

DEVELOPMENT OF SUSTAINABLE LIVING ENVIRONMENT IN THE CITIES THROUGH THE BIOECONOMY

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Abstract. Around three quarter or 72.4 % of the European Union's population live in urban areas, and this share continues to grow; thus, towns and cities are the centres of economic activity and social life. At the same time, the constant increase of population, a lack of strategic planning and poor environment management cause a lot of problems for the living environment and life quality. Such situation analysis initiated this study which is of theoretical nature and aims to provide the knowledge base for development of sustainable living environment in the cities through the bioeconomy. The aim of the study was to explore the living environment from the sustainability perspective and to describe the key areas of life where bioeconomy can facilitate development of sustainable living environment in the cities. In this research, suitable qualitative and quantitative research methods were applied. The research finds out that most of the European cities have common environmental problems, with most worrying issues being air pollution and water pollution. Therefore, providing qualitative and sustainable living environment in urban areas has become an important issue. In this study, the authors have explained concept of sustainable living environment, which focuses on the following: good state of environment, biodiversity and well functioning ecosystem services, housing conditions that promote wellbeing, low carbon and energy efficient solutions, sustainable use of natural resources. It were concluded that this concept could be met through the development of bioeconomy.

Key words: bioeconomy, sustainable living environment, Latvia.

JEL code: Q5, Q57.

Introduction

According to statistical information (Eurostat, 2015a), around three quarter or 72.4 % of the European Union's population live in urban areas, and this share continues to grow, thus towns and cities are the centres of economic activity and social life. At the same time, the constant increase of population, a lack of strategic planning and poor environment management cause a lot of problems for the living environment and life quality. These problems can be considered as main drivers of societal challenges of the 21st century such as climate change, natural resource scarcity and environmental pollution that demand transformative change (McCormick K., Kautto N., 2013). Many examples can already be observed when the mentioned problems associated with living environment have become the main reason why people choose to leave urban areas and try to search residence with better living conditions.

Over the past two decades, biotechnology has provided a motor for environmentally sustainable production and for the development of a diverse

range of innovative products. The potential economic and environmental benefits of biotechnology have created a growing strategic interest in the bioeconomy (OECD, 2009). An early definition of bioeconomy offered by the OECD (2006) supposes that "*bioeconomy is the aggregate set of economic operations in a society that use the latent value incumbent in biological products and processes to capture new growth and welfare benefits for citizens and nations*". In more recent communication, the OECD (2009) has changed the concept defining bioeconomy as "*transforming life science knowledge into new, sustainable, eco-efficient and competitive products*". The United States of America (The White House, 2012) suggest that "*bioeconomy is based on the use of research and innovation in the biological sciences to create economic activity and public benefit*". In Europe, the concept of bio-based economy offered by the European Commission (2012) is very broadly used. This concept of the bio-based economy is also used in Finland and Sweden and states that "*a bio-based economy integrates the full range of natural and*

renewable biological resources – land and sea resources, biodiversity and biological materials (plant, animal and microbial), through the processing and the consumption of these bioresources". From such definitions, it can be concluded that concept of bioeconomy focuses on an economy which is based on the use of biomass resources rather than fossil-based products and systems. It can be also understood that bioeconomy is an economy where the basic materials, chemicals and energy are derived from renewable biological resources, such as plant and animal origin resources.

Such situation analysis served as the basis for the research **hypothesis**: bioeconomy can foster development of sustainable living environment in the cities. The defined hypothesis initiated the **aim** of this research: to provide the knowledge base for development of sustainable living environment in the cities through the bioeconomy. The following research **tasks** are advanced to achieve the set aim:

- 1) to explore living environment from the sustainability perspective;
- 2) to describe the key areas of life where bioeconomy can facilitate development of sustainable living environment in the cities.

To achieve the set aim and tasks of the research, the authors have used the publications and studies of foreign scientists and statistical data from Eurostat. The research authors widely have applied generally accepted research methods in economics, i.e. monographic descriptive method as well as analysis and synthesis methods to study the problem elements.

Research results and discussion

1. Exploration of living environment from the sustainability perspective

According to Muslim M.H. and co-authors (2012), living environment can be examined from various standpoints, such as an architectural,

been also pointed out that in recent decades, the interest in research on living environment has risen, and various approaches, concepts and viewpoints have been applied by housing researchers from an extensive range of disciplines (Muslim M.H. et al., 2012). In this research authors' have focused on exploring living environment from the ecological and environmental perspective as urban environmental problems are threats to present or future human well-being, resulting from human-induced damage to the physical environment, originating in or borne in urban areas (DANIDA, 2000).

Most of the European cities have common environmental problems such as poor air quality, high levels of traffic and congestion, poor-quality built environment, high levels of ambient noise, derelict land, greenhouse gas emissions, urban sprawl, generation of waste and wastewater. Danish International Development Agency (DANIDA, 2000) has ranged all of these problems by type of hazard in five groups:

- biological pathogens (pathogens in the open water bodies, at municipal dumps; contaminated water in piped systems);
- chemical pollutants (ambient air pollution from industry and motor vehicles; water pollution; hazardous wastes);
- physical hazards (traffic hazards; violence; natural disasters and impact because of inadequate attention to prevention and mitigation);
- citizens' access to land for housing (important influence on housing quality directly and indirectly);
- heat island effect and thermal inversions (raised temperatures a health risk).

There is a strong consensus among the European Union (EU) residents about the importance of environmental protection, the most worrying issues being air pollution and water

pollution (Eurostat, 2015b). Air pollution is both an environmental and a social problem, as it leads to a multitude of adverse effects on human health, ecosystems, the built environment and the climate. Air pollution poses the single largest environmental health risk in Europe today (EEA, 2015). Air pollution is, thereby, a complex problem that poses multiple challenges in terms of management and mitigation (EEA, 2015).

Since providing qualitative and sustainable living environment in urban areas has become an important issue, governments in national and international level have made policies and strategic planning documents with the aim to improve current conditions of living environment in cities and to make it sustainable for next generations.

Sustainable urban development - economic, social and environmental - is central also in the European Union's Regional Policy. Principle of sustainable development is included in the European Union's Lisbon Strategy (European Council, 2000), which defines that a competitive, knowledge-based economic growth must be in harmony with nature and culture as well as in the European Union's Sustainable Development Strategy (European Commission, 2009). In 2005, the European Commission approved the EU "Thematic Strategy on the Urban Environment" which sets goals and objectives for improving the urban environment and promotes sustainable development in the large cities. As a continuation of the Lisbon Strategy in 2010, the Europe 2020 (European Commission, 2010) strategy was created which aim is "smart, sustainable and inclusive growth", and urban areas are considered as being central to achieving its targets. Sustainable growth in this strategy means: to promote a more competitive economy in which resources are used efficiently and sustainably, while carbon dioxide emissions should be as low as possible; to protect the environment and to prevent the loss of biodiversity; to strengthen European leadership

in developing new green technologies and production methods. Furthermore, urban development issues have been integrated, to a large extent, into regional and national programmes supported by structural and cohesion funds, principally the European Regional Development Fund (ERDF) and the European Social Fund (ESF). For example, during the period 2014–2020, each EU Member State should invest at least 5 % of the ERDF in sustainable urban development.

Such situation analysis let the authors to conclude that sustainable living environment in the cities should be developed on the conceptual basis (Figure 1).

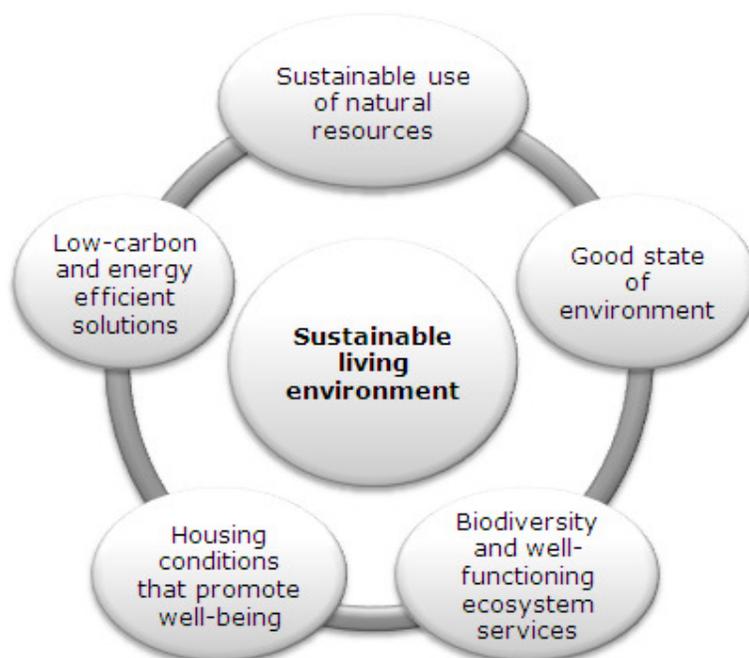
According to information summarized in Figure 1, the concept of sustainable living environment should focus on the following: good state of environment, biodiversity and well functioning ecosystem services, housing conditions that promote wellbeing, low carbon and energy efficient solutions, sustainable use of natural resources. In the second part of this research, the authors have explored how this concept can be met through the development of bioeconomy.

2. Key areas of life where bioeconomy can facilitate development of sustainable living environment in the cities

In the frame of this study more recent definition of bioeconomy were used (European Commission, 2012). In this definition bioeconomy encompasses the sustainable production of renewable resources from land, fisheries and aquaculture and their conversion into food, feed, fibre, bio-based products and bio-energy as well as the related public goods. Such definition indicates that according to concept of bioeconomy biomass resources are transformed into competitive bioeconomy products. The total bioeconomy includes:

- the traditional biobased sectors such as agriculture, horticulture, forestry, fisheries, food and feed, pulp and paper;

- the new biobased sectors such as biotextile, biochemistry, bioenergy and biotechnology.



Source: authors' construction adopted from Ministry of the Environment of Finland, 2015

Fig. 1. **Concept of sustainable living environment**

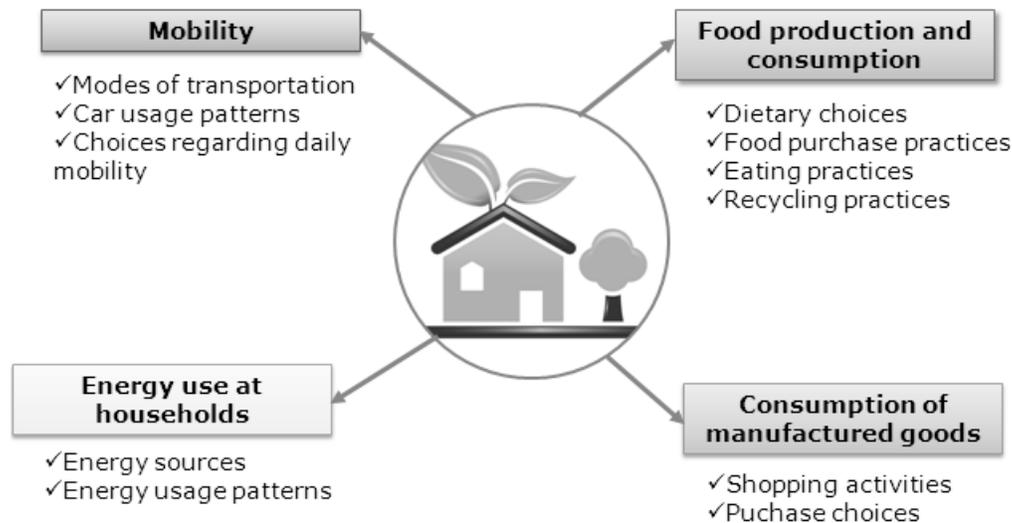
Therefore, food security, energy security, sustainable production, public health, natural resources, climate change, economic and social development are main advantages and benefits from development of bioeconomy.

In the context of this study authors would like to point out that bioeconomy relies on renewable natural resources to produce food, energy, products and services. It means that bioeconomy goes in line with the principles of sustainable development, and thus also it affects development of sustainable living environment in the cities.

However, according to A. Dumitru and co-authors (2015), alternative conception for living environment and lifestyles that would support bioeconomy products are only possible if there is presence of social acceptability as well as reasonable level of wellbeing and relatively fair distribution of opportunities and resources.

In order to meet the set aim of this study authors presumed that living environment is highly connected with and influenced by people lifestyles. This corresponds to L. Rydén and co-authors (2003) that state that "*way we live, our lifestyle, is what leads to environmental impact*". Although A. Dumitru and co-authors (2015) point out that lifestyle is outcome of many different decisions and behaviours, which, taken together, have a certain environmental impact. Thus, concept of sustainable lifestyles implies that - the more person acts sustainably, the more sustainable this person lifestyle would become.

On the basis of previous research (Dumitru A. et al., 2015; Finland Ministry of the Environment, 2015; Rydén L. et al., 2003), the authors have identified the main areas of life and people's choices where bioeconomy can facilitate development of sustainable living environment (Figure 2).



Source: authors' construction adopted from Dumitru A. et al., 2015

Fig. 2. Areas of life where bioeconomy can facilitate development of sustainable living environment in the cities

The choices that people make regarding the main life areas – food production and consumption; consumption of manufactured goods; energy use at households; mobility – can open the way for the re-thinking of conditions for societal transformations towards sustainability. However, lessons from lifestyle changes supported by the different municipalities in Sweden (Rydén, L. et al., 2003) have shown that:

- the alternatives leading to sustainable development must be made attractive;
- the alternatives should be close to the citizens, easily accessible, and visible;
- information about the alternatives should be communicated in a clear and personal way;
- local authorities have a responsibility to support and encourage citizens to take their own initiatives;
- feed-back is very important.

Such considerations let the authors to conclude that in order to facilitate development of sustainable living environment in the cities there is a need for further research giving understanding about people's choices between traditional products and products (i.e. food,

energy, manufactures goods, services) produced from renewable natural resources and their motivation to change their lifestyle.

Conclusions

- 1) Around three quarter or 72.4% of the European Union's population live in urban areas, and this share continues to grow, however, constant increase of population, a lack of strategic planning and poor environment management cause a lot of environmental problems such as climate change, natural resource scarcity and environmental pollution that demand transformative change.
- 2) Provision of qualitative and sustainable living environment in urban areas has become an important issue. According to the present research findings, the concept of sustainable living environment should focus on the following: good state of environment, biodiversity and well functioning ecosystem services, housing conditions that promote wellbeing, low carbon and energy efficient solutions, sustainable use of natural resources.

3) Main areas of life where bioeconomy can facilitate development of sustainable living environment are food production and consumption; consumption of manufactured goods; energy use at households; mobility. The choices that people make regarding these life areas can open the way for the re-thinking of conditions for societal transformations

towards sustainability. However, there is a need for deeper understanding about people's choices between traditional products and products (i.e. food, energy, manufactures goods, services) produced from renewable natural resources and people's motivation to change their lifestyle.

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