate a rise in exports). Goods which may also have a significant impact on

[1] Repetto, R. (1993). *Trade and Environment Policies: Achieving Complementarities and Avoiding Conflicts*, Washington, DC: World Resources Institute.

[2] Lucas, R.E.B. (1992) *Economic Development, Environmental Regulation and International Mitigation of Toxic Industrial Pollution: 1960-1998* in P. Low /ed./, *International Trade and the Environment,* Discussion Paper 159, Washington, DC, World Bank.

the changing face of foreign trade are those which encourage the improvement of the state of the environment, mainly goods and services related to the measurement, prevention and/or moderation of water and air pollution, as well as those that aid in the resolution of problems regarding waste, noise pollution and ecosystems. These encompass cleaning technologies, goods and services that limit environmental risk and lessen the pollution and exhaustion of natural resources, recycling, as well as waste disposal plant, tools and technology[3].

From a review of studies published concerning the relationship between trade and environmental protection, it can be concluded that the effects of this relationship may be either positive and negative. Some authors[4] believe that the accelerated deregulation and liberalization of trade is a factor of major importance in this regard. Generally speaking, two distinct opinions can be portrayed. The traditional approach is that environmental standards limit the competitiveness of companies, which are forced to adopt these standards and as a result limit their export potential. The more contemporary opinion is that the implementation of appropriate environmental standards has long-term benefits which should improve the competitive position of complying companies in the long run[5].

In examining the relationship between foreign trade and the transfer of pollutants, it is useful to distinguish between overt and covert transfers. Overt transfer occurs when pollutants are emitted across borders through the air, water or land as a result of natural causes (wind, oceanic or river currents) as well as human transport of pollutants (waste and other harmful products) onto other countries' territories. Covert transfer occurs through the import of goods and services which degrade the environment in the country of origin – the importing country, while usually avoiding the direct effects, nevertheless is a covert contributer thereto.

Empirical studies on the impact of foreign trade on the environment are scarce in the existing scientific literature. Nevertheless, an interesting analysis of this issue was presented by W. Antweiler, who created an index (the Pollution Terms of Trade Index - PTTI) that represents the quantity of pollutants emitted as a result of the production of exportable goods worth one US Dollar, as compared to imported goods of the same value (the index is multiplied by 100).

---

[3] Portion of the OECD council published in Environmental Goods and Services Industry - Manual for Data Collection and Analysis, OECD-EUROSTAT, WTO, Paris, 1999.

[4] P.C. Ekins, C. Folke, R. Costanza, *Trade, Environment and Development: The Issues in Perspective*, Ecological Economics 1994, 9(1), 1-12.

[5] S. Alpay, *The Trade and Environment Nexus*, in: E. Ortiz, A. Cabello (ed.), *Economic Issues and Globalization: Theory and Evidence*, ISINI, 1999, p. 302-304.

This is a *terms of trade* index, which means that the prices are replaced by the amount of pollutants. If the index is higher than 100 and if a given country conducts zero-balance foreign trade, then this exchange results in an increase in pollutants on this country's territory[6].

A number of publications analyzing foreign trade with respect to environmental protection factors are available[7]. One of the most complex of these analyses regarding the interdependence of competitiveness and environmental protection standards is that of the World Bank, in which P. Sorsa develops determinants in the trade of environmentally-sensitive materials, as categorized in level 3 SITC, whereby changes in the structure of trade volume were analyzed during the period 1970-1990[8].The main conclusions of this analysis are as follows:

1. Environmental expenditures do not constitute a very significant share of overall expenditures, thus it is not very likely that they could cause a shift in comparative advantage in the majority of industries.
2. Variation in the amount of money spent on environmental protection among highly industrialized countries is relatively small.
3. Environmental protection expenditures are concentrated in only a few basic heavy industries.
4. There is a strong correlation between the use of energy and the amount of money spent on the environment.
5. Positive implementations and increasing comparative advantage with respect to environmentally-sensitive goods are more visible in those countries in which environmental protection policies are geared more towards pro-ecological investment rather than towards day-to-day spending on environmental protection[9].

One can conclude from the European Commission's analysis that even though it may be very expensive to achieve positive results within the scope of environmental protection, there are also benefits to be had related to the improvement of the productivity of utilized resources, increased

[6] W. Antweiler, *The Pollution Terms of Trade*, Economic Systems Research, Vol. 8, No. 4, comp. also W. Antweiler, B. Copeland, M. Taylor, *Is Free Trade Good for the Environment?*, NBER Working Paper Series, 1988, No. 6707.

[7] I. Walter, *The Pollution Content of American Trade*, Western Economic Journal 11 (1); p. 61-70; Xinpeng Xu, Liang Song, *Regional Cooperation and the Environment: Do "Dirty" Industries Migrate?*, Weltwirtscaftlisches Archiv, Band 136, 2000 r. p. 137-157.

[8] P. Sorsa, *Competitiveness and Environmental Standards*, The World Bank Research Working Papers, February 1994.

[9] *op. cit.*, p.6

competitiveness, and a positive effect on employment levels[10]. These studies also show that although there is no direct correlation between economic growth and environmental protection, it would be very difficult to achieve a continuous improvement in the state of the environment without economic growth[11]. Economic growth in and of itself is capable of generating additional resources that may be utilized in limiting pollution and protecting the environment. Positive effects can be strengthened even more by appropriate economic policies, including trade policy[12].

The relationship between trade policy and environmental protection raises two main issues. The first is based on answering the following question, "what type of trade policy should be adopted from the environmental protection point of view?" - in other words, what trade restrictions should be enforced if we are dealing with cross-border environmental protection issues as well as with common global resources? The second problem is related to the variation of environmental protection standards among nations and how these standards relate to competitiveness. Here, the question posed is, "do lower environmental protection standards have an effect on "unfair" trade advantages?", which includes the problem of using these lower standards as non-tariff barriers[13].

2. The promotion of sustainable development through trade[14]

During previous sessions, the Commission on Sustainable Development stressed the importance of sustainable development in eliminating trade barriers. During preparations for the Seattle conference, elimination of the following items was proposed:

- subsidies leading to a surplus of output capacity in the fisheries sector,
- subsidies that support the export of agricultural products,

---

[10] Communication to the Council and the Parliament on Trade and Environment, Brussels, 28.02.96.COM (96) 54, Final.

[11] Communication on Economic Growth and Environment, COM(94)465 final, Brussels, 1994.

[12] Communication to the Council and the Parliament on Trade and Environment, Brussels, op. cit.

[13] P. Uimonen, J. Whalley, *Environmental Issues in the New World Trading System*, MacMillan Press, London, 1997, p. 37-38.

[14] On the basis of: Economic Growth, Trade and Investment, Commission on Sustainable Development, Economic and Social Council, Report of the Secretary General Part III, Trade and the Environment April 24 - May 5 2000, and the World Trade Organization and Sustainable Development: An Independent Assessment, IISD, http://iisd.ca/trade/trdhom.htm

- escalation of customs duties in the forestry sector,
- restructurization of trade in the area of goods and services which have a specific impact on environmental protection.

It will take additional and continuing effort to apply the above mentioned propositions to products which the developing countries are interesting in exporting, such as textiles, clothing, leather products, footwear, minerals and other products manufactured using natural raw materials.

During its fifth session, the Commission came to the conclusion that trade liberalization should be accompanied by certain policies aimed at protecting the environment as well as natural sources of raw materials, which would allow for the protection and support of sustainable development through the improved allocation and utilization of natural resources. During its second session, the importance was noted of developing structures which would facilitate evaluation of the impact of trade policies on the environment and, at the same time, take into consideration the special needs and conditions of developing countries. One of the main questions raised by the Commission on Sustainable Development during earlier meetings was how to utilize economic incentives, such as **facilitated market access**, for the purpose of producing environment-friendly products, especially in developing countries. The promotion of such products may also encompass other issues relating to the relationship between trade and the environment. An important role is played by special production methods based on modern technology, which are transferred within the context of international institutions. UN experts praised developing countries' efforts to promote and spread managerial systems that take into consideration the needs of the environment (for example those that comply with ISO 14001 standards).

As a result of the GATT/WTO Uruguay Rounds, as well as within the context of existing Environmental Agreements (e.g. the Montreal Protocol), the highly economically developed countries adopted measures with the aim of encouraging developing countries to use alternative technologies which would promote environmentally-friendly production. Bringing this aim to life should be supported by technical and financial aid provided by these highly developed countries. The goal of this aid should be:

- to ensure a constant flow of information on the standards and regulations regarding environmental protection,
- to establish training programs on the creation of environmental protection policies for developing countries and those undergoing systemic transformation,

- to improve the efficiency of product inspection, certificate issuance, and quality control in areas affecting environmental protection in developing countries and those undergoing systemic transformation,
- to improve the efficiency of the institutional and technical control of the movement of harmful substances such as harmful wastes and chemicals,
- to better utilize market potential in promoting environment-friendly products,
- to further technological research and growth of cooperation
- to provide technological aid for improvement of the sectors most harmful to the environment (such as the mining industry)[15].

It was also noted that Sanitary and Phytosanitary Measures (SPS) allow each country to individually establish its own level of protection under the condition that these measures are not unwarranted. The SPS Measures should:

- be absolutely necessary, in other words not even slightly violate GATT regulations,
- be based on scientific research,
- not be adopted without solid scientific validation,
- be based on estimation of risk appropriate to a given situation,
- be avoided if the same goal can be reached by economically and technically valid methods that don't necessarily disrupt free trade[16].

In practice, however, the above mentioned changes did not substantially vary GATT/WTO's approach to individual countries' introduction of measures that protected the environment but at the same time disrupted free trade[17].

An example of this is GATT's stance on America's ban on the import of canned tuna fished by Mexican and Venezuelan fishermen. Owing to the special relationship existing between the United States and Mexico, the conflict regarding this prohibition of sale on the American market ended amicably. The United States revoked the ban on this import, but at the same time American canned goods manufacturers introduced a seal on their cans that indicated that a given product was manufactured without harm to sea mammals. As American consumers have a relatively high level of ecological awareness, they are thus discouraged from buying cans that do not meet this standard. Simultaneously,

---

[15] Communication from the Commission to the Council and the European Parliament on Trade and the Environment, Brussels, 28,02,96,COM (96) 54 Final p. 4-9.

[16] Communication... op. cit. p. 5.

[17] A. Budnikowski, Ochrona środowiska jako problem globalny [*Environmental Protection – A Global Problem*], PWE, Warsaw 1998, pp. 64-75.

the United States provided Mexico with credits designed to enable its fishing fleet to purchase appropriate nets for this purpose[18].

Another change in GATT/WTO's interpretation of regulations allowing for the waiver of the free trade principle in the name of environmental protection occurred after the Appellate Body ruling of 1998 in the Shrimp-Turtle Case[19].

The decisions made in these cases illustrate the acknowledgment that trade policy measures that serve the widely understood concept of environmental protection may be adopted as long as the necessary procedures of the GATT/WTO are complied with.

It should be noted that the above decision is a step in the direction of allowing more laws to be passed by individual nations regarding environmental protection measures, even if they disrupt the freedom of international trade. As a result, one could draw the conclusion that the positions of the WTO in this matter are evolving more slowly than the expectations of the international community. Confirmation of this view can be found to the extent the demonstrations which took place at the WTO meeting in Seattle, which was organized to plan the preparation of future rounds of negotiation, were orchestrated by pro-ecological organizations. The slogans of their demonstrators made it perfectly clear that that the WTO continues to be perceived as an organization whose devotion to implementation of the principle of free trade poses a direct threat to environmental systems on a world-wide scale[20].

The international environmental management systems requirements standard (ISO 14001) is seriously discussed and debated also by countries in economic transition.[21] While it is clear that product-related eco-labels and related standards are covered by the TBT Agreement, the position is less clear for environmental management systems. The question as to whether management standards (such as ISO 9000 and 14000) or only those standards

---

[18] The only exception to this principle is the possibility of the ban encompassing the import of products manufactured by prisoners.

[19] Por. Ranne O., *More Leeway for Unilateral Trade Measures? The Report f the Appellate Body in the Shrimp-Turtle Case*, Intereconomics, March/April 1999 and Liebig K., The WTO and Trade Environment Conflict, The (New) Political Economy of the World Trading System, Intereconomics, March/April 1999, cit. For: A. Budnikowski, Ochrona środowiska jako problem globalny [*Environmental Protection - A Global Problem*], PWE, Warsaw 1998, pp. 64-75.

[20] Based on A. Budnikowski, Ochrona środowiska jako problem globalny,(*Environmental Protection as a Global Problem)* PWE, Warsaw, 1998, pp. 64-75.

[21] *Standards and Regulations in International Trade, Economic Commission for Europe*, United Nations, Geneva, 1998, p. 22. See also, Koncepcja średniookresowego rozwoju gospodarczego w Polsce do roku 2002 *(Medium-range planning for economic development in Poland until 2002)*, Warsaw, 1999.

directly related to products should be covered by the Agreement remains subject to internal discussion at WTO. There is no empirical evidence of trade implications arising from the use of the ISO 14000 series of standards[22].

3. Environmental protection trends in Poland in the 1990's

In 1994, the basic principles of Polish environmental protection policy until the year 2000 were laid out in two documents entitled "Government Ecology Policy" (M.P. Nr. 18. pos. 118) and "The Executive Program for Implementing Government Ecology Policy until the year 2000)". These documents set forth the aims and tasks of ecology policies both with regard to capital investment and operating expenditures (training seminars, for example).

In December, 1999 the Polish Ministry of Environmental Affairs adopted a Strategy for the Sustained Development of Poland to 2025, which listed guiding principles for the various ministries and agencies in elaborating sectoral strategies.

In the programs adopted by the Polish Ministry of Economic Affairs, core environmental protection policies are reflected in the issued documents "Medium-range planning for economic development in Poland until 2002"; as well as in the "Program for the support of economic innovation until 2006".

In "Medium-range planning for economic development in Poland until 2002", the government sets forth priorities, the implementation of which by the year 2002 should increase innovation in the Polish economy. Among such priorities are:

- the creation of mechanisms and structures which would encourage innovative activities and foster the formation of innovative policies
- increased efficiency in the initiation of contemporary economic practices
- changing the models of consumption and methods of production in Poland to make them more amenable to permanent, sustainable development.

In the "Program for the support of economic innovation until 2006", programs for achieving the above-mentioned changes in the models of consumption and methods of production are set forth in detail, including:

- support for "clean production" programs,
- creation of a data base containing domestic environmental protection technologies,

[22] Standards and Regulations.... op.cit., p. 22.

- development of certification procedures to assure the effective use of energy,
- development of local initiatives in the search for renewable energy sources.

An analysis of the implementation of Poland's ecology policy indicates that the instruments used and the official systemic solutions implemented are generally in accordance with those solutions applied and accepted worldwide. In this area, Poland is adapting itself both to the standards set forth by the OECD, of which Poland has been a member since 1996, as well as to European Union norms, inasmuch as Poland will be obligated to apply the environmental protection regulations of the *acquis communitaire* upon its accession to the EU. It should be noted that the European Union has allocated to Poland so-called "pre-accession funds" from the ISPA for the period 2001-2006 to aid it in adapting its environmental protection law to that of the EU.

An important element in environmental protection in Poland is voluntary self-regulation – the voluntary compliance with or adoption of recognized codes and norms by Polish firms or companies. In this case the adoption of or compliance with such codes or norms is not a prerequisite condition for Poland's accession to the EU, but rather an effect of anticipation of the closer economic ties and resulting competitive pressures that such accession will bring. In addition, more and more firms are concerned with protecting their global reputations and thus seeking partners whose products comply with, for example, ISO norm 14000 or existing progressive industry codes. A consequence of the ever-closer economic cooperation is sure to be an increasing awareness of the importance of ecological issues among the management class of Polish business firms.

After 1989 Poland made a great leap forward in improving the state of its natural environment. The share of funds invested into environmental clean-up and protection efforts grew to 1.9% of the GNP in 1998, which amounted to 9.5% of overall investment into the economy. From 1988-1998 the atmospheric emissions of sulfur-dioxide decreased by 50% (from 4.2 to 2.1 million tons, of carbon dioxide by 30% (from 509 to 365 million tons) and of industrial dusts more than threefold (from 3.4 to 1.1 million tons). In addition, the emission of untreated sewage waste was reduced nearly fourfold, from 1664 hm3 to 424 hm3. The territory of national parks, nature reserves, and other forms of protected natural environments was increased 2.2 times, from 4.5 million hectares to 9.7 million. The share of raw-material depleting manufactures in overall production and export fell by more than 1/3, while the share of reprocessed manufactures rose. The technological solutions implemented and standards adopted in the 1990's are ever more in accord with those applied in the EU. Nevertheless it needs to be noted there remains a certain number of

ecological standards and legal regulations in effect in Poland which vary from those imposed upon the member states of the EU, and adoption of the ecological regulations of the *acquis communataire* in Poland continues to be a large task and important element in Poland's accession. It is currently envisioned that approximately 170 EU Directives and Regulations concerning environmental protection will be adopted by 2002, with the remaining 14 being adopted between 2003-2010. The major benefit to Poland of adoption of the EU environmental protection regulations will the improvement in the quality of life of its inhabitants (especially in their personal health). Implementation of the EU environmental protection program should also reduce ecological losses (both at the macro- and micro- economic levels) and improve the state of the natural environment. Taking into consideration, however, the high financial cost of the entire program to harmonize Polish environmental law with that of the EU, estimated to be more than 30 billion euro, its implementation will proceed in stages[23].

4. An empirical analysis of foreign trade in Poland in the context of environmental protection

The empirical analysis presented in this section concerns two basic and opposing categories of goods in the Polish foreign trade market:

1) **goods supporting preservation of the natural environment; and**
2) **goods harmful to the environment.**[24]

Goods supporting preservation of the natural environment, defined according to the classification system proposed by OECD/EUROSTAT, are divided into three groups: a) waste treatment technologies; b) goods and services limiting the risk of damage to the natural environment; and c) goods and services minimalizing pollution and the depletion of natural resources.

---

[23] Taken from a report assessing the costs and benefits of Poland's integration into the EU appearing on 26.05.200 on the UKIE (Office of the Committee on European Integration) website at www.ukie.gov.pl

[24] Based on the definition of the environmental protection industry set forth in the OECD/Eurostat Informal Group: "Goods and services protecting the environment include the manufacturing of products and the development of services regarding the measurement, prevention, minimalization, elimination, or correction of water and air pollution and solar system pollution, as well as addressing the problems of waste disposal, noise pollution, and eco-system maintainance".

As regards **goods supporting preservation of the natural environment**, the years 1993-1996 were characterized by a constant growth trend in overall imports, especially great with regard to imports from the EU. In 1997-1998 the import growth trend was reversed, but still the absolute value of annual imports was significantly higher than at the beginning of decade. As regards the overall category of goods supporting preservation of the natural environment, the growth in imports nearly tripled between 1992 and 1998, and in the case of waste treatment technologies and products increased nearly fivefold. As regards Polish exports of this category of goods, their share in overall exports rose from 2.87% in 1992 to 3.33% in 1998. Growth in such exports to the EU, however, was somewhat lower, where their share in overall Polish exports to the EU rose from 2.95% in 1992 to 3.36% in 1996, then fell to 3.15% in 1998. Taken together in the period analyzed export in the overall category of goods supporting environmental protection experienced an absolute increase of more than two-fold (225%), with a particularly significant increase taking place in the case of waste treatment technologies and products, the exports of which increased by 3000%. It should be noted however that the absolute value of exports of this sub-category of goods is relatively small, being the smallest of the analyzed sub-categories.

The trends listed above concerning Polish foreign trade in goods supporting preservation of the natural environment are generally positive and attest to the pro-ecological development of the Polish economy, both in terms of reducing and treating pollution and the development of pro-ecological technologies.

As regards the category of **goods harmful to the environment,** the manufacturing processes and products of primarily the following industries were examined: mining, metallurgical, paper and cellulose, energy, building construction materials, and transportation vehicles industries. The major conclusions to be drawn from our analysis are presented below in summary form.

It should be noted that the analysis below was carried out on 6 HS levels based on official data collected by GUS (the Main Statistical Office of Poland) and reported to OECD/UN. The analysis encompasses three categories of foreign trade: overall imports and exports; foreign trade with the 15 member states of the EU; and with the 29 OECD states. Based thereon, the following conclusions could be drawn:

Poland's foreign trade in environmentally harmful goods in the years 1992-1998 is characterized by a continuing downward trend, which must be viewed as a positive attribute. The share of goods harmful to the environment in Poland's overall exports fell more than 10 percentage points, from 56.6% in 1992 to 46.16% in 1998.

This downward trend was even more pronounced in exports to the UE, where it fell from a 57.2% share in 1992 to 46.04% in 1998. The share of goods harmful to the environment in Poland's overall imports also declined, but to a lesser degree, from 46.86% in 1992 to 42.39% in 1998. As regards imports from the EU countries, the decline was less than one percentage point, from 41.64% to 40.82%. (See the tables in the statistical annex)

The **conclusions presented confirm the pro-ecological emphasis of Poland's restructurization efforts**, particularly when read together with the significant increase in Poland's foreign trade in pro-ecological goods and services.

STATISTICAL ANNEX

Table 1. Structure of goods supporting preservation of the environment in Polish imports: -total and from the European Union (in %)

Specification	1992		1994		1995		1996		1997		1998	
	Total	from EU	Total	from UE/15/	Total	from EU	Total	from EU	Total	from EU	Total	from EU
World-total	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
A.Pollution Management Group	**4,99**	**6,81**	**5,14**	**6,62**	**5,46**	**7,02**	**5,73**	**7,48**	**5,42**	**6,88**	**4,34**	**6,22**
1. Air Pollution control	0,88	1,30	0,96	1,38	1,22	1,68	1,50	2,17	1,20	1,70	0,86	1,68
2. Wastewater management	2,13	2,91	2,08	2,77	2,11	2,82	2,01	2,67	1,96	2,58	1,87	2,37
3. Solid waste management	0,83	1,18	0,97	1,26	0,96	1,19	1,04	1,35	1,03	1,33	0,61	1,21
4. Remediation and clean-up of solid and water	0,27	0,30	0,25	0,25	0,25	0,32	0,27	0,32	0,29	0,32	0,06	0,06
5. Noice and vibration abatement	0,30	0,41	0,20	0,21	0,26	0,27	0,34	0,36	0,39	0,41	0,42	0,42
6. Environmental monitoring, analysis and assessment	0,57	0,72	0,68	0,75	0,65	0,74	0,57	0,61	0,55	0,54	0,52	0,48
B. Cleaner Technologies and Products Group	**0,18**	**0,28**	**0,21**	**0,31**	**0,23**	**0,34**	**0,26**	**0,40**	**0,28**	**0,43**	**0,30**	**0,43**
1. Cleaner/resource-efficient technologies and processes	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2. Cleaner/resource-efficient products	0,18	0,28	0,21	0,31	0,23	0,34	0,26	0,40	0,28	0,43	0,30	0,43
C. Resource Management Group	**0,55**	**0,85**	**0,50**	**0,76**	**0,41**	**0,58**	**0,48**	**0,68**	**0,47**	**0,66**	**0,48**	**0,43**
1. Indoor air pollution control	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2. Water supply	0,03	0,05	0,03	0,05	0,02	0,03	0,02	0,02	0,01	0,02	0,00	0,01
3. Recycled materials	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
4. Renewable energy plant	0,06	0,17	0,11	0,23	0,08	0,17	0,11	0,18	0,10	0,18	0,11	0,07
5. Heat/energy saving and management	0,43	0,59	0,34	0,45	0,28	0,36	0,33	0,44	0,33	0,43	0,34	0,32
6. Sustainable agriculture and fisheries	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
7. Sustainable forestry	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
8. Natural risk management	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
9. Eco-tourism	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
10. Other	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Source: Own calculations based on the official data of foreign trade statistics in Poland.

Methods of the calculation and classifications of goods - based on: "Environmental Goods and Services Industry - Manual for Data Collection and Analysis", OECD-EUROSTAT, WTO, Paris, (1999).

Table 2. Structure of goods supporting preservation of the environment in Polish export: total and to the European Union (in %)

Specification	1992		1994		1995		1996		1997		1998	
	Total	to UE/15/	Total	to UE/15/	Total	to UE/15/	Total	to UE/15/	Total	to UE/15/	Total	to UE/15/
World-total	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
A.Pollution Management Group	**2,53**	**2,50**	**2,42**	**2,45**	**2,38**	**2,43**	**2,67**	**2,58**	**2,64**	**2,50**	**2,73**	**2,47**
1. Air Pollution control	0,22	0,23	0,16	0,14	0,19	0,13	0,20	0,16	0,17	0,14	0,22	0,16
2. Wastewater management	1,46	1,54	1,37	1,53	1,29	1,42	1,33	1,43	1,35	1,41	1,41	1,38
3. Solid waste management	0,18	0,21	0,34	0,31	0,38	0,36	0,49	0,31	0,46	0,28	0,50	0,31
4. Remediation and clean-up of solid and water	0,11	0,02	0,09	0,06	0,04	0,05	0,05	0,05	0,05	0,05	0,01	0,01
5. Noice and vibration abatement	0,48	0,45	0,35	0,31	0,35	0,33	0,44	0,46	0,51	0,52	0,50	0,52
6. Environmental monitoring, analysis and assessment	0,08	0,06	0,11	0,11	0,12	0,13	0,16	0,17	0,10	0,10	0,09	0,09
B. Cleaner Technologies and Products Group	**0,00**	**0,00**	**0,01**	**0,01**	**0,04**	**0,01**	**0,06**	**0,03**	**0,06**	**0,02**	**0,06**	**0,03**
1. Cleaner/resource-efficient technologies and processes	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2. Cleaner/resource-efficient products	0,00	0,00	0,01	0,01	0,04	0,01	0,06	0,03	0,06	0,02	0,06	0,03
C. Resource Management Group	**0,33**	**0,44**	**0,55**	**0,83**	**0,56**	**0,68**	**0,58**	**0,75**	**0,59**	**0,74**	**0,55**	**0,65**
1. Indoor air pollution control	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2. Water supply	0,01	0,01	0,03	0,01	0,03	0,01	0,03	0,01	0,02	0,00	0,00	0,00
3. Recycled materials	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
4. Renewable energy plant	0,07	0,08	0,05	0,22	0,03	0,09	0,01	0,02	0,01	0,01	0,01	0,01
5. Heat/energy saving and management	0,23	0,33	0,45	0,56	0,48	0,55	0,51	0,69	0,53	0,69	0,50	0,60
6. Sustainable agriculture and fisheries	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
7. Sustainable forestry	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
8. Natural risk management	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
9. Eco-tourism	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
10. Other	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Source and methods of analysis as under the table 1.

Table 3. Value and share of goods supporting preservation of the environment, and goods harmful to the environment, in Polish imports in 1992-1998

Specification	1992		1993		1995		1996		1997		1998	
	Total	From EU/15/	Total	From EU/15/	Total	From EU/15/	Total	From EU/15/	Total	From EU/15/	Total	From EU/15/
IMPORT - total /mln of USD/	15908,4	9538,8	18802,0	11860,2	28923,4	18392,9	37107,4	23383,0	42277,2	26632,4	47003,8	31030,1
Goods supporting preservation of the environment												
- value in tsd of USD	910,0	757,6	1064,3	882,0	1764,4	1462,5	2401,9	2000,0	2610,3	2120,3	2405,6	2195,5
- share in % of total import	5,72	7,94	5,66	7,44	6,10	7,95	6,47	8,55	6,17	7,96	5,12	7,08
Goods harmful to the environment[1]												
- value in Mio. of USD	7455,2	3972,0	8072,9	4638,6	12360,5	7270,1	15828,5	9558,3	18712,7	11203,1	19926,4	12666,5
- share in % of total import	46,86	41,64	42,94	39,11	42,74	39,53	42,66	40,88	44,26	42,07	42,39	40,82

Source: Own calculations based on the official data of foreign trade statistics in Poland.

Methods of the calculation and classifications of goods -based on: "Environmental Goods and Services Industry - Manual for Data Collection and Analysis", OECD-EUROSTAT, WTO, Paris, (1999).

[1] Combaining such goods as: **Mining and energy:** Salt, sulphur, earth, stone, plaster, lime and cement -CN. 25; Ores, slag and ash -CN 26; Mineral fuels, oils, distillation products -CN. 27; **Chemical industry:** Inorg. chemicals, precious metal compound, isotope -CN. 28; Organic chemicals -CN. 29; Pharmaceutical products--CN. 30; Fertilizers -CN. 31; Tanning, dyeing extracts,tannins, derivs, pigments -CN. 32; Essential oils, perfumes, cosmetics, toileteries -CN. 33; Soaps, lubricants, waxes, candles, modelling pastes -CN. 34; Albuminoids, modified starches, glues, enzymes -CN. 35; Explosives, pyrotechnics, matches, pyrophorics, etc. -CN. 36; Photographic or cinematographic goods -CN. 37; Miscalaneous chemical products -CN. 38; **Wood industry:** Wood and articles of wood, wood charcoal -CN. 44; Cork and articles of cork, -CN. 45;Manufactures of plaiting material, basketwork, etc. -CN. 46; **Cellulosic-paper industry:** Pulp of wood, fibrous cellulosic material, waste etc.-CN. 47; Paper and paperboard, articles of pulp -CN. 48; Printed books, newspapers, pictures -CN. 49; **Industry of building materials:** Stone, plaster, cement, asbestos, mica, etc mat.-CN. 68; Ceramic products -CN. 69; Glas and glasware -CN. 70; **Steel and coloured metal industry:** Iron and steel -CN. 72; Articles of iron and steel -CN. 73; Copper and articles thereof -CN. 74; Nickel and articles thereof -CN. 75; Aluminium nd articles thereof -CN. 76; Lead and articles thereof -CN. 78; Zinc and articles thereof -CN. 79; Tin and articles thereof -CN. 80; Other base metals, cermets, articles thereof -CN. 81; Tools, implements, cutlery, etc. -CN. 82; Miscalaneous articles of base metals -CN. 83; **Transport equipment industry:** Railway, tramway locomotives, rolling stock equip. -CN. 86; Vehicles other than railway tramway -CN. 87; Aircraft, spacecaft and parts and parts thereof- CN. 88; Ships, boats and other floating structures -CN. 89.

Table 4. Value and share of goods supporting preservation of the environment, and goods harmful to the environment in Polish exportin 1992–1998

Specification	1992		1993		1995		1996		1997		1998	
	Total	to UE/15/	Total	to UE/15/	Total	to UE/15/	Total	to UE/15/	Total	to UE/15/	Total	to UE/15/
EXPORT - total /Mio. of USD/	13181,2	8470,3	14098,9	9619,1	22864.6	15852,1	24425,7	16004,8	25747,2	16322,6	28193,6	19284,8
goods supporting preservation of the environment												
- value in Mio. of USD	377,8	249,8	389,1	283,7	681,1	494,6	807,3	537,0	847,1	531,9	939,4	606,5
- share in %	2,87	2,95	2,76	2,95	2,98	3,12	3,30	3,36	3,29	3,26	3,33	3,15
goods harmful to the environment												
- value in Mio. of USD	7462,4	4848,8	7587,2	5030,1	11808,0	8096,7	11908,5	7648,3	11790,8	7452,2	13013,0	8879,6
- share in %	56,61	57,24	53,81	52,29	51,64	51,08	48,75	47,79	45,79	45,66	46,16	46,04

Source and remarks as under the table 3.

References

Alpay, S., (1999), *The Trade and Environment Nexus*, in: E. Ortiz, A. Cabello (ed.), *Economic Issues and Globalization: Theory and Evidence*, ISINI.

Antweiler, W., Copeland, B., Taylor, M, (1988), *Is Free Trade Good for the Environment?*, NBER Working Paper Series, No. 6707.

Budnikowski, A. (1998), Ochrona środowiska jako problem globalny (*Environmental Protection - A Global Problem*), PWE, Warsaw.

Communication on Economic Growth and Environment, COM(94)465 final, Brussels, 1994.

Communication to the Council and the Parliament on Trade and Environment, Brussels, 28.02.96.COM (96) 54, Final.

Economic Growth, Trade and Investment, Commission on Sustainable Development, Economic and Social Council, Report of the Secretary General Part III, Trade and the Environment April 24 - May 5 2000, and the World Trade Organization and Sustainable Development: An Independent Assessment, IISD, http://iisd.ca/trade/trdhom.htm

Ekins, P. C., Folke, R. Costanza, T. (1994): *Trade, Environment and Development: The Issues in Perspective*, Ecological Economics, 9(1), 1-12.

Environmental Goods and Services Industry - Manual for Data Collection and Analysis, OECD-EUROSTAT, WTO, Paris, (1999).

Lucas, R. E. B. (1992) *Economic Development, Environmental Regulation and International Mitigation of Toxic Industrial Pollution: 1960-1998* in P. Low /ed./, *International Trade and the Environment,* Discussion Paper 159, Washington, DC, World Bank.

Repetto, R. (1993). *Trade and Environment Policies: Achieving Complementarities and Avoiding Conflicts*, Washington, DC: World Resources Institute.

Report assessing the costs and benefits of Poland's integration into the EU appearing on 26.05.2000 on the UKIE (Office of the Committee on European Integration) Warsaw, website at www.ukie.gov.pl

Sorsa, P. (1994), *Competitiveness and Environmental Standards*, The World Bank Research Working Papers, February.

Standards and Regulations in International Trade, Economic Commission for Europe, United Nations, Geneva, 1998.

Uimonen, P., Whalley, J.(1997), *Environmental Issues in the New World Trading System*, Mac Millan Press, London,

Walter, I., *The Pollution Content of American Trade*, Western Economic Journal 11 (1).

Xinpeng Xu, Liang Song (2000*), Regional Cooperation and the Environment: Do "Dirty" Industries Migrate*?, Weltwirtscaftlisches Archiv, Band 136, p. 137-157.