Local Political Measures to Improve the Air Quality in Urban Areas in the Context of Sustainable Development

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Abstract: This article proposes a series of local political measures that can be applied in the context of sustainable development in urban areas from Romania, considering the provisions of the Romanian legislation for the evaluation of air quality under national and European Union standards. These measures can maintain the ambient air quality in urban areas where there are limits provided by the actual legislation for air pollutants; can improve the quality of the ambient air in the urban areas where it does not fall within the limits provided by the actual legislation; as well as limit/eliminate negative effects on the environment.

1 INTRODUCTION

Sustainable development, as a notion, was historically introduced to the international community after the Conference on the Human Environment, held in Stockholm, Sweden, in 1972, a context in which the problems of education for sustainable development and environmental education were highlighted (Yenchun Jim Wu and Ju-Peng Shen, 2016).

Lester R. Brown, a specialist in the development of contemporary society, founded the World Watch Institute in Washington in 1974, promoting articles, studies, materialized in annual reports on the evolution and progress of structuring a sustainable society.

Lester R. Brown in "Plan B 2.0" highlights the conflict between industrial civilization and the environment and presents issues such as the tendency to deplete natural resources of energy, raw materials, and food, the use of renewable resources at a rate higher than their capacity regeneration, physicochemical degradation, and pollution of vital environmental factors: water, air, soil.

The involvement of the political factor in explaining and resolving these issues has offered wide international debates at a high level; for example, the 1975 Charter of Belgrade concluded that environmental problems can be identified and prevented, and/or resolved through an educational process. In the same year, 1975, the United Nations Educational, Scientific and Cultural Organization (UNESCO) launched the International Program on Environmental Education (IEEP) internationally and introduced a series of educational activities to lay the foundations for a future. environmental education plan.

This was followed by the Tbilisi Declaration (UNESCO, 1978: 25), including in Recommendation 1 (3) the purpose and objectives of environmental education: "The main objective of the environmental education is to succeed in making individuals and communities understand the complex nature of natural and built environment resulting from the interaction of biological, physical, social, economic and cultural aspects and to acquire knowledge, values, attitudes and practical skills, to participate responsibly and efficiently in anticipating and solving environmental problems and environmental quality management".

In 1983, the World Commission on Environment and Development (WCED), headed by Gro Bruntland, was set up based on a resolution adopted by the United Nations General Assembly.

The widespread definition of sustainable development was promoted by the World Commission on Environment and Development

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(WCED) in its report "Our Common Future" under the title Brundtland Report: "Sustainable development is the development that seeks to meet the needs of the present without compromising future generations to meet their own needs".

On the other hand, the Brundtland Report clarified that economic development is a continuous, evolving process, but that the strategies applied to achieve the objectives must be correlated to be adapted to the ecological limits offered by the environment and the planet's resources.

In 1987, under the auspices of UNESCO, an international conference was held in Moscow on the central theme of environmental education and the importance of sustainability in environmental education, which aimed to establish an international action plan for environmental education and training for the 1990s. It was proposed to form a system of complex knowledge on the integrity of nature, on the unity of man, society, and nature, through which to form the respective competencies, value orientations, conduct, and activity that would ensure a responsible attitude towards nature, focused on ecological education.

The "Earth Summit" took place in Rio de Janeiro in 1992, bringing together representatives from about 170 states, which adopted a series of conventions on climate change (reduction of methane and carbon dioxide emissions), biological diversity (species conservation), and stopping massive deforestation, such that to not affect the biophysical balance of the Earth, but without giving up social welfare.

In 1992, UNESCO's "Agenda 21" laid the formal foundations for sustainability education to facilitate the acquisition of knowledge that would allow understanding of environmental issues in their depth and complexity, ultimately leading to decision-making based on environmental awareness, as well as promoting opportunities to have direct experiences with the natural environment.

The United Nations Summit was held in 2002 in Johannesburg on the World Summit on Sustainable Development (WSSD), which formulated sustainable development as a central element in international politics, highlighting the multiple aspects of the concept of sustainable development and the connections between poverty, the environment and the use of natural resources. The Johannesburg Declaration promoted responsibility for economic development, social development, and environmental protection (at local, national, regional, and global) and implied the development theory and practice.

Sustainable development (SD) has become a ubiquitous development paradigm that proposes a stable theoretical framework in human-environment decisions (environment, economic environment, or social environment). The concept of sustainable development sums up economic, social, and environmental concepts that can evolve in interdependence, supporting each other.

Within the European Union, since 2006, the concept of sustainable development has been implemented in the Strategy for an enlarged Europe, based on a unitary strategic vision, for the continuous improvement of the quality of life for present and future generations, for the creation of sustainable, capable communities to manage and use resources efficiently and to exploit the potential of ecological and social innovation of the economy, to ensure social cohesion, prosperity, and environmental protection (Ţălu, 2019; Ţălu and Nazarov, 2020; Velasco et. al., 2021).

In 2010, as a process of further sustainable development of the EU, the Europe 2020 Strategy was adopted which identifies through concrete actions the objectives of promoting smart growth (education, research, innovation), sustainable (renewable resources, energy efficiency, reduction of greenhouse gas emissions). carbon) and inclusive (prosperous savings, job creation, poverty reduction, etc.).

In Rio de Janeiro, Brazil, on June 20-22, 2012, the UN Conference on Sustainable Development "Rio + 20" was held with the objectives of promoting green economic development, sustainable development, and poverty reduction, as well as assessing progress to present and existing gaps in implementation measures and obtaining results from previous summits. However, the most important goal was to identify and prevent new global challenges and threats to sustainable development. The documents adopted at the conference stressed that states must align and make joint efforts in implementing "green economy" methods to help sustainable development. States can also turn to renewable energy resources, promoting policies that reduce the global poverty rate, protect the environment, and, most importantly, effectively manage cultivation, distribution, and consumption of the planet's resources (Mensah et al., 2019).

The Development Summit in September 2015 adopted the 2030 Agenda for Sustainable Development, which covers both developed and developing countries and includes the 17 Sustainable Development Goals (SDGs), informally brought together under the name of Sustainable Development Goals. Global for the next 15 years to eradicate

extreme poverty, combat inequality and injustice and protect the planet by 2030.

On 22 November 2016, the European Commission presented the Communication "Next steps for a sustainable European future" in which it is committed to sustainable development.

Today, about 55% of the world's population lives in urban areas, and in the coming decades it is expected that this process will increase. Clean cities with green spaces harmoniously located are more attractive offering environmental benefits, but also substantial economic benefits and social co-benefits (Bulkeley and Betsill, 2005; Nuţă et. al., 2015; Rainald and Schrauth, 2021).

Romania strives for the implementation of the 2030 Agenda by local institutions, in line with the needs, interests, and concerns of citizens, by defining local and national development strategies.

An appropriate strategy on economies and urban environments is addressed through the Urban Development Strategies supported by the Alliance of Cities, in which environmental issues are seriously and sustainably analyzed. Considered important as a whole, these experiences highlight the process of urban governance for solving and improving the environmental conditions in cities.

In this article are shown the main solutions approached in urban areas in Romania by developing innovative tools for urban impact assessments to support air quality and climate change, by analyzing technological and non-technological measures and local administrative policy options.

2 RESEARCH METHODOLOGY

In this study, a set of questions was proposed:

1) What are the policies of local governments that can be effectively applied to improve air quality and reduce air pollution, depending on local urban conditions?

2) How the responses of environmental factors are integrated through planning and management in urban areas in Romania?

3 DISCUSSION

In recent decades, the impact of air pollution on health has been intensively studied by researchers and has highlighted the correlation between high levels of air pollution and conditions such as allergies, respiratory diseases, and cardiovascular diseases.

This effect is particularly prevalent in urban centers, where there has been an increase in mortality rates and a reduction in life expectancy, as well as high economic costs for cities and health systems (Goodsite et al., 2021).

At the first WHO global conference on air pollution and health in 2018, air pollution was described as a "silent public health emergency". Medical motivation is statistically expressed by the 7 million premature deaths annually due to the effects of air pollution, of which about 4 million are due to air pollution (outside). Besides, to reduce life expectancy, air pollution has a clear negative impact on our daily lives, triggering respiratory illness, medical leave, hospitalizations, and loss of education and careers. In general, children are more vulnerable to air pollution: because exposure to air pollution in early childhood, in a phase of lung development, crystallizes in the reduction of lung capacity that persists into adulthood (Goyal et. al. 2020; Rao et al., 2014).

Among the key pollutants of short duration, which has a negative influence on human health, we highlight:

a) Black carbon (BC, also known as soot) which is part of the composition of fine particles (particulate matter - PM, especially 2.5 μm - PM2.5), which is the air pollutant with the most harmful effect on human health and the main initiator of mortality caused by air pollutants. Also, PM is related to genotoxicity and mutations.

b) Methane (CH_4) is a precursor to ground-level ozone, which is the cause of asthma and other respiratory diseases, leading to premature deaths related to air pollution. Ozone also harms plants, resulting in crop losses of $ 11-18 billion annually (Yan et. al, 2018).

Air pollution with various pollutants comes from a wide variety of sources, such as road transport, agriculture, thermal power plants, industry, and households. In urban centers, vehicles are a primary source of mobile pollution. The development and implementation of local policies, at different levels, to address these phenomena in their complexity is a difficult task, given the different geographical locations and economic activity, which converge on the idea that there is no universal solution to combat pollution air. However, to reduce exposure and subsequent adverse effects, local authorities through effective and long-term measures must limit local pollutants, such as sources, demographics, transport infrastructure and the local economy.

In the literature are presented many sets of tools and methodologies for the use of city authorities in

environmental planning and management (Bălănică, et. al, 2019; Iordache, and Dunea, 2013; Năstase et al.,2018; Paraschiv and Paraschiv, 2019; Oncioiu et al., 2020; Charini et al., 2021).

Real-time air quality parameters are evaluated using 100 stations in Romania by the National Air Quality Monitoring Network (RNMCA, 2021), in the process of air quality assessment is performed by performing measurements at fixed points or by applying numerical methods by mathematical modeling following the dispersion in time of pollutants emitted into the atmosphere.

In Romania, there are three types of regimes: A, B, and C associated with the zones and agglomerations for sulfur dioxide, nitrogen dioxide, and nitrogen oxides, suspended particles, lead, benzene, carbon monoxide, ozone, arsenic, cadmium, mercury, nickel, and benzo(a)pyrene. In the case of zone A, the evaluation of the ambient air quality is performed by performing measurements at fixed points, but in exceptional cases, mathematical modeling and/or indicative measurements can be applied. For zone B the assessment of ambient air quality involves the application of fixed-point measurements and modeling and/or indicative measurement procedures. In the case of zone C, the assessment of ambient air quality is done only by modeling procedures or objective estimation techniques.

The directions of action proposed by the National Strategy for Sustainable Development of Romania for the period 2030, propose an overall political vision of the measures to be implemented at a national level.

In the case of urban areas in Romania, we consider that they can be applied extensively with efficiency in the policies of local administrations for the improvement of air quality and the reduction of air pollution, the following measures depending on local conditions:

- improving the sanitation activity of urban areas;
- expanding pedestrian areas and encouraging cycling;
- compliance with the provisions of the building permits, with all the documentation related to the environmental agreement, and of other specialized approvals for the completion of the investment objectives;
- compliance with the provisions of environmental legislation and the conditions stipulated in the regulatory acts for construction sites;
- observance of the maximum time limit approved for the execution of municipal works

(repair works of public roads and restoration of green spaces);
- location of hypermarkets in the peripheral areas of urban areas;
- extensive application of integrated air quality management programs for urban agglomerations and ensuring public access to real, online information on air quality;
- increasing the number of thermally rehabilitated homes and blocks of flats;
- finding solutions for upgraded variants of some district thermal power plants with high efficiencies;
- modernization of public transport lines with electric vehicles;
- introduction of the intelligent traffic light system and arrangement of above-ground and underground parking lots;
- implementation of some bypasses of the urban areas, through the ring roads;
- application of an efficient national program for decommissioning of old vehicles;
- the location of the locations of the large industrial platforms on the outskirts of the city, in the opposite direction from which the wind acts with predilection;
- implementation of new non-polluting economic activities in the services sector and closure of highly polluting systems;
- application of ecological projects and programs correlated with the socio-economic development strategy;
- attracting private investors for the exploitation of alternative energy resources (technology parks) and the introduction of renewable energy sources (especially hydropower and solar energy);
- projects for national and international financing programs in the field of use of renewable resources.
- intensifying collaborations with institutions specialized in urban issues;
- increasing the areas of green spaces compared to the spaces occupied by constructions;
- the application of ecological anti-skid material in order not to favor its resuspension in the ambient air at the contact with the wheels of the motor vehicles;
- rehabilitation of the used road network and efficiency of the road traffic;
- modernization of the car park (means of public transport, e.g. vehicles with power supply);
- promoting public transport;
- limiting the influx of cars in the central area,

- efficient recovery of renewable energy sources;
- attracting private investors who use clean technologies and developing "green" technology centers and parks;
- application of "greenhouse" type programs, by promoting systems that use solar, geothermal, wind energy, and other systems that lead to improved air quality.

4 CONCLUSIONS

In this article were proposed a series of local political measures that can be applied in the context of sustainable development in urban areas from Romania, considering the provisions of the Romanian legislation for the evaluation of air quality under national and European Union standards.

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