

SUSTAINABLE COMMUNITY REHABILITATION WITH FORESTRY SYSTEMS

REABILITAREA SUSTENABILĂ A COMUNITĂȚILOR PRIN SISTEME DE CULTURI FORESTIERE ÎN ROMÂNIA

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Abstract. Development of green areas at the periphery of towns was a concern for city planners since the middle of the XIXth century. Sustainable design of urban systems as ecological entities calls for increasing the percentage of planted areas as well as community oriented projects. The control of urban sprawl is basically unattainable, the trend of housing developments at the periphery being noticeable in later years in all major towns in Romania. The need to juxtapose green areas in-between housing developments is just as pressing as the one for public functions. A solution would be to intervene with a pattern of small forestry plantation patches of fast growing trees, in addition to extending the natural forests. Urban forestry provides means for sustainable tree harvesting, additionally stabilizing the concentration of carbon dioxide in the atmosphere at microclimatic level. Forestry plantation could be beneficial for the community in terms of socioeconomics, providing a sustainable source of income. The authors propose means of implementing such forestry systems with regard to socio-economic aspects of community rehabilitation.

Key words: sustainable, community rehabilitation, forestry plantations

Rezumat. Dezvoltarea de zone verzi, la periferia orașelor a fost o preocupare pentru planificatorii orașelor de la mijlocul secolului XIX. Proiectarea durabilă a sistemelor urbane ca entități ecologice solicită creșterea ponderii suprafețelor plantate, precum și proiecte orientate spre comunitate. Controlul expansiunii urbane este, în principiu, de neatins, tendința de evoluție a construcțiilor de locuințe la periferie fiind vizibilă în ultimii ani în toate orașele importante din România. Nevoia de a juxtapune spații verzi între dezvoltările de locuințe este la fel de presantă ca cea pentru funcții publice. O soluție ar fi intervenția cu un model de zone mici de plantații forestiere cu specii de copaci copaci cu creștere rapidă. Plantațiile forestiere oferă mijloace sustenabile pentru recoltarea copacilor, stabilizând concentrația de dioxid de carbon în atmosferă la nivel microclimatic. Culturile forestiere sunt benefice și pentru comunitate din punct de vedere al socio-economic, oferind o sursă durabilă de venit.

Cuvinte cheie: sustenabilitate, reabilitarea comunității, culturi forestiere

INTRODUCTION

Horizontal sprawl of cities through progressive dwellings developments in the suburbs must be joined by an effort to extend the green areas, with special

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care to the forests that surround towns, forming the green belt, thus balancing the air quality and reducing pollution.

In addition to the care for extending natural forests, forestry plantations with fast growing tree species can successfully meet this challenge. Forest plantations combine the economic benefits (sustainable source of biomass, by increasing the share of energy from renewable energy sources) with the ecological ones (storing solar energy in wood mass and fixation of carbon dioxide from the atmosphere), representing alternatives to forestry and the unavoidable alteration, even through sustainable management policies of their ecosystem balance. The environmental benefits of forestry plantations include, aside from the priority objectives previously set, the phyto-remediation of polluted land with household waste and heavy metals, recovery of agricultural land damaged by excessive fertilization, reduction of pollution of groundwater, thus projecting a natural filter (Rosu et al, 2009).

Developing and expanding forests are obligations and regional priorities in order to achieve ecological balance locally, nationally and globally, being carried out through the National Afforestation Program, (Petrescu-Mag, 2011). In this regard, short rotation forestry plantations on land outside the forest is a concern at European, regional and national levels (Cosofret and Danila, 2014).

In an extended review of urban forestry, Roy et al, 2012, evaluates the potential of urban trees of ameliorating the environmental degradation resulting from rapid urbanisation. The review extrapolates from previous research the services of urban forests, that include:

- life support, energy conservation and opportunities for aesthetic experiences, citing ecological economics literature;
- mitigating carbon pollution, improving urban air quality, attenuating storm-water flooding, conserving energy and reducing noise, among others, citing urban forest and environmental literature; but also the disservices, that include:
- financial, health and maintenance burdens upon urban residents, citing environmental and social studies;

Tree plantations, though encouraged through governmental policies, in an effort to sequester carbon, have raised recently several questions regarding social and ecological effects. Orderly rows of trees have increased sevenfold over the last two decades, assuring new means of production in societies with deprived labour forces. In a sustainability concerned world, their ecological benefits have been praised, although some critics have voiced concerns over the negative impact of exotic species introduction, high water consumption and even negative social and economic impacts (Rudel, 2009).

MATERIAL AND METHOD

The space occupied by forests in relation to city centre can be classified in four major areas:

- urban;
- sub-urban;
- ex-urban;
- rural;

with the development of green belts and the possibility of extending them through plantations in the sub-urban and ex-urban areas, (fig. 1) (Konijnendijk *et al*, 2006)

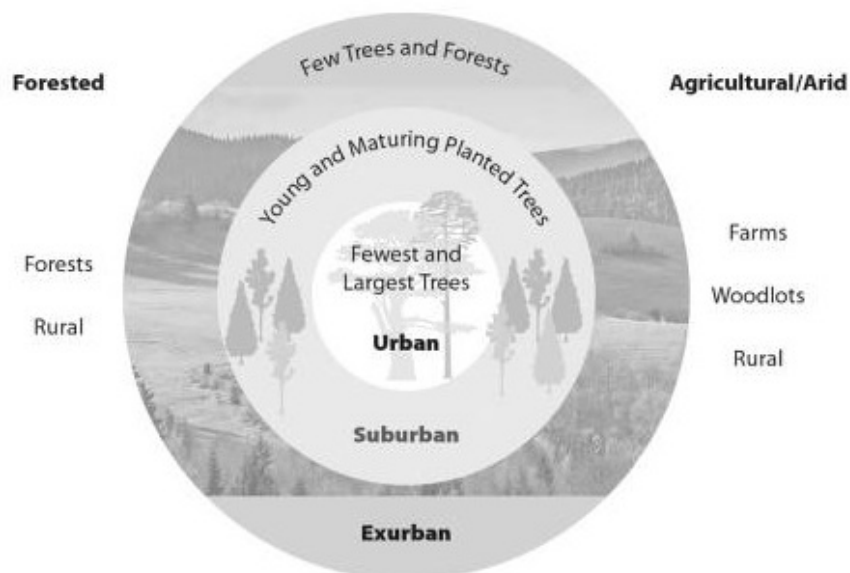


Fig. 1 - Land use and the urban forest (Miller *et al.*,2015)

The density (number of trees on a patch of land) varies according to the zone patterns after:

- urban area is characterized by the lowest density of trees, which are found in parks and residential areas, with the greatest degree of arboreal maturity;
- suburban area has a higher density, with the greatest potential for increasing forested areas, particularly in residual perimeters, characterized by the new built neighbourhoods young plantations and conserved forest patches particularly in non-agricultural lands;
- ex-urban zone is located at the junction of suburban area with rural one, is defined in the specific literature as: peri-urban forest, anthropogenic-natural interface or urban-rural interface and is characterized by a patchwork of farmland, woodland, with industrial or commercial areas. In the forested areas, tree numbers will be decreasing, while in agricultural areas, they will be growing in number, (Helms, 1998).

In Romania, the need to juxtapose green areas in-between housing developments is just as pressing as the one for public functions. A solution would be to intervene with a pattern of small forestry plantation patches of fast growing trees, in

addition to extending the natural forests. Urban forestry provides means for sustainable tree harvesting, additionally stabilizing the concentration of carbon dioxide in the atmosphere at microclimatic level. Forestry plantation could be beneficial for the community in terms of socioeconomics, providing a sustainable source of income.

The authors propose means of implementing such forestry systems with regard to socio-economic aspects of community rehabilitation.

RESULTS AND DISCUSSIONS

City forested belt, historical and current trends

The green city belt represents the forested suburban and ex-urban area, with the role of providing an environment for recreation of the urban population and improving air quality by absorbing carbon dioxide from the atmosphere and, as a secondary objective, providing wood fibre by a sustainable management (Miller *et al*, 2015).

In Europe, the first concerns for the wooded areas in the proximity of cities date back to Renaissance and Baroque, with the demolition of the city walls, and migration of the aristocracy to villas and palaces in the suburbs.

The concept of forested city belt in the current meaning arises on the industrial revolution. In response to the first chaotic development and uncontrolled occupation of land by the early nineteenth century, cities in the UK make great efforts to expand green areas on the periphery, by introducing forested belts and satellite settlements.

The "Romantic Landscape" pursued by this process becomes an area of leisure enjoyed by all classes. With the expansion of industrialization across the continent, similar patterns are repeated in many European cities (Lawrence, 1993).

Early twentieth century finds the city in search of solutions to social and urban issues. The development of large industrial cities, a great number of housing projects, often unsanitary and population migration from rural green to urban gray, all lead to a heterogeneous landscape. Moreover, the quality of urban life generates controversy on how to structure the city and how people can interact with the natural inhabitant. Thus, two patterns of green city planning emerge:

- the progressive model, developing the concept of functional segregation, separating residential areas from industrial areas, integrating the city with no apparent limit landscape;
- the cultural model, supporting the idea that the key to metropolitan chaotic expansion resides in the construction of new satellite towns, with concentric green rings surrounding the city (Choay, 2002).

The cultural model promotes the idea of city green belt, continuing on the path set by British urban planners in the XIXth century. Among the prominent figures of this movement could be mentioned Ebenezer Howard, that brought the concept of garden city, R.Unwin and B.Parker, that through their projects both in the United Kingdom and the United States have implemented the concept of the

city's green belt. A follower of the Chicago School, W.E. Burges in the interwar period is advancing a new theory in urban sociology and ecology, publishing in 1925 the model theory of concentric circles. Following an analysis carried along a decade of Chicago's development, proposed an ideal spatial organization for a city that has the start in the urban core, bordered by a green area perimeter (fig. 2)

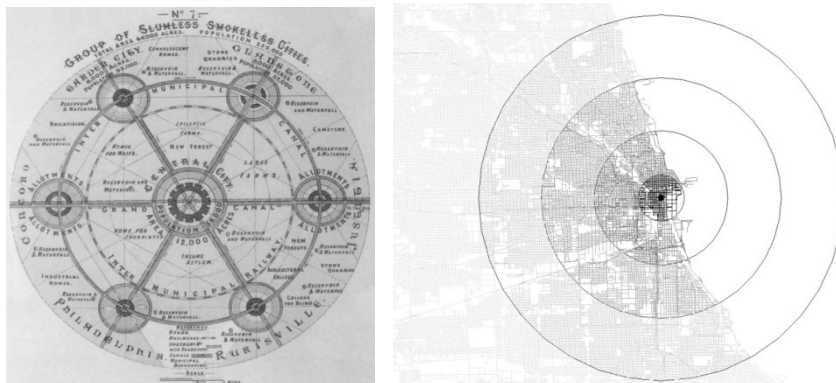


Fig. 2 - Concentric models, Ebenezer Howard and W.E. Burges (commons.wikimedia.org, <http://www.gutenberg.org>)

Currently, many cities, both in the developed and in the developing world take efforts to expand the forested belt: Beijing has expanded green areas from 3.2% in 1947 to 26.9% in 1990; in Shenyang, China, growth in the last decade of green areas was of 8%, consisting mostly of young tree species. Policies to increase the green belt are followed up in major European cities as well, Dublin and Vienna monitoring the levels of fine particles per cubic meter, compared with the number of trees in the extended urban area, (Miller *et al.*, 2015).

Green belt, design considerations

Forested landscapes in urban region tend to create their own aesthetic, but landscapers can manipulate the effects through arrangement of vegetation to further consider simplicity, balance, focalization, unity, proportion and rhythm. A good design must integrate elements such as:

- connectivity between various areas;
- integration of open space;
- uses of paths for circulation;
- uses of vegetation as visual cues, such as focal points of interest, (Bell *et al.*, 2005).

People's choices may vary when considering the size of vegetation, tree density, canopy considerations. Various studies showed that people tend to prefer moderately dense forests over paths of few trees or over-dense ones, that their perception is largely influenced by their distance from the trees and varies with age and education. More mature individuals enjoy more dense stocking and a

natural look of the forest. Graduates of science schools are more inclined to prefer a neat and organized landscape, while art graduates enjoy natural-like environments (Miller et al., 2015).

Considering the above, it is safe to assume that from an aesthetic point of view, orderly rows of trees can be associated with the existing tree stock in an effort to extend the city's forest belt. After all, similar landscape solutions have been practiced for the classical orderly alleys in European parks for centuries.

CONCLUSIONS

The progressive urban model claimed a vertical city that is lost in the landscape, and the culturalist urban model supports the idea of a precise city limitation through a green belt.

Nowadays, in the current context of excessive urbanization, it seems increasingly difficult to achieve a physical separation or a necessary green transition for the city functional zones and the surroundings. Realization of green belts around cities is not a new concern, but one that has been applied successfully, either based on the urban theories described above, but mostly based on the experiences of city dwellers for centuries. Forest plantations may accompany urban developments by creating new green spaces of parks with ornamental trees in the suburbs, bringing social benefits as well.

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