Environmental Sustainability and Ecological Complexity: Developing an Integrated Approach to Analyse the Environment and Landscape Potentials to Promote Sustainable Development

Masnavi, M. R.*

Graduate Faculty of Environment, University of Tehran, P.O.Box 14155-6135, Tehran-Iran

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ABSTRACT: The notion of Sustainable Development has rapidly gained considerable attention since the last decades of the twentieth century. It has become a locus for global paradigm shift on environment and development issues particularly after Rio Conference in 1992. The comparative analysis of Agenda 21 and major UN documents, MDG and RIO+20 as well as some major sources are made to provide a context for the assessment of landscape and environment importance for achieving sustainability. Study showed almost half of the Agenda 21 is devoted to the Environmental problems, landscape issues and protection of nature and natural resources. Landscape ecology and ecological complexity theories have been widely used in recent decades to analyze natural systems and artificial phenomena to predict the future behavior of systems; and to provide better solutions for balanced interactions of human and living organisms at larger scales. The paper investigated landscape ecology and complexity theory potentials for better understanding landscape system and its nature as an ever changing semi-living phenomenon, which plays a key role for the life of inhabitants of the planet. Using an integrated approach and analyses, this research is to develop the ecological dimensions of landscape as framework for the contribution of landscape ecology and ecological complexity towards achieving sustainable development. Analyses led the paper postulates the new dimensions: Transformation complexity and Accumulation complexity; and reveals Ecosystem complexity and Biocomplexity to expand the current dimensions of ecological complexity, with their effects on the landscape systems, environmental sustainability and hence sustainable development.

Key words: Sustainable development, Landscape, Ecology, Complexity, Theory, Environment

INTRODUCTION

The notion of Sustainable Development has rapidly gained considerable attention since last decades of the twentieth century. It has become a locus for global paradigm shift on environment and development issues, particularly after its first declaration through Earth Summit, in Rio Conference in 1992. The most well known and nowadays the classic definition of Sustainable Development is a statement presented at the Brundtland Report: Our Common Future, released during the 1987 United Nations World Commission on Environment and Development!; "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987). Brundtland identified Environment, Society and Economy as three interconnected aspects or pillars of sustainable development. First, the environmental or ecological aspect which recognises the limits to the society’s patterns of consumptions and productions. As part of the ecological aspect, it is recognised that natural resources are finite and the capacity of the environment to deal with production and waste is also limited. (Aminzadeh and Khansefidi, 2010; Yavari et al., 2007)

Second, the social aspect relates to the question of equity; not just equity between developed world countries and developing world countries but those future generations should have access to the same natural resources as the present. The third pillar or economic aspect recognises that the economy must be operated within existing ecological limits (WCED 1987). Mossalanejad, 2013; 2011. Although the definition seems to be very simple, it has generated some controversial arguments thereafter, who discuss over either simplicity, ambiguity, or the complexity of the term.

*Corresponding author E-mail: masnavim@ut.ac.ir