



## ENVIRONMENTAL MANAGEMENT IN CONTEXT OF AIR QUALITY MANAGEMENT PROGRAMMES

Anna Zelga-Szmidla<sup>1</sup>

Czestochowa University of Technology  
Faculty of Management

**Abstract:** The aim of this paper is to present the role of citizen's perception of air quality management programmes. Although environmental management terminology and the low-carbon economy programme are known to both citizens and municipalities, they operate inefficiently. The quality of atmospheric air in Poland according to environmental monitoring is "poor": pollution knows no borders and only a combination of actions can stop the "domino effect". The content of the paper is based on interviews with inhabitants of the Silesian province after the announcement of the Clean Air Programme by the government. The chosen interviewed persons suggests an interest in the programme, but the inhabitants also indicate other programmes and notice the extension of the undertaken activities in time. Also, the results of the analysis of available documents and information have been presented. Environmental management on the example of the selected programme will contribute to the improvement of the air quality. According to the author, only a programme implemented on a mass scale will contribute to the improvement of the air quality. In this context environmental education is becoming increasingly important. The main purpose of the presented research is to draw attention to the residents' approach to topics related to the air-related program.

**Keywords:** environmental management, air quality, environmental awareness

**DOI:** 10.17512/znpcz.2020.01.09

### Introduction

Developing the ecological policy principles of the state is based on conscious and intentional actions supported by the rational use of resources and natural environment values, appropriate protection and skilful shaping using human knowledge (Dobrzański (ed.) 2010, p. 20). B. Kryk points to a proactive policy based on stimulating changes in the economy and a transition from "dirty" to "clean" technologies. The changes mentioned above force a different approach towards sectors that are harmful the environment. The precautionary principle in selecting the technology is becoming increasingly more important (Kryk (ed.) 2012, p. 165). The document indicating the objectives of the government is the "Second National Ecological Policy for the period up to 2025", while the current document postpones the time frame until 2030. According to this document, "the implementation of greenhouse gas reduction targets resulting from the European Union regulations or, in other words,

---

<sup>1</sup> Anna Zelga-Szmidla, dr, [anna.zelga-szmidla@wz.pcz.pl](mailto:anna.zelga-szmidla@wz.pcz.pl), ORCID: 0000-0002-7458-1675

reducing greenhouse gas emissions by at least 40% compared to the level of 1990, requires undertaking proper actions in the sectors covered by the EU Emissions Trading System (EU ETS) where the required reduction at European Union level is expected to reach 43% compared to the level of 2005 (there are no national targets) and in other sectors not covered by EU ETS where the reduction at the EU level is expected to reach 30% compared to 2005, and the expected target for Poland is 7% compared to the level of 2005” (MŚ 2019, p. 10). The project clearly shows that implementation of the basic environmental objectives of the Polish government requires focusing on improving the environmental protection control and management system as well as enhancing the financing mechanism.

The term “quality” relates to the work of a human being. A great deal of information about quality can be read in the Code of Hammurabi (2100 BC). When analysing a harsh approach to the work of a man based on the Hammurabi Code, a man would be severely punished for damaging the environment, including the atmosphere. It is believed that the first definition of quality was formulated by Plato<sup>2</sup>. In Latin, quality is “qualitas” and in many languages this word has kept its original pronunciation that refers to the recognisable Q quality symbol, e.g. English - quality, German - die Qualität, French - qualité. Quality is a term hard to define, which should be approached from many different levels. In *Table 1* the basic terminology for this subject is presented.

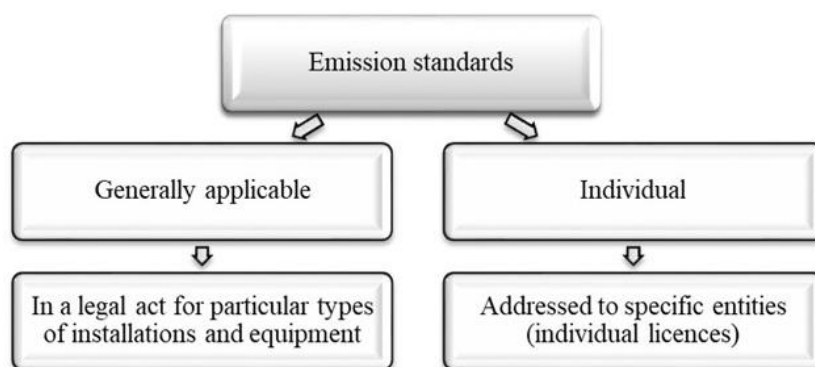
**Table 1. Definitions of quality according to different authors**

<b>J.M. Juran</b>	“Suitability for use or application” (Juran 1988, p. 78)
<b>G. Taguchi</b>	“Quality is a minimum loss incurred by the enterprise and made by the product in the time of its processing” (Jedlinski 2000, p. 15)
<b>W.E. Deming</b>	“The predicted level of homogeneity and reliability achieved at low cost and according to market requirements” (Flood 1993, p. 42)
<b>M. Harry and R. Schroeder</b>	“The right to value for the purchaser and the supplier in every aspect of economic exchange” (Harry, Schroeder 2001, p. 16)

Source: Author’s own elaboration based on quoted bibliography

Emission quality standards (norms) belong to administrative and legal instruments (legal and administrative). The term “environmental quality standards” should be defined as the levels of permissible concentrations for air, soil, water, noise or radiation (Ingaldi, Ociepa-Kubicka, Seroka-Stolka 2016, p. 14-15). The emission standards are shown in *Figure 1*.

<sup>2</sup> Poiots (Greek) – property or feature of an object, “things are not equal to ideas, but they are similar to them, so ideas are models of things, we see the presence of ideas in things, and therefore the order of the real world is a representation of the world of ideas” (Tatarkiewicz 2014).



**Figure 1. Emission standards (norms)**

Source: Author's own elaboration based on (Ingaldi, Ociepa-Kubicka, Seroka-Stolka 2016, p. 13-14)

Environmental management, in order to achieve the intended effect, should be based on introducing such changes to the enterprise or organisation that would be able to reduce the negative impact on the environment. As a part of the activities aimed at improving air quality and counteracting climate change, the European Union's policy aimed at reducing greenhouse gas emissions plays a significant role in our country. This task is difficult for Poland for many reasons. Poland's economy is one of the most carbon-intensive, which is a result of the major importance of coal as a resource to produce electricity and heat. Among the basic international documents that Poland has signed one should mention: The United Nations Framework Convention on Climate Change and the Paris Agreement<sup>3</sup>, as well as the obligations arising from the law of the European Union, i.e. the so-called Energy and Climate Package (<https://bip.mos.gov.pl/...>). Environmental management based on restricting negative environmental impacts achieves the intended effect over time. This is evidenced by the benefits observed after the introduction of exemplary standards ISO 14001 and EMAS by companies and organisations, presented in *Table 2*. Improvement in the area of management in enterprises as well as the introduction of a "permanent improvement" are indicated in the research of A. Pacan and R. Ulewicz (Pacan, Ulewicz 2017, p. 165-174).

The two presented examples of the most recognisable environmental management systems do not compete against but rather mutually complement each other (Woźniak 2012, p. 19-26). The proposed schemes are not mandatory and the interest in them increases every year along with the public's environmental awareness of the need to preserve the environment for future generations.

<sup>3</sup> The objective of the Paris Agreement of 2015 is to limit the increase in the global temperature to less than 2°C above the level of the pre-industrial era by the end of the century.

**Table 2. Benefits from ISO14001 and EMAS standards**

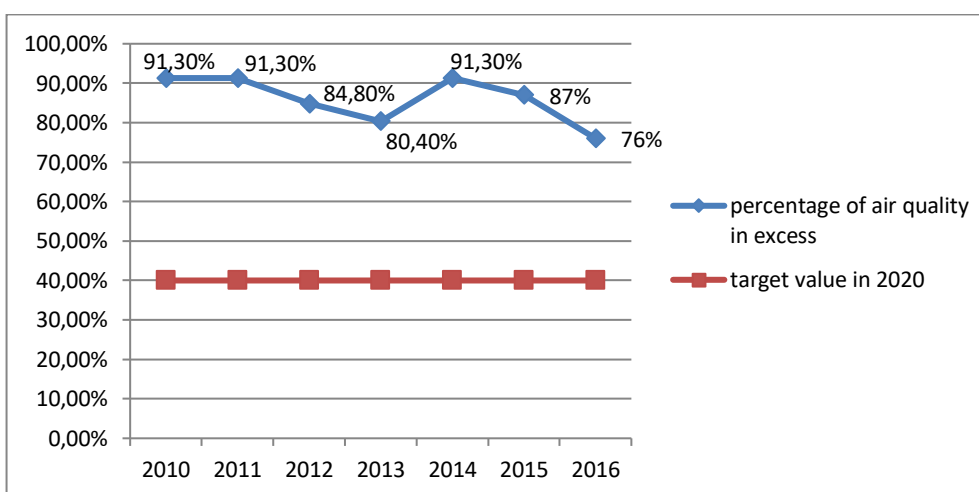
ISO 14001	EMAS
<ul style="list-style-type: none"> <li>• change in customers' and partners' perception of the enterprise</li> <li>• improved environmental results</li> <li>• reduced costs through water and energy saving</li> <li>• reduced activity related to the environment</li> <li>• enhanced the perception of the enterprise by financial institutions</li> </ul>	<ul style="list-style-type: none"> <li>• increased creditability</li> <li>• increased market value of the enterprise</li> <li>• improved efficiency of technological processes</li> <li>• expansion into new markets</li> <li>• implementation of activities related to sustainable development</li> <li>• increased competitiveness</li> </ul>

Source: Author's own elaboration based on (Ingaldi, Ociepa-Kubicka, Seroka-Stolka 2016, p. 69-70; Kryński, Kramer, Caekelbergh 2013, p. 315-316)

### Characteristics of Air Pollution

The group of air pollutants coming from so-called low emissions originates mainly from households and is therefore referred to as the household and communal sector. The pollution resulting from this source comes mainly from the use of low-quality coal and waste incineration. Other factors include the obsolete and unsuitable technology of furnaces and small local boiler plants, as well as the low energy standard of buildings. For urban areas and those located along transit routes, the share of emissions from transport has a significant impact on air quality.

Figure 2 clearly shows that exceedance of air quality standards recorded in the years 2001-2016 make it impossible for Poland to reach the level of 40% in 2010. It directly affects the quality of our life and health as well as the condition of the entire ecosystem ([https://bip.mos.gov.pl/...](https://bip.mos.gov.pl/)).



**Figure 2. Air quality status – percentage indicators of zones where standards were exceeded**

Source: Author's own elaboration based on ([https://bip.mos.gov.pl/...](https://bip.mos.gov.pl/))

In Poland, the concentrations of particulate matter and benzopyrene remain an important problem, especially during the heating season. According to the results of the 2016 air quality assessment carried out by the Environmental Protection Inspectorate among 46 zones in the country, exceedances were recorded in 35 zones due to exceedance of the PM10<sup>4</sup> limit value, 18 zones due to exceedance of the PM2.5<sup>5</sup> particulate matter limit values, 34 zones due to exceedance of the level of benzopyrene limit value, and 4 zones due to exceedance of the limit value for nitrogen dioxide (<https://bip.mos.gov.pl/...>). Disturbing reports from, among others, the World Health Organisation, indicate Poland as the most polluted country in the European Union due to average concentrations of air pollutants harmful to health. “Referring to air quality and pollution, this is a very big problem not only in Poland, but unfortunately in all of Europe. In Europe we have about 440,000 premature deaths, in Poland the number of premature deaths due to poor air quality is about 44,000”, says Karmenu Vella (<https://www.mp.pl/...>). The inhabitants of towns and cities are exposed to the effects of poor air quality due to the terrain, heating and population density (Upper Silesian agglomeration, Cracow agglomeration, Rybnik-Jastrzębie agglomeration, Łódź agglomeration). The problem of air pollution also affects the inhabitants of rural areas due to the use by households of individual heat supply systems or water heating systems with poor pollutant emission parameters. Since September 1, 2017, the Anti-Smog Act, passed by the Silesian provincial assembly on April 7, 2017, has come into force in the whole province. Although the short-term exposure to high concentrations of PM10 particulate matter (from a few hours to several days) may cause the occurrence of disease symptoms, especially in vulnerable groups of the society, i.e. the elderly, the sick, small children, pregnant women; the long-term exposure increases the risk of respiratory and circulatory diseases in the whole population (Juda-Rezler, Toczko (eds.) 2016). According to OECD, up to 2050 the level of air pollution in towns and cities will be the world's leading environmental cause of mortality (<https://bip.mos.gov.pl/...>).

### **Characteristics of government’s Clean Air Programme**

Considering the current air quality, in 2015 the Ministry of the Environment adopted the National Air Protection Programme (KPOP), the aim of which is to achieve, as soon as possible, the permissible levels of particulate matter and other toxic substances in the air and, in accordance with EU law, up to 2030 – the levels indicated by the World Health Organisation. As a part of the amendment to the Environmental Protection Law, the effectiveness of actions resulting from the air protection programmes and short-term action plans was significantly enhanced. Thanks to the amendment, the provincial assembly may, through a relevant resolu-

---

<sup>4</sup> PM10 – the mixture of airborne particles with a particle dimension of not more than 10 µm; it contains such toxic substances as benzopyrene, dioxins and furan.

<sup>5</sup> PM2.5 – particulate matter with a particle dimension of not more than 2.5 µm that, according to the World Health Organisation, is the most harmful to human health among other atmospheric pollutants.

tion, introduce restrictions or limitations on the operation of fuel-burning installations and determine the types or quality of fuels approved for use. So far, anti-smog regulations have been prepared and implemented for Cracow and nine other provinces: Lesser Poland, Silesia, Opole, Mazovia, Łódź, Lower Silesia, Greater Poland, Podkarpackie and Lublin. In 2017 The Economic Committee of the Council of Ministers, on the recommendation of the Prime Minister, presented the government's Clean Air Programme. Actions to improve air quality are included in the government strategy documents – the Strategy for Responsible Development by 2020 (with an outlook to 2030) and in the “Energy for the Future” Electromobility Development Plan (<https://bip.mos.gov.pl/...>). The Clean Air Programme is addressed to owners and co-owners of single-family houses. The overriding objective is to improve energy efficiency and reduce dust and other pollutant emissions from residential buildings through the thermomodernisation of buildings and the simultaneous exchange of heat sources. The implementation period covers 2018-2029. The basic condition for co-financing is the replacement of old heating facilities, i.e. furnaces and solid fuel boilers as well as the purchase and installation of new heating facilities (<https://dziennikzachodni.pl/...>). This additional funding can be obtained to purchase and instal photovoltaic microgenerators and solar collectors that can be co-financed up to 100% (but only in the form of a loan). In the case of existing buildings, potential beneficiaries may apply for additional funding in order to reduce the energy intensity of the building which covers insulating walls, replacing windows and doors, modernising central heating and water heating systems and installing ventilation with a heat recovery system). Implementation of the Program was initiated by a series of meetings in municipalities all over the country (<http://nfosigw.gov.pl/...>). In terms of improving the quality of atmospheric air, integrated measures are needed, as the current ones do not bring the intended effects. According to the review of activities on the fight against air pollution, information of which was placed in the commune, municipal and city guides (Zelga-Szmidla 2018, p. 150-151), one needs to introduce centralised measures such as those mentioned in the presented Clean Air Programme. Although the results can be considered only in a few years, it is necessary to join the programme collectively already now. This is facilitated by media and Internet campaigns.

### **Role of Perception of Air Quality Management Programmes**

Interviews were conducted at the end of September and the beginning of October 2018 in four age groups. A distinction was made between the level of education of the respondents and the regions of the Silesian Province, focusing on the areas most exposed to the problem of pollution. Silesian Province is one of the most urbanised in Poland. At the end of 2017 it was inhabited by over 4.55 million people, with a population density of 370 people/km<sup>2</sup> (<http://demografia.stat.gov.pl/...>). Open meetings organised for those interested in the Clean Air Programme proved to be very helpful. The places of the meetings are shown in *Table 3*. The interviews with attendees clearly indicate that the observed inappropriate practices result from many factors, among which the most important include: lack of sufficient knowledge about

the reasons for using heating facilities, lack of environmental awareness; as the reason for using poor quality fuels the financial aspect related to so-called energy poverty concerning residents with the lowest incomes is indicated. The discussions clearly demonstrate that the inhabitants who should join the programme in the nearest future will not do so. As a reason, the respondents point to errors on the part of the municipal authorities such as spatial planning or inappropriate land use by blocking air routes.

**Table 3. Place of analysed open meetings**

<b>Commune</b>	<b>District</b>	<b>Date</b>
City of Częstochowa	Częstochowa	28/09/2018
Miedźno	of Pszczyna	22/10/2018
Rajcza	of Żywiec	23/10/2018
City of Racibórz	of Racibórz	25/10/2018

Source: Author's own elaboration

The survey respondents declare the use of renewable energy sources in the future, mainly pointing to the installation of photovoltaic cells. By analysing the age ranges, the most pessimistic attitude regarding this subject is presented by the group of 51-60 year-olds. The most interested in the programme were the 40-50 year-olds with secondary and higher education. The source of information about the Clean Air Programme, according to the talks, is the campaign in media, information in communes and, for Rajcza and Miedźno – parish notices. Comparing the meetings in cities and in districts, one can see significant differences. Scepticism about joining and implementation occurs mostly in districts where the inhabitants are more distrustful and suspicious. The inhabitants also observe other local programmes that can be implemented and, on the examples of districts, bring even more benefits. The inhabitants of districts notice the benefits of the ban on the distribution of low quality coal (e.g. “sludge”), but there are also pathologies in form of importing worse quality energy resources from, e.g. the Czech Republic or Ukraine on clients’ request. According to the respondents “when one is limited by finances, it is the price that really matters” and environmental well-being becomes of secondary importance. In Częstochowa and Racibórz, the respondents indicate that the authorities put more emphasis on the use of public transport; there were even opinions to drastically reduce car transport. The report on the condition of atmospheric air in 2017 prepared by the Provincial Inspectorate for Environmental Protection in Katowice one year after introduction of the Anti-Smog Act shows that 11,098 old furnaces were liquidated. On the other hand, the reduction in basic air pollution is: for the “Silesian zone – 300 t/year, then for the Upper Silesian agglomeration: 269 t/year, Rybnik-Jastrzębie agglomeration: 54 t/year, the city of Bielsko Biała: 14 t/year and Częstochowa: 6.8 t/year” (<http://www.katowice.pios.gov.pl/...>).

## Conclusions

The issues of environmental management related to the ecological policy of Poland should be based on combating crime against the environment while at the same time developing the ecological competences of the society, knowledge, developing skills and shaping mindsets in order to popularise models of sustainable consumption. In actions aimed at improving air quality, it is very important to continuously work on raising the environmental awareness of the society. The main lines of action, to which particular attention should be paid, are shaping proper behaviours and attitudes of the society through various educational campaigns, including optimal ways of heating flats and the related effects. This kind of activity currently takes place on many different levels. Society must change its approach to the environment – it is true that some natural resources can be regenerated, but man still must limit his selfish attitude. Every inhabitant, especially those who live in the areas at most risk, should bear in mind reports on the causes of mortality due to air pollution as polluted air means polluted soil, water and food.

## References

1. Dobrzański G. (red.) (2010), *Ochrona środowiska przyrodniczego*, Wydawnictwo Naukowe PWN, Warszawa.
2. Flood R.L. (1993), *Beyond TQM*, John Wiley & Sons, Chichester.
3. Harry M., Schroeder R. (2001), *Six Sigma. Wykorzystanie programu jakości do poprawy wyników finansowych*, Oficyna Ekonomiczna, Dom Wydawniczy ABC, Kraków.
4. <http://demografia.stat.gov.pl/bazademografia/CustomSelect-Data.aspx?s=lud&y=2017&t=00/24> (accessed: 21.08.2019).
5. <http://www.katowice.pios.gov.pl/monitoring/raporty/2017/raport2017.pdf> (accessed: 21.08.2019).
6. [https://bip.mos.gov.pl/fileadmin/user\\_upload/bip/prawo/projekty/PROJEKT\\_POLITYKI\\_EKOLOGICZNEJ\\_PANSTWA\\_2030/Projekt\\_Polityki\\_ekologicznej\\_panstwa\\_2030.pdf](https://bip.mos.gov.pl/fileadmin/user_upload/bip/prawo/projekty/PROJEKT_POLITYKI_EKOLOGICZNEJ_PANSTWA_2030/Projekt_Polityki_ekologicznej_panstwa_2030.pdf) (accessed: 21.08.2019).
7. <https://dziennikzachodni.pl/program-czyste-powietrze-wnioski-i-zasady-jak-dostac-pieniadze-na-termomodernizacje-i-wymiane-pieca-w-prywatnych-domach/ar/13509185> (accessed: 23.09.2019).
8. <http://nfosigw.gov.pl/czyste-powietrze/aktualnosci/art.6,duze-zainteresowanie-programem-priorytetowym-czyste-powietrze.html> (accessed: 21.08.2019).
9. <https://pl.wikipedia.org/wiki/PM10> (accessed: 05.08.2019).
10. <https://pl.wikipedia.org/wiki/PM2,5> (accessed: 05.08.2019).
11. <https://www.mp.pl/pacjent/pulmonologia/aktualnosci/136508,co-roku-44-tys-polakow-umiera-przedwcześnie-z-powodu-smogu> (accessed: 23.09.2019).
12. Ingaldi M., Ociepa-Kubicka A., Seroka-Stolka O. (2016), *Proekologiczne zarządzanie w przedsiębiorstwie. Współczesne problemy i uwarunkowania*, Wydawnictwo Wydziału Zarządzania Politechniki Częstochowskiej, Częstochowa.
13. Jedliński M. (2000), *Jakość w nowoczesnym zarządzaniu*, Wydawnictwo Zachodniopomorskiej Szkoły Biznesu w Szczecinie, Szczecin.
14. Juda-Rezler K., Toczko B. (red.) (2016), *Pyły drobne w atmosferze. Kompendium wiedzy o zanieczyszczeniu powietrza pyłem zawieszonym w Polsce*, Główny Inspektorat Ochrony Środowiska, Warszawa.
15. Juran J.M. (1988), *Juran on Planning for Quality*, Free Press, New York.



16. Kryk B. (red.) (2012), *Gospodarowanie i zarządzanie środowiskiem*, Wydawnictwo Naukowe Uniwersytetu Szczecińskiego, Szczecin.
17. Kryński A., Kramer M., Caekelbergh A.F. (2013), *Zintegrowane zarządzanie środowiskiem*, Wolters Kluwer, Warszawa.
18. MŚ (2019), *Polityka ekologiczna państwa 2030*, Ministerstwo Środowiska, Warszawa.
19. Pacan A., Ulewicz R. (2017), *Research of Determinants Motivating to Implement the Environmental Management System*, "Polish Journal of Management Studies", Vol. 16(1).
20. Tatarkiewicz W. (2014), *Historia filozofii*, t. 1, Wydawnictwo Naukowe PWN, Warszawa.
21. Woźniak K. (2012), *Współczesne narzędzia doskonalenia systemów zarządzania organizacjami*, Mfiles.pl, Kraków.
22. Zelga-Szmidla A. (2018), *Zarządzanie środowiskiem w gminach zagrożonych smogiem południowej Polski*, [w:] Pachura P., Ociepa-Kubicka A., Zelga-Szmidla A., Kielesińska A. (red.), *Innowacyjność i kreatywność w zarządzaniu*, Wydawnictwo Naukowe Intellect, Wałeczków.

## ZARZĄDZANIE ŚRODOWISKOWE W KONTEKŚCIE PROGRAMÓW ZARZĄDZANIA JAKOŚCIĄ POWIETRZA

**Streszczenie:** Celem niniejszego artykułu jest przedstawienie roli postrzegania przez obywateli programów zarządzania jakością powietrza. Mimo że terminologia zarządzania środowiskiem i program gospodarki niskoemisyjnej są znane zarówno obywatelom, jak i gminom, to działają one nieefektywnie. Jakość powietrza atmosferycznego w Polsce według monitoringu środowiskowego jest słaba: zanieczyszczenie powietrza nie respektuje granic państw i tylko kombinacja działań może zatrzymać tzw. efekt domina. Treść artykułu oparta jest na wywiadach z mieszkańcami województwa śląskiego po ogłoszeniu przez rząd programu Clean Air. Wybrane osoby, z którymi przeprowadzono wywiady, sugerują zainteresowanie programem, ale mieszkańcy wskazują także inne programy i zauważają przedłużenie podjętych działań w czasie. Przedstawiono również wyniki analizy dostępnych dokumentów i informacji. Zarządzanie środowiskiem na przykładzie wybranego programu przyczyni się do poprawy jakości powietrza. Według autorki tylko program wdrożony na masową skalę przyczyni się do poprawy jakości powietrza. W tym kontekście edukacja środowiskowa staje się coraz ważniejsza. Głównym celem prezentowanych badań jest zwrócenie uwagi na podejście mieszkańców do tematów związanych z programami związanymi z jakością powietrza.

**Słowa kluczowe:** zarządzanie środowiskiem, jakość powietrza, świadomość ekologiczna