Editorial

Man and Environment in Israel: An Editorial Introduction

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The present special issue of the Geography Research Forum focuses on diverse subjects dealing with the human-environment interface in Israel. This issue consists of 7 papers which reflect some of the environmental problems and challenges faced by Israel at present. In order to better understand the various problems and challenges described in these papers within the context of the state some background information about Israel is necessary.

Israel is a small country (only 22,072 km2) but diverse in terms of its human population and biological stock. About 8 million people live in Israel of which 82% are Jews and the rest are Arabs. Ninety two percent of the population lives in cities. Some of the settlements, which are officially defined as rural settlements, are practically urban suburbs. The more interesting phenomenon is the fast increase in the urbanization rate of the Arab population which is due to high population increase rates and the expansion of the rural settlements which transform very rapidly into towns. The paper by Tarabeih Khamaisi and Shmueli describes these urbanization processes that are entailed by environmental problems and conflicts within Arab localities and in their contact zones with adjacent Jewish communities.

The Israeli Coastal Plain (194 km long and between 1-7 km wide) of the Mediterranean is home to almost 70% percent of the nation's population, mostly Jews. Eight cities out of 14 in Israel with population size of above 100,000 are located in this area, whereas 40% live in the Tel Aviv metropolitan area at a density of 1464/sq.km. Obviously the intense urbanization process within the 64 years of statehood has taken place at the expense of open spaces in this important region in ecological terms of ground water, sand resources, habitat conservation, etc.

Two thirds of the area of the Mediterranean coastal dunes in Israel disappeared since the establishment of the state in 1948 due to urbanization. The total area of declared, approved and proposed nature reserves along the coastal plain is approxi-

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mately 50 km2, constituting 8% of the total area of the coastal plain. Of the total nature reserve areas that are declared and proposed in this plain, sand dunes comprise approximately 66%. Of this, 94% are located in its southern part. The largest nature reserve in the south that conserves the unique flora and fauna of the sand dunes is Nizzanim (20 km2).

As opposed to this central area of the country, 35% of the population lives in the northern part, in which 60% are Arabs, most of whom live in towns with many rural characteristics. This region contains large and significant national parks and nature reserves that are typical eastern Mediterranean forests and woodland, with a high percentage of planted and native forests that are under the responsibility of the JNF (Jewish National Fund). Therefore, it is not surprising that the increase of the Arab population, followed by the transformation processes from rural settlements into urban ones, produce internal and external conflicts within the settlements and with the forestry and nature and parks authorities (see the paper of Tarabeih et al.).

The southern part of Israel, which includes the Negev and the Arava Valley, is part of the Saharo-Arabian extreme deserts. Only 14% of the population live in this area, mostly in rural settlements. About 20% of the national parks and nature reserves (1000 km2 out of 5000 km2) are located in this region. However, there are intense human impacts on the open spaces due to military activities and native Bedouin livelihood.

From the above it follows that human impact on open spaces and within the and outside cities in Israel is high. Soil is one of the significant elements of urban ecosystems that reflects the spatial and temporal human impact. Direct impact estimates such as trampling or indirect estimates of residential exposure to environmental pollutants, the levels of which are measured by air quality monitoring stations, can be estimated by soil analysis. The paper by Zhevelev and Bar (Kutiel) focuses on human impact on soil at various land use units in the city of Tel Aviv, located in the Israeli Mediterranean coastal strip. The authors found that urbanization led to an increase in organic matter and soil moisture content compared to natural conditions existing in an adjacent national park. However, the spatial differences in soil properties at the upper layer differed with the socio-economic level of the neighborhood. The significant changes were found in the municipal parks, which were especially expressed in low socio-economic neighborhoods. These results may be explained by the fact that in the low socio-economic neighborhoods there is limited municipal park area in relation to its high residential density and high outdoor activity rates, which resulted in high trampling pressures on the soil compared to the high socio-economic neighborhood studied.

Kloog and Portnov suggest the Voronoi rezoning technique (VP) instead of the traditional SCA (small census-designated statistical areas) as zoning tool for analyzing the association between soil lead pollution exposure estimates and asthma morbidity in children in the Greater Haifa Metropolitan Area (located in the northern part of the Mediterranean coastal strip) controlled for socio-economic status of the

study population and its health attributes. The results show that the model fits were consistently higher in the Voronoi tessellation models than in the SCA and interpolation models, indicating that the VP method appears to improve the multivariate models' explanatory power.

Some forests in Israel, especially the planted ones, are composed of pine trees of various species. These trees are considered more flammable as compared to other species such as oak trees. The city of Haifa is surrounded by pine forests and oak woodlands, which are part of the large Carmel national park and nature reserve that hosts hundreds of thousands visitors per year. Twenty seven man-made wild fires were reported for the years 2005-2010, where 3 of them destroyed more than 100 ha of natural forests and woodlands. Such frequent and intense fires are a threat to the city's inhabitants. The paper by Freeman aims to integrate economic valuation, fire disturbance, and land use change in a model that estimates the consequences of man-made and natural disturbance on woodland succession based on the case study of the proposed expansion of road infrastructure in the Carmel National Park and nature reserve. The main findings are that the construction of the road, in combination with ongoing fire exposures, would result in a net loss of 30 ha of natural woodlands cover. Of the remaining woodland areas, succession will favor open woodlands and there will be a net loss of moderate and dense woodlands. The present value of the economic losses associated with these land cover changes is approximately US$640 million, including lost benefits from direct and indirect uses as well as option and non-use values.

In Israel there are 160,501 ha of planted (41%) and natural forests and woodlands that are managed by the Jewish National Fund. The paper by Tal reviews the evolution of Israel's forestry policies that have been formulated throughout the years by the Israeli government forestry agency and the Jewish National Fund. It details the new approach to afforestation and forestry maintenance, The Bible of Forestry, that is based on maximization of ecosystem services with a particular emphasis on recreation and conservation.

Ecosystem services is a new concept, which contrasts with the concept of economic evaluation of human impacts on ecosystems. It tries to evaluate the services gained from ecosystems in order to encourage man's rationale for ecosystem conservation. It is not easy to determine the services and their overall economic values. This is indeed a challenge. The paper by Orenstein et al. aims to test a methodology for taking inventory of ecosystem services for five long-term ecological research (LTER) sites in the Northern Negev semi-arid region that differ in their land use and therefore in their management goals. Site managers were asked for presence/absence of 86 ecosystem services that were divided into 3 categories: provisioning, regulating and cultural. Their findings indicate that management agencies, through their land use policies, can alter the package of services, for example, by emphasizing agricultural-oriented or forestry-oriented services or particular cultural services, such as those associated with education or tourism.

Last but not least is the paper by Sztankeler-Tzabari et al. that reviews the political ecology of the damage caused to the Dead Sea and its surroundings in the last 50 years by anthropogenic intervention in its water balance, primarily by the Dead Sea Works Corporation. The Dead Sea is considered the lowest and the saltiest lake in the world, located in one of the most extreme desert regions. However, it attracts hundreds of thousands of domestic and foreign tourists, mainly in the winter time. The operations of the Dead Sea Works has generated salt surplus that causes a gradual increase of the water level of the local production pool risking thus nearby hotels being flooded. Recently, the Israel Corporation, the owner of Israel Chemicals and Dead Sea Works, has signed a financial agreement with the government for protecting the Dead Sea hotels through salt harvesting.

As noted, Israel is highly diversified ecologically and culturally. However, it is also one of the dense countries in the world. Together with its unique geo-political situation, this background gives ground to the emergence of complex environmental problems and crises. This special issue presents but a handful of the major ones, pointing toward sustainable solutions. It also showcases, however, only a handful of the exponentially growing number of studies conducted in Israel in this field in recent decades.