



World Scientific News

An International Scientific Journal

WSN 104 (2018) 190-201

EISSN 2392-2192

The role of green areas in shaping sustainable development of the city

Justyna Imiolczyk

Faculty of Management, Czestochowa University of Technology, Czestochowa, Poland

E-mail address: justyna.celica@gmail.com

ABSTRACT

The subject of considerations in the following study is the role of green areas and their impact on the sustainable development of cities. Sustainable development is a concept that gains in importance in the last time. It fulfills a particularly important role in cities, where the level of environmental degradation is high. Green areas are an important element of infrastructure and have a positive impact on the shaping of urban space. The study presents changes in the area of green areas in the city of Czestochowa over the years 2015-2016.

Keywords: Sustainable development, green areas, public space

1. INTRODUCTION

Since the concept of sustainable development, it has been implemented in various territorial organizations, including in cities, as the basis for their operation. This applies in particular to large units in which sustainable development fulfills a significant and specific function (Godschalk, D. R., 2004, pp. 5-13.). Cities as individuals with a significant degree of air pollution and environmental degradation are increasingly adopting the concept of sustainable development as an element of strategy. At each level of development planning, the specificity of a specific territorial unit, its internal and external conditions and environment should be taken into account. Urban greenery is an important element of sustainable urban

development, it performs ecological, technical and health functions. The preservation of such areas has a positive effect on the aesthetics of the area. Municipal greenery also has social and economic functions, including a recreational, leisure or tourist function (White, E. V., Gatersleben, B., 2011, pp. 89-98). Creating cities in which the share of green areas is significant influences the level of implementation of the idea of sustainable development. This concept contributes to the improvement of the quality of life and transformation of polluted cities into cities that seek to reduce pollution and increase the comfort of living of residents (Pearce, D., Barbier, E., Markandya, A., 2013, p. 20).

2. SUSTAINABLE URBAN DEVELOPMENT

It is widely recognized that the idea of sustainable development appeared already in the 1960s. This concept is an attempt to answer questions about the threats related to the dynamic development of global economies, fast economic growth, depletion of non-renewable environmental resources, pollution of the natural environment, differences in the wealth of nations and the disruption of many ecosystems. The concept of sustainable development has gained the most importance after the publication of the report of the World Commission on the Environment and Development of the United Nations in 1987. This document highlights the need to connect economic goals with economic and social goals. However, first mentions and attempts to adapt the concept of sustainable development should be sought much earlier. Maintaining the balance of the natural and cultural environment is an issue that has arisen since the development of civilization (Bansal, P., 2005, pp. 197-218).

Sustainable development is an idea that has taken a key place among the development priorities of contemporary European societies and economies (Moon, J., 2007, pp. 296-306).

Progressive consumerism makes issues related to environmental protection more and more often considered. One of them is sustainable development, the essence of which is to strive for development with the least possible interference in the environment. The goal of the concept is to strive for economical rational use of resources (Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L., Holling, C. S., Walker, B., 2002, pp. 437-440). Sustainable development also assumes that human activities should not disturb the natural environment and should be left in the best possible condition for future generations (Gechev, 2005, p. 1).

Sustainable development refers to three dimensions such as economics, ecology and society (Keiner, 2004, p. 381). Their coherent functioning and proper relations between them are essential. The economic dimension refers primarily to economic development and efficient and rational use of resources, the ecological dimension assumes protection of the natural environment and natural resources, while the social aspect assumes improvement of the quality and living conditions of society (Hall, J. K., Daneke, G. A., Lenox, M. J., 2010, pp. 439-448).

The global management system is multi-level and fragmented. It covers problems related to both the entire economy and local problems, including pollution and environmental degradation. At the local level, many solutions are implemented that affect the level of sustainable development of a given area. This study presents one of the practices which is striving to increase the area of green areas.

For cities and regions, the management system must include: environmental aspects (the quality of air and water, the emission of carbon dioxide and other harmful substances into the air):

- purposefulness and attractiveness for the local community (security, social cohesion, demand for public services, accessibility of urban services),
- the economic capacity of the city and the region to provide services necessary for economic entities, employment and trade (taking into account the rational and economical use of resources and energy - and the needs of future generations).

Considering that a significant part of the world's population lives in cities and urban areas, the concept of sustainable development depends to a large extent on the sustainable development of cities and suburban areas (Laconte, 2018, pp. 2-3).

A city is a unit composed of many different elements, between which there are different types of relationships, functioning in a specific environment and in a specific area. It is a territorial social system, acting as a dynamically changing whole. Should be treated as a dynamic, functional whole. The essence of the concept of the territorial social system, especially in relation to the city, is to meet the needs of the inhabitants of a given area and to take into account their opinions in creating and determining directions of development. The city requires an integrated approach to the implementation of the idea of sustainable development taking into account the social, economic and ecological aspects, taking into account spatial and institutional conditions (Jabareen, Y. R., 2006, pp. 38-52).

3. THE IMPACT OF PUBLIC GREENERY OF THE FUNCTIONING OF THE CITY

Green cities being a factor shaping sustainable development is manifested in comprehensive pro-ecological activities aimed at improving the quality of life of residents. Urban green areas are an important element of public space. They are classified as a strategic element of the city's urban furnishings, including recreation and other manifestations of residents' activity (Shu-hua, L. I., 2005, p. 10).

Currently, many initiatives are taken to promote activities aimed at caring for the city's infrastructure and increasing the share of green areas. Green areas can be divided due to different criteria. Table 1 presents the breakdown due to functionality and availability and the way it is created. Table 2 presents classifications due to the tasks and functions of urban greenery.

Table 1. Types of green areas

[Source: Own study based on White, E. V., Gatersleben, B. (2011). *Greenery on residential buildings: Does it affect preferences and perceptions of beauty?*. Journal of environmental psychology, 31(1), 89-98]

Type	Description
Public areas	It is mainly used for passive and active recreation - parks, green spaces, boulevards, municipal forests, promenades.

Areas of greenery for special purposes	These are mainly green insulation belts, greenery that accompanies communication, didactic gardens, workers' allotment gardens, cemeteries, parks and historical gardens.
Green areas accompanying various objects	They include greenery accompanying housing estate and individual housing, accompanying cultural and social services, accompanying commercial and industrial facilities, accompanying business services or technical services.
Areas of the horticultural, agricultural and forestry economy	Included in them are garden farms and nurseries of ornamental trees and shrubs, production farms, agricultural and livestock farms or production forests.
Greenery for recreation, excursion and tourism	Includes bases, land resorts, forestry and rest resorts as well as municipal forests, forest parks.
Natural areas	It is mainly forests, meadows, greenery near water reservoirs.
Designed green areas	These include green areas, parks, street greenery, cemeteries, allotments, lawns, flower beds, boulevards, green of greenery designed.
Public green areas - open	These include urban, central, district, cultural and leisure parks, green spaces, public green areas, greenery that accompanies public transport, promenades, boulevards, municipal and suburban forests, insulation, windbreaks.
Green areas with limited availability	They include botanical gardens, zoological gardens, and ethnographic gardens, allotments, cemeteries (denominational, historical), historic parks and gardens.
Greenery areas	Greenery is included in them housing estate, przedgódkki, garden behind the house, playgrounds, greenery at nurseries and kindergartens, primary and secondary schools, at universities, greenery accompanying cultural and social facilities, state, central and field administration buildings.
Production areas	Areas where production facilities, warehouses, warehouses, bases and workshops are located.
Agrotouristic grounds	Areas on which there are objects for recreation in conditions similar to the countryside.
Areas of touristic and holiday greenery	These are mainly holiday resorts, national and landscape parks.

Creating urban greenery is one of the tasks of local authorities. The basis for planning the amount of green areas in cities should be relevant data related to spatial development and striving to increase their impact on the effective and sustainable development of urban areas. Plans for the area of green areas should be included in the relevant documents, eg city development strategy or environmental protection program. In order to determine the amount and area of green areas in urbanized areas, specific indicators enabling objective evaluation are applied. They are one of the measures forwarded each year by the city authorities to the Central Statistical Office (Wolch, J. R., Byrne, J., Newell, J. P., 2014, pp. 234-244). Urban greenery in the form of parks, green areas, squares, garden gardens, green areas on housing estates, forests affects the aesthetics of the city and the perception of its appearance.

The behavior of people in the public space can be divided into three types:

- necessary behaviors eg (way to work),
- optional behavior (eg walk, stop in urban space for relaxation),
- social (eg greetings, conversations).

It has been observed that the high aesthetic values of public space contribute to the prolongation of the necessary behavior. It can therefore be assumed that the higher the quality of public spaces, the greater tendency of the society to stay in it to establish contacts and increase the level of social life. Land development in cities should enable satisfying the needs of the local community in the scope of recreation rest and active spending in public space, and encourage social behavior. The role of green areas affects the perception of a given territorial unit, as well as the quality of life of residents. Green areas and their aesthetics affect the city's perception and attractiveness, especially when the existing development is significantly widespread (Maas, J., Verheij, R. A., Groenewegen, P. P., De Vries, S., Spreeuwenberg, P., 2006, pp. 587-592.).

4. ANALYSIS OD THE AREA OF GREEN AREANS IN THE CITY OF CZESTOCHOWA

Public green areas are a basic element of the urban space of cities. They fulfill ecological, social and aesthetic role, which increases with the development of contemporary cities. The basic legal acts regulating issues related to green terns include:

- Act of 16 April 2004 on nature protection (consolidated text, Journal of Laws of 2016, item 2134, as amended),
- Act of 13 September 1996 on maintaining cleanliness and order in communes (unified text Journal of Laws of 2017, item 1289).

Municipal green areas in accordance with the act on protection and shaping the environment have been recognized as natural objects, which should be protected and used in a way that allows their survival for the needs of the next generations. The "urban green area" means vegetation complexes that meet relaxation, health and aesthetic objectives, in particular: parks, green spaces, greenery on squares, streets, insulation greenery and workers' allotment gardens. In the city of Czestochowa, the division of green areas due to their functions is as follows:

- a) Greenery available
 - passive recreation areas - city parks, green areas,
 - active recreation areas, cultural parks, municipal forests
 - Green areas with limited access and special purpose:
 - employee gardens,
 - cemeteries,
 - historic parks and gardens.
- b) Greenery area
 - estate parks,
 - greenery near public facilities,
 - greenery near transport routes
- c) Areas of agriculture and forestry
- d) Excursion and recreation areas
 - suburban forests,
 - leisure and sports facilities,
 - national parks
- e) Open areas.

The open areas of Czestochowa are divided into two groups:

- furnished green areas with urban functions (parks, green areas, squares and areas of temporary undeveloped areas, street greenery),
- natural green areas are a remnant of old natural systems separated by buildings and communication roads without ecological continuity.



Figure 1. Park Staszica in Czestochowa

[Source: www.polskieszlaki.pl/parki-podjasnogorskie-w-czestochowie.htm access (25.05.2018)]



Figure 2. Park 3 Maja in Czestochowa

[Source: http://fotopolska.eu/Czestochowa/b76089,Par3_3_Maja.html?f=922294-foto (25.05.2018)]



Figure 3. Lisiniec Park project

[Source: <http://zdrowaczestochowa.pl/article/9662/> access 25.05.2018]



Figure 4. Solidarnosc Square

[<https://www.mapofpoland.pl/Czestochowa,zdjecie,77643,Skwer-Solidarnosci.html#galeria> access 25.05.2018]

The mentioned types of areas form the so-called urban nature system and only their interconnectedness can affect the improvement of living conditions in urban areas. For the proper functioning of urbanized systems, green areas are one of the basic elements of spatial development and are part of the city's assets.

Using data from the Central Statistical Office, Table 1 presents green areas in the Czestochowa municipal commune in 2012-2016. Table 2 analyzes the area of green areas in the city of Czestochowa in 2005, 2010, 2015 and 2016.

Table 3. Area of green areas in the city of Czestochowa

[Source: Own study based on <http://stat.gov.pl/>]

Name	Type	Unit	2013	2014	2015	2016	2017
plantings	trees	quantity	1 097	3 748	681	1 849	892
plantings	shrubs	quantity	34 125	25 703	17 218	53 319	18 982
losses	trees	quantity	969	3 908	1 769	8 281	6 151
losses	shrubs	quantity	42	4 324	387	12 076	1 187

walking and recreational parks	objects	quantity	11	11	11	11	11
walking and recreational parks	surface	hectare	148,3	151,49	154,74	154,78	154,78
lawns	objects	quantity	80	82	95	92	93
lawns	surface	hectare	40,6	36,98	39,91	38,59	38,77
street greenery	surface	hectare	135,3	144,44	150,56	146,81	146,62
estate green areas	surface	hectare	294,1	300,09	292,68	293,43	311,54
parks, green areas and greenery areas	surface	hectare	483,0	488,56	487,33	486,80	505,09
cemeteries	objects	quantity	11	11	11	12	12
cemeteries	surface	hectare	56,7	56,70	50,78	52,28	52,28
municipal forests	surface	hectare	32,0	32,00	32,00	32,00	32,00
share of parks, green areas and estate green areas in the total area		%	3,0	3,1	3,1	3,0	3,2
walking and recreational parks	objects	quantity	11	11	11	11	11
walking and recreational parks	surface	hectare	148,3	151,49	154,74	154,78	154,78
lawns	objects	quantity	42	44	57	54	55
lawns	surface	hectare	26,2	22,59	25,52	24,20	24,38
estate green areas	surface	hectare	76,5	75,74	68,33	72,38	72,41
total (in cities and in the countryside)	surface	hectare	70 531	76 662	77 664	75 770	78 794

Table 4. Area of green areas in the city of Czestochowa

[Source: Own study based on <http://stat.gov.pl/>]

Years	2005	2010	2015	2016
Green areas	Surface [ha]			
walking and park parks	145,6	148,3	154,78	154,78
lawns	29,6	39,2	28,59	38,77
street greenery	109	135,3	146,81	146,62
estate green areas	378,7	263,4	293,43	311,54
Totality	662,0	586,2	633,61	651,71
Area per capita [%]	0,27%	0,25%	0,28%	0,29%

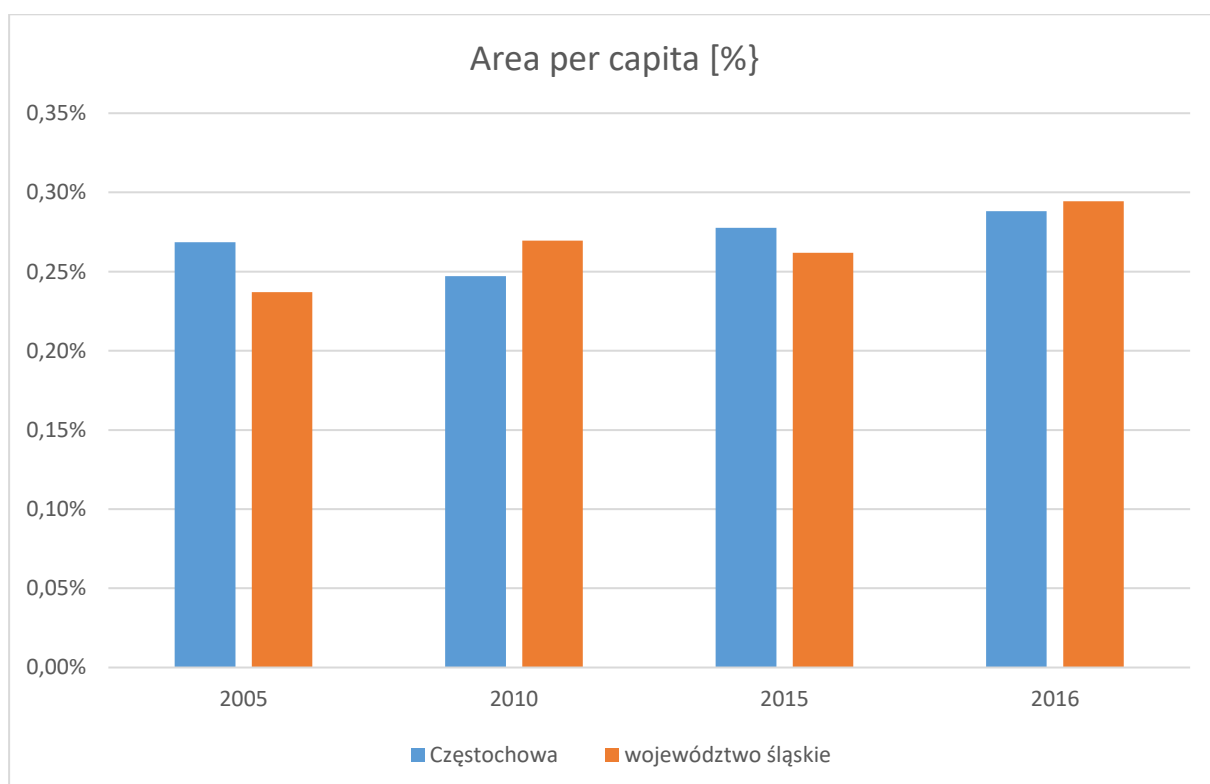


Figure 5. The area of green areas in the city of Czestochowa per capita

[Source: Own study based on <http://stat.gov.pl/>]

The total number of green spaces in the city of Czestochowa decreased slightly in 2016 in relation to the base year. Taking into account particular types of green areas, it is possible to observe an increase in the area of walking and recreation parks, green areas and street greenery, which is undoubtedly a positive phenomenon from the perspective of sustainable development of the city. However, the area of estate greenery decreased compared to the base year, however, in the last research year one should notice their progress in relation to previous years. The area of green areas per capita has increased.

The figure shows the areas of green areas calculated per capita (expressed in area hectare per one inhabitant) in the city of Czestochowa and the province of Silesia. This size is an important and at the same time the most reliable environmental measure, important especially for urban areas. The area of green areas per capita in the city of Czestochowa is at a similar level as in the Slaskie Voivodeship. In the base year, this indicator in the city of Czestochowa was higher. In the last year of research, these values are very similar, but in Czestochowa the rate is slightly lower. This means that the city of Czestochowa, against the background of the Silesian Voivodeship, shapes the level of public greenery at an appropriate level.

5. CONCLUSIONS

Implementation of the principles of sustainable development in cities requires a thorough knowledge of individual elements of the city system and relations between them. It is necessary to define the goals and tasks leading to achieving the balance within the given unit, as well as adjusting them to local conditions. This is a certain difficulty due to the inability to model solutions implemented in other units, which is caused by differences in spatial, geographical, climatic, natural, political, social and economic conditions. The shaped public space of cities affects the quality of life of residents and economic conditions. City authorities should preserve the quality of life of city dwellers and ensure high quality of the natural environment and the availability of various types of goods and services, including access to green areas. The emphasis on the idea of sustainable development is placed on the subjective treatment of residents and the care of the surroundings (Berke, P. R., & Conroy, M. M., 2000., pp. 21-33, Griggs, D., Stafford-Smith, M., Gaffney, O., Rockström, J., Öhman, M. C., Shyamsundar, P., Noble, I., 2013, p. 305.). Green areas have a significant impact on shaping the quality of life in the city. They are considered to be important for the conservation of natural resources and, at the same time, sustainable development of the city.

Public greenery is an inseparable development of the spatial city. The number and area of green areas is varied in individual areas, however local authorities, both through their own activities and the application of incentive measures to the local community, should contribute to increasing their share in the total area of the city.

References

- [1] Gechev R., The Essence of Sustainable Development [in:] Sustainable Development, Economic Aspects, University of Indianapolis Press, Indianapolis 2005.

- [2] Keiner M., Re-emphasizing sustainable development – the concept of ‘evolution ability’, *Environment, Development and Sustainability* 2004, no 6.
- [3] Godschalk, D. R. (2004). Land use planning challenges: Coping with conflicts in visions of sustainable development and livable communities. *Journal of the American Planning Association*, 70(1).
- [4] White, E. V., Gatersleben, B. (2011). Greenery on residential buildings: Does it affect preferences and perceptions of beauty? *Journal of Environmental Psychology*, 31(1), 89-98.
- [5] Bansal, P. (2005). Evolving sustainably: A longitudinal study of corporate sustainable development. *Strategic Management Journal*, 26(3), 197-218.
- [6] Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L., Holling, C. S., Walker, B. (2002). Resilience and sustainable development: building adaptive capacity in a world of transformations. *A Journal of the Human Environment*, 31(5), 437-440.
- [7] Hall, J. K., Daneke, G. A., & Lenox, M. J. (2010). Sustainable development and entrepreneurship: Past contributions and future directions. *Journal of Business Venturing*, 25(5).
- [8] Jabareen, Y. R. (2006). Sustainable urban forms: Their typologies, models, and concepts. *Journal of Planning Education and Research*, 26(1).
- [9] Shu-hua, L. I. (2005). Constructing Landscape Greenery Space Using Native Plants . *Journal of Chinese Landscape Architecture*, 1.
- [10] Wolch, J. R., Byrne, J., & Newell, J. P. (2014). Urban green space, public health, and environmental justice: The challenge of making cities ‘just green enough’. *Landscape and Urban Planning*, 125, 234-244.
- [11] Maas, J., Verheij, R. A., Groenewegen, P. P., De Vries, S., Spreeuwenberg, P. (2006). Green space, urbanity, and health: how strong is the relation? *Journal of Epidemiology & Community Health*, 60(7).
- [12] Berke, P. R., Conroy, M. M. (2000). Are we planning for sustainable development? An evaluation of 30 comprehensive plans. *Journal of the American Planning Association*, 66(1).
- [13] Griggs, D., Stafford-Smith, M., Gaffney, O., Rockström, J., Öhman, M. C., Shyamsundar, P., ... & Noble, I. (2013). Policy: Sustainable development goals for people and planet. *Nature*, 495 (7441).
- [14] Pearce, D., Barbier, E., & Markandya, A. (2013). Sustainable development: economics and environment in the Third World. Routledge.
- [15] Moon, J. (2007). The contribution of corporate social responsibility to sustainable development. *Sustainable Development*, 15(5).