THE SCALE IN URBAN REGENERATION, SUSTAINABILITY, AND THE URBAN CYCLICAL ECOSYSTEM

X. Dereka[1], A. Kantzioura, N. Kefalogiannis

[1]School of Science and Technology, Hellenic Open University, 26335, Patras, Greece

derekaxanthippi@netscape.net, kantzioura.athina@ac.eap.gr, kefalogiannisnec@yahoo.gr

ABSTRACT

The topic of the research is "*The Scale in Urban Regeneration, Sustainability, and the Urban cyclical ecosystem"*. The main purpose of the research is to show the method to Sustainable cities and to prove that the ecosystem approach based to Urban ecology is the way. The research gives emphasis to Utopias, where the main characteristics are the big scale, the autonomy, having social perfection. The architects that tried to solve social and functional problems in that scale in the beginning of the 20th century were characterized as megalomaniacs. In the 70's the scale began to downsize. The environmental issues, the definitions and acceptance universally of the sustainability became a political goal. The EEA (European Environmental Agency) reports that politicians misunderstood the way to sustainability. The methodology of the research is the use of an indicator framework DPSIR (Drivers, Pressure, State, Impact, Response) of EEA for the municipalities where indicators can be applied emphasizing the different problems and solutions for different areas. The traditional settlements of Greece in their common characteristics and the newly build Hammarby (Sweden) were used as prototypes for implementing the way to sustainability. Two case studies from Greek municipalities were selected, one with high quality of living and one with low. The results of the use of the framework DPSIR and the "A type, Descriptive Indicators" of EEA typology, using statistical indicators for comparison and the chosen prototypes can give the true picture of every municipality. The high-quality living of an area when it is not functioning as an ecosystem has supra- local effects, but not internal, giving consumption inequality. The conclusions give the importance of the holistic ecosystem approach, the need of large-scale regeneration and the connection of social, financial, and environmental characteristics as consequences of political targets.

KEYWORDS

DPSIR; Ecosystem; EEA; Regeneration; Sustainability; Utopias

1. INTRODUCTION

The contemporary goal of small-scale regenerations and actions from the local authorities is sustainability.

Large-scale regenerations were being implemented in degraded areas and after the world wars in Europe[1].

Famous architects tried to solve functional and social problems with projects, named utopias[2].

The characteristics of utopias are the large-scale, autonomy, and social perfection.

The energy crisis and social reactions are the reasons the scale started to decrease. At the same time, the direction (top- down) of decisions started including the citizens (bottom- up) [3].

After the 90's the regenerations and the political actions aimed at the sustainable development[1].

But the EEA (European Environmental Agency) reports that the local authorities misunderstood the meaning of sustainability and their actions are fragmentary and inadequate[4].

The environmental crisis effects social groups asking an emerge solution.

The cyclical ecosystem could be the solution in the contemporary era or is it a new utopia[5]?

The Research Goals are:

- To prove that the procedure and the targets for sustainability and regenerations from the local authorities are problematic and incomplete.
- The use of an ecosystem approach as a tool to achieve sustainability.
- To strengthen the urban tool of Large- scale regeneration.
- To give prototype indicators from the traditional settlements for comparison to sustainability.
- And finally, to ascertained if the sustainable community is the new utopia or feasible.

2. METHODOLOGY

The cyclical ecosystem is based in Urban Ecology. The management and planning of the urban ecosystem is synonymous to the sustainable city [6]. The EEA through environmental reports [4] evaluates the municipalities functions and targets in that base.

The urban ecology uses prototypes, areas for comparisons and the EEA is suggesting the use of prototype areas and indicator comparisons[7,8] for the local authorities in their environmental reports.

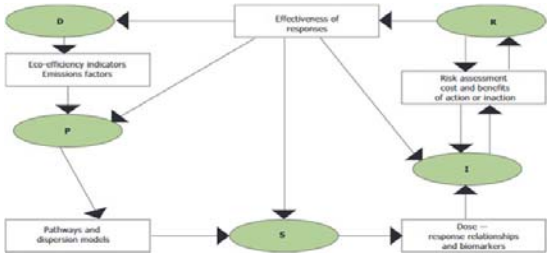

Figure 1. Digest of EEA Indicators, (EEA, 2014)

The research dissertation is making use of the indicator framework DPSIR[1] (Drivers, Pressure, State, Impact, Response) of EEA for the municipalities where indicators can be applied emphasizing the different problems and solutions for different areas. The traditional settlements of Greece and the newly build Hammarby (Sweden) were used as prototypes for implementing the way to sustainability. Two case studies from Greek municipalities were selected, one with high quality of living and one with low. The municipality of Filothei-Psychiko in Attika and Pavlou Mela in Thessaloniki.

The five phases of the EEA framework are:

- *Drivers, Driving force indicators*

They are the Forces that push or create the occasion for the subsequent pressure. These can be social, such as demographics (urbanization), economic development, change in lifestyles, consumption, and resource production.

- *Pressures*

Indicators show growth in gaseous emissions, biological agents, consumption, and resource use.

- *State indicators*

They give a quantitative and qualitative description of natural phenomena, biological, and chemical of an area. They could describe the "wildlife" in an area but also the concentration of CO2 in the atmosphere.

- *Impact indicators*

It concerns the effects that came from the

[1] The first framework of acceptors was the "Stress-Response framework", created by Antony Friend and D. Rapport in 1979, Statistics Canada scientists

State and concerns ecosystems, the economy, the health, and well-being of people. It can be the result of chain effects, locally to globally, the water quality of an area, the noise, or the rise in temperature because of air pollution affecting the balance of radiation.

o *Response*

It concerns the efforts for prevention, treatment, improvement, for changes in the state of the environment.

Among the indicators the framework can be strengthened with more information on procedures and indicators.

In the research statistical[2] indicators of each municipality are used based in the indicator typology of EEA, in DPSIR framework.

The EEA typology[8] categorizes five types of indicators.

o *A type, Descriptive Indicators:*

Type A indicators can be used in the DPSIR framework in all phases. Indicators of this type describe the current situation. In an area related to environmental issues such as climate change, waste, acid pollution, toxic content, etc. The use of descriptive indicators (A) only with a certain value may make it difficult to assess its significance by someone who is not an expert, but the comparison with another descriptive indicator (A) will help to understand the situation it presents.

o *B type, Performance Indicators:*

Performance indicators can have the same variables as Descriptive indicators with the difference that they are related to target values, and "distance to target".

o *C type, Efficiency Indicators:*

Type C indicators give the relationship between impulses (D) and pressures (P) (intermediate indicators) Efficiency with a comparison method on resource consumption, waste, gas emissions

o *D type, Policy- Effectiveness Indicators:*

They can be placed as intermediate indicators from the Response indicators phase of the indicator frame, with Driving Forces, State, Pressure, or Impact.

They are important for understanding development processes, they relate the diversification of environmental data to the effectiveness of policies implemented

o *E type, Total Welfare*[3]

The indicators provide overall sustainability measurements, with overall views on the economy, the environment and society.

The EEA does not have overall indicators of well-being (type E total welfare), as they are considered very multifaceted to be defined (EEA, 2014).

The research dissertation is making use of the *A, D and E type indicators*.

The A type are used with comparisons for better understanding of the area's situation in the phases D, P, S, I.

The dissertation is proposing the common characteristics of the traditional settlements as ***E type*** prototype indicators, along Hammarby's environmental management.

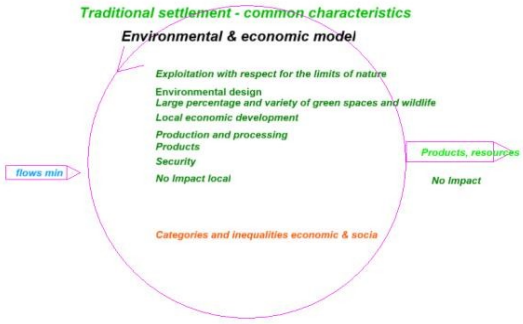

Figure 2. Traditional settlements in their common characteristics as a prototype for the R (Response phase). Own process

The traditional settlements in their common characteristics is chosen because had (the pre-industrial period) the ability to sustain! The social inequalities are not taken as a prototype standard for comparisons.

[2] The indicators According to EEA should be based in statistics.

[3] The EEA is in search of the E type indicators (EEA, 2014).

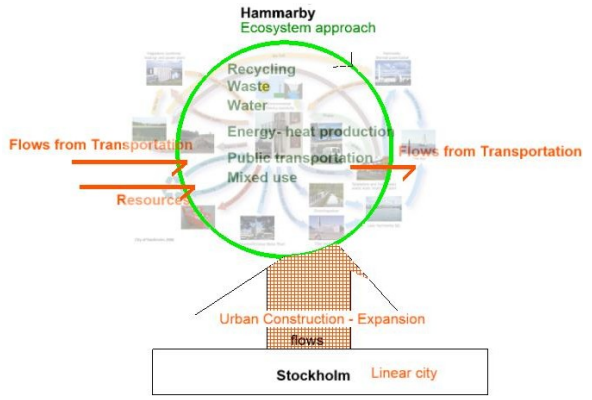

Figure 3. Hammarby as a prototype for the R (Response phase). Own process

Hammarby is a large- scale urban regeneration based to the urban ecology theory and is recognized internationally as a successful project and a sustainable city.

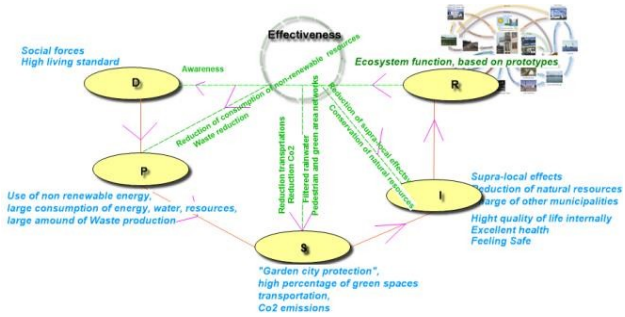

Figure 4. EEA DPSIR framework in Filothei- Psychiko municipality. Own process

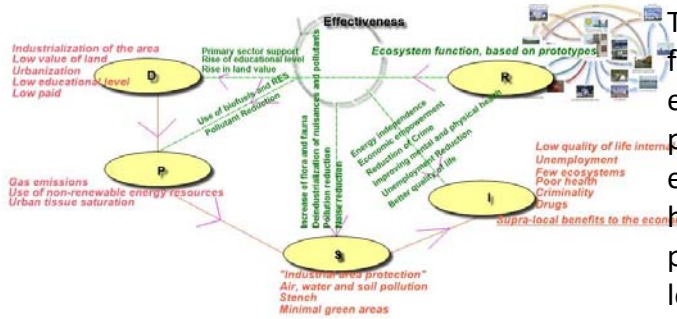

Figure 5. EEA DPSIR framework in Pavlou Mela municipality. Own process

After the (R) *Response,* the *Effectiveness is* an intermediate phase of the (DPSIR) framework. The *D type Policy- Effectiveness Indicators* concerns the new values in all phases. The last stage is very important to check the effectiveness of proposals-actions (Response).

3. RESULTS AND DISCUSSION

The Hammarby's goal was "twice as good" (50% less) energy consumption than Stockholm. It is a very successful project in the environmental design and management for all the stages of the project in a large- scale (construction- function- suburb demolish) from "cradle to crave"! Hammarby acts in the boarders of its area- ecosystem for environmental management only (waste, energy, water).

Although they offered mixed land use in the tertiary sector (no rural zone) to obtain the less possible energy consumption, the need to transport gives gas emissions and energy consumption.

Overall, the ecosystem area of Hammarby is not sustainable. In the traditional settlements all the needs and procedures were covered in the borders of the area ecosystem.

The case studies for each municipality Filothei-Psychiko and Pavlou Mela with the implementation in the framework (DPSIR) it seems that different forces drive to pressures, giving different state and impacts.

The case studies show the need of control and implementation of the ecosystem approach, regardless of living standards.

The high-quality living of an area when it is not functioning as an ecosystem gives supra- local effects, but not internal. That fact attracts people with high income and education in an expensive green environment. On the other hand, a system with significant industrial production has local consequences and supra-local financial benefits. The quality of living is low, and the area attracts low income and uneducated people. The residents of the expensive green suburb produce more waste, consume more water and resources having excellent health compared with the poor area.

The social characteristics of the inhabitants of the two municipalities, the environment and their financial situation are completely different and dependent. The low quality of environment attracts social and financial issues.

Mechanisms for the revitalization of local

economies are the entry of the rural zone into the cities.

Table1. Comparative table of prototypes and case studies. Own process

	Patterns of traditional settlements	Hammarby	Filothei - Psychiko	Pavlou Mela
Environment				
Natural				
Existence of a variety of animals and plants	☺	☺	☺	☺
Green belts, variety	☺	☺	☺	☺
Forest areas around the settlement	☺	☺	☺	☺
Biodiversity Conservation	☺	☺	☺	☺
Artificial man-made				
Settlements on a human scale	☺	☺	☺ ☹	☹
Form of settlement, organic	☺	Neighborhoods	Garden- city	Arbitrary
Materials, local or bioclimatic	☺	☺	☺	☹
Water permeable surfaces (common)	☺	☺	☺	☹
Geomorphology, Climate - Adaptation of settlement construc	☺	☺	☺	☹
Energy saving	☺	☺	☹	☺
Resource consumption	☠	↑	↑	☠
Small movements	☺	☺	☺	☺
Energy production (Within ecosystem limits)		☺	☹	☹
Waste- Recycling	☺	☺	☹	☹
Water Recycling	☺	☺	☹	☹
Economy				
Production zone	☺	☹	☹	☺
Self-sufficiency	☺	☹	☹	☺
Society				
High financial income	∞	↑	↑	↓
Recognition, communication	☺	☺	☺	☹
Equality of rights	↓	↑	↑	∞
Quality of life	∞↑	↑	↑	↓

The main conclusion of the comparative table (table 1) is that sustainability does not mean a high standard of living.

4. CONCLUSIONS

The decisions and priorities of a municipality are crucial at local and supra- local level!

Overall is proved, the need to use the circular ecosystem as a municipal goal and one way for the sustainability of the city. With the implementation as a political response (R) of the ecosystem, regardless of the region, the response concerns large-scale actions and planning.

The selection of prototypes and the use of an EEA, DPSIR Indicator Framework helps to select appropriate indicators and identify important parameters.

In order to implement the sustainable community, or the circular ecosystem, the modern utopia, the knowledge and the choices of a municipality in overall approaches is necessary, with social priorities within the boundaries of the ecosystem area which must achieve the ability to sustain.

REFERENCES

[1] Oikonomou, D. (2004). *Urban Renaissance and Urban Regeneration.* Technika Hronika. (in Greek)

[2] Bartolacci, J. Rewind: Modernist Dreams of Utopian Architecture. *Architizer.*

[3] Couch, C. (2003). City of Change and Challenge, Liverpool. Urban Planning and Regeneration in Liverpool. Ashgate Publishing.

[4] Mehra, M. (1997). *Towards Sustainable Development for Local Authorities*. European Environmental Agency. Part 1. IMSA Amsterdam. The Netherlands.

[5] Portokalidis, K. & Lalenis, K. (2011). Integrated Ecosystem Cities in the Age of Climate Change. Utopia or feasible perspective. *Science magazine Aeihoros, 16.* (in Greek)

[6] Sukopp, H. (2002). On the Early History of Urban Ecology in Europe. Preslia. Praha

[7] Bosch, P., Buchele, M. & Gee, D. (1999). *Environmental Indicators: Typology and Overview*. EEA.

[8] Maguire, C. (2014). *Digest of EEA indicators 2014*. EEA. Technical report, No 8/2014.