Chapter 8.6

Planning for Sustainable Urban Futures:
An Ecological Approach to Sustainable Urban Development

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ABSTRACT

In recent years, cities have shown increasing signs of environmental problems due to the negative impacts of urban activities. The degradation and depletion of natural resources, climate change, and development pressure on green areas have become major concerns for cities. In response to these problems, urban planning policies have shifted to a sustainable focus and authorities have begun to develop new strategies for improving the quality of urban ecosystems. An extremely important function of an urban ecosystem is to provide healthy and sustainable environments for both natural systems and communities. Therefore, ecological planning is a functional requirement in the establishment of sustainable built environment. With ecological planning, human needs are supplied while natural resources are used in the most effective and sustainable manner and ecological balance is sustained. Protecting human and environmental health, having healthy ecosystems, reducing environmental pollution and providing green spaces are just a few of the many benefits of ecological planning. In this context, this chapter briefly presents a short overview of the importance of the implementation of ecological planning into sustainable urban development. Furthermore, it presents a conceptual framework for a new methodology for developing sustainable urban ecosystems through ecological planning approach.

INTRODUCTION

In the last few decades, human activities have created various forms of environmental change in urban ecosystems. The sprawl of settlements, development of transportation networks and industrial activities cause destructive and irreversible effects on the soil source and its quality through loss of soil fertility and biodiversity, disruption of gas and nutrient cycles, poor irrigation and drainage systems, erosion risks and so on. Furthermore, the chemical and hazardous wastes generated by commercial or industrial activities threaten the health related quality of life of the population (Pauleit et al., 2005; Dorsey, 2003). As a result of the increasing pressure of intensive land use in the existing city, green areas and other open spaces become scattered, polluted and turn into so-called 'Brownfields'. Such alteration significantly affects natural habitats and species in these areas.

The evolution of technological change, the introduction of motorised vehicles and the increase in energy consumption due to population growth contribute to the growing air pollution problem. Sulphur dioxide, nitrogen oxides, carbon monoxide, and suspended particulate matter (SPM, including lead) are the main pollutants in the urban air. These pollutants have harmful effects on human health such as increased mortality, morbidity, deficiencies in pulmonary function, cardiovascular and neurobehavioural effects (Mage et al., 1996). In additon, air pollution creates a major environmental issue: climate change. Changes in climate cause an increase in the number and severity of natural disasters such as floods, storms and hurricanes. Climate change is directly linked to ozone depletion and increased greenhouse gases and has long-term environmental effects such as desertification, rising sea levels and global warming.

Urban development and population pressure also create water pollution through daily activities. In urban areas, the discharge of domestic, industrial and commercial effluents are the main sources of pollution of water bodies in the natural environment. Urbanisation affects the quantity of water bodies with its impervious surfaces (parking lots, streets, roads, roofs) by preventing the infiltration of stormwater into the ground and increasing the amount of runoff. Furthermore, these surfaces cause significant threats (flooding, coastal erosion, water pollution) to the quality of aquatic and terrestrial habitats. The increased imperviousness is also linked to the urban heat island effect which affects human health and comfort related to changes in energy balance, microclimates and the concentration of atmospheric pollutants (Randolph, 2004; Barnes et al., 2001).

The growth of human population and urbanisation has begun to threaten the sustainability of resources, the structure and functioning of the environment is changing more rapidly than our understanding. Citizens, policy makers, and leaders of business and industry are all trying to find solutions for the sustainable management of these resources at both local and global levels (Lubchenco, 1998). As Vitousek et al. (1997) summarise: *It is clear that we control much of Earth, and our activities affect the rest. In a very real sense, the world is in our hands and how we handle it will determine its composition and dynamics, and our fate*. This brings us to the main message: to build a sustainable community for future generations, it becomes a necessity to review and revise existing urban development policies in the light of sustainable development.

To achieve sustainable urban development, cities need to be managed to achieve a balance between meeting the needs of human beings and protecting the natural environment. This can be done by managing resources carefully and ensuring their availability for the next generations. In order to protect and enhance environmental conditions for future generations, it is essential to provide the sustainability of urban ecosystems. Therefore, the concept of ecological planning becomes a functional requirement in achieving sustainable built environment. It is an effective

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