Journal of Marine and Island Cultures (2012) 1, 27–37

Journal of Marine and Island Cultures

www.sciencedirect.com

ORIGINAL ARTICLE

Holistic conservation of bio-cultural diversity in coastal Lebanon: A landscape approach

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Received 22 March 2012; accepted 12 April 2012
Available online 27 June 2012

KEYWORDS

Mediterranean;
Coastal landscapes;
Biodiversity conservation;
Sustainable agriculture;
Lebanon

Abstract Bridging terrestrial and marine ecosystems, Mediterranean coastal littorals are important floral and faunal habitats and an important component of the traditional Mediterranean landscape mosaic. The expanding urban footprint in Mediterranean littorals is increasingly threatening semi-natural sites and agriculture in coastal landscape. This paper proposes a holistic landscape approach to the sustainable planning of coastal littorals arguing that it is more likely to succeed because it is integrative of the concerns for safeguarding environmental resources and conservation of biodiversity but also responsive to socio-economic concerns of securing agricultural livelihood and providing for the cultural needs for open/green spaces by the growing inhabitants of coastal cities. The challenge is to combine protection for the three seemingly disparate activities. The town of Damour on the Mediterranean coast of Lebanon is taken as a case study. The wide coastal, banana cultivated plain makes for an exceptionally verdant landscape and scenic reprieve in an otherwise predominantly urbanized coastline. The methodology of ecological landscape design is applied to secure a holistic reading of the physical setting and propose a holistic, integrative conceptual model for the protection of coastal biodiversity that is ecologically sensitive and in synergy with agricultural and cultural uses.

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Peer review under responsibility of Mokpo National University.

Production and hosting by Elsevier

Introduction

Mediterranean coastal littorals are rapidly urbanizing. Population in urban settlements increased from 285 millions in 1970–427 millions in 2000 and will probably reach 524 millions by 2025 according to Blue Plan trend scenario (Antipolis, 2001). The ecological and environmental impact of population concentration and intensified human activities threaten biodiversity and natural resources and alter local climates. The

2212-6821
http://dx.doi.org/10.1016/j.imic.2012.04.003

Mediterranean Sea is also designated as a world 'biodiversity hot spot', its flora estimated at 25,000 plant species, 7.8% of the world species, of which 50% are endemic to the region (Myers et al., 2010). The threat to biodiversity is all the more worrying considering that coastal landscapes represent the interface of marine and terrestrial ecosystems and as such are important habitats for wildlife that warrant protection. Historically, coastal landscapes were an integral component of the network of wildlife habitats (riparian, highland, woodlands, orchards), partly natural and partly managed, that characterized the Mediterranean countryside. The impact of urban expansion affects not only natural resources but as well the quality of life in cities. As the urban footprint expands, the inhabitants of the city are distanced from contact with nature, deprived of green and open spaces.

The dual impact of high population concentrations and economic activities on coastal lands, 'caostalization', is especially severe in the southern and eastern Mediterranean (Antipolis, 2001) (Fig. 1). With a few exceptions, the countries in the southern and eastern littorals have high rates of population growth, developing economies and weak physical planning. Developing the economy, providing employment, services and infrastructure is generally the priority, not biodiversity conservation and environmental sustainability.

Lebanon in the eastern Mediterranean is in many ways a microcosm of the urbanizing Mediterranean problematic. Although a small country (10,452 square kilometers), high mountains, wide valleys, coastal and inland rivers make for terrain and climatic diversity that harbors a wealth of endangered fauna and flora. Lebanese coastal landscapes are increasingly demonstrating the phenomena of 'coastalization'; 55% of the country's 4.4 millions population live in the coastal plain which includes as well the country's four largest cities and the capital, Beirut. Attempts to assess the damage to environment and natural resources by the state with support from international organizations have resulted in several comprehensive studies of Lebanese coastal environments and the state of biodiversity[3]. By 2003 the MoE secured a number of Protected Areas, mostly Cedar reserves in the higher altitudes but also two Protected Areas that are littoral and marine, respectively, Tyre Beach Nature Reserve and Palm Island Nature Reserve. Nevertheless, state initiatives are predominantly exclusive to 'nature'. They fail to incorporate semi-natural and agricultural landscapes in the coast or recognize the bio-cultural diversity of the traditional Mediterranean landscape. The latter is aggravated by the absence of coordination between state agencies that care for the environment and nature conservation and those responsible for agriculture and forestland. Failure to consider the diversity and synergy between natural, managed and cultural landscapes is noted by Naveh (2008) who critiques the 'ingrained tendency to fragmentize and take apart what is in reality whole and one', attributing the rift to the divergences between the 'bio-centric' approach of scientists the 'anthropocentric' approach of social scientists. The outcome has been a compartmentalized approach, an either or focus on 'nature' and the 'natural' or 'culture' and the 'cultural', that undermines ecological integrity and compromises the character of Mediterranean regional landscapes (Makhzoumi et al., 2012).

This paper is a response to the fragmented, piecemeal approach to the bio-cultural diversity characteristic to Mediterranean coastal littorals. Instead the holistic landscape framework is proposed that addresses concern for biodiversity conservation, agriculture and urban development in coastal littorals. Shifting the focus from 'nature' to 'bio-cultural' conservation, the paper argues, is valid because it responds to the layered and multifunctional structure of traditional landscapes in the region (Makhzoumi, 1997). The holistic landscape approach proposed is interdisciplinary, drawing on continuing research into coastal urban biodiversity (Chmaitelly et al., 2009; Talhouk et al., 2005a), urban agriculture (Lteif, 2010) and the application of the holistic methodological framework of ecological landscape planning (Makhzoumi, 2012, 2000; Makhzoumi and Pungetti, 2008; Makhzoumi and Pungetti, 1999).

Applications of a holistic/landscape approach to bio-cultural diversity conservation

Historical evidence suggests that the expansion of domesticates and agricultural economies across the Mediterranean was accomplished in waves of colonization that came to establish coastal farming enclaves around the Basin (Zeder and Sabloff, 2008). The process involved as well domesticates and domestic technologies by indigenous populations in Mediterranean littorals and the domestication of endemic species. Human environmental impact is especially evident in the islands with the replacement of island endemic species with faunas imported from the mainland. Nevertheless, up to the middle of the twentieth century traditional agricultural practices continued to maintain the high levels of biodiversity characteristic in the region since the Neolithic (ibid). Presently, the spatial and ecological diversity of traditional Mediterranean rural landscapes sustains a diversity of wildlife just as traditional management practices of semi-natural and agricultural landscapes contributes to the high level of endemism (Makhzoumi, 1997).

Traditional rural landscapes the world over are shrinking, threatened by urban and suburban encroachment. In Europe, for example, virtually all semi-natural landscapes are the products of traditional agricultural, hydrological, and silvicultural management regimes. Land-use changes by the expanding footprint of cities and infrastructural networks fragment and eventually replace unique and species-rich habitats. Accepting that urbanization is the dominant pattern of land use change, it becomes necessary to question conventional approaches to biodiversity conservation and the narrow and exclusive focus on 'nature' (Bengtsson et al., 2003). Broadening the focus of nature conservation, however, implies accepting the resilience of natural processes that ecosystems have the ability to reorganize after large-scale natural and human-induced disturbances. Spatial resilience in natural ecosystems takes the form of 'ecological memory' that is composed of species, their interactions and structures that make ecosystem reorganization possible (ibid). Ecological memory can be found in abandoned sites and disturbed patches everywhere. Above all, the implication is that the prevailing focus on "static reserves" should be complemented with "dynamic reserves", such as ecological fallows and dynamic successional reserves that are part of ecosystem management mimicking natural disturbance regimes at the

[3] Ministry of Environment with the support of UNEP/GEF (1996), National Report entitled "Biological Diversity of Lebanon"; Mehdi (2004) Coastal Area Management Program with support from UNEP; and more recently, Nader and Talhouk (2002) SAP-BIO, "National Report of the Country of Lebanon".