Spatial Modeling and Assessment of the Interaction between Modern and Heritage Urban Landscapes with GIS

A case study of Irbid city, Jordan

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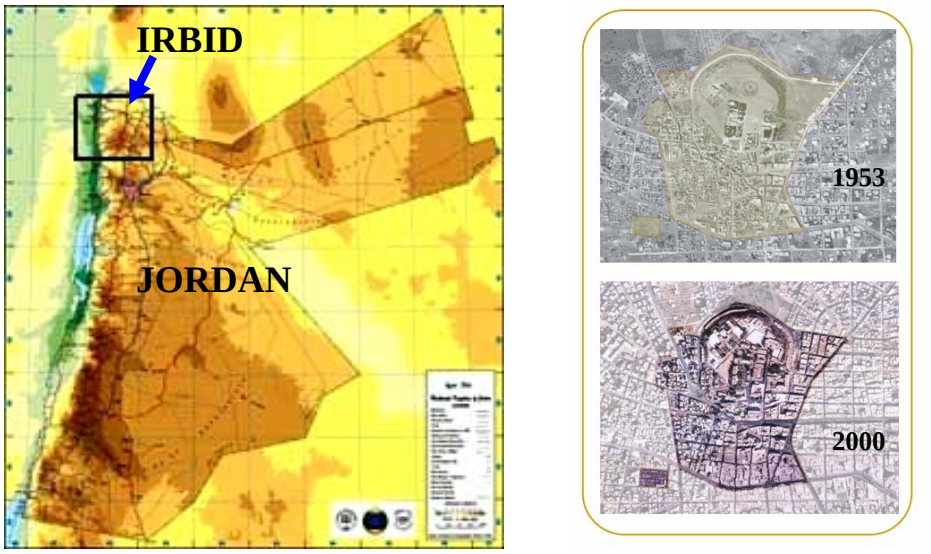
1. Introduction

Modern Cities are witnessing a rapid increase in the population growth rates. By 2005, it is predicted that one-half of the 6.5 billion people of our planet will be living in cities for the first time in human history (United Nations 1997). For example, among the 1.3 billion inhabitants in China, 30% are urban dwellers, which is projected to increase to more than 50% of the population by 2030 (United Nation 2001). This increase in population is associated with excessive urbanization and infrastructure expansion. City boundaries continue to sprawl over time, consuming more and more of heritage areas, rural areas, forests, and other important non-urban areas. Understanding the change brought by urban development is critical to those who study urban dynamics and those who manage resources and provide services in these rapidly changing environments (Knox 1993, Turner *et al.*, 1993).

Some cities in the world have their specialty through containing historical sites and ancient remainings return to thousands of years ago. Unplanned urban expansion and altering of the landscapes into industrial, commercial or residential land uses will have a negative impact on the existing historical sites. This negative impact can be represented in either two ways: direct and non-direct. Direct negative impact is associated with the destruction and total removal of the historical buildings to construct new infrastructure. On the other side, non-direct impact results as a by-product of the effect resulted from close modern urban areas that transferred to the heritage areas such as air pollution, fragmentation and lack of connectivity between these sites.

2. Current Work

The above introduction shows clearly the increase in the need of studying the interaction between modern and ancient/heritage landscapes to address the problems associated with such interaction to reach the concept of sustainable development. For this purpose, we select the historical center of Irbid city, Jordan as a case study. Irbid is located in the northern part of Jordan at Longitude of 35d 51m 0s and Latitude of 32d 33m 20s as shown in fig. 1 (1a. Irbid city location and 1b. The urban growth change in the city between 1953 and 2000 from aerial images).



a. Irbid city location b. The urban growth change (1953-2000)

Figure 1. Irbid City as a Case Study

Irbid city represents a real example of the interaction between the modern and heritage (central area shown in the fig. 1b) landscapes. This paper, using Geographic Information Systems (GIS), focuses on investigating a number of urban planning concerns in the city that include but not limited to: the assessment of ancient-modern landscapes compatibility, heritage buildings degradation, urban change detection and its role in the fragmentation and lack of connectivity between historic sites, visual pollution and the overall urban system connectivity (Batty et. al. 1999). Spatial analysis through GIS focuses on evaluating the current condition of the historical city urban system. This includes identifying the impact of the urban and infrastructure expansion, as detected from historical land use change noticed from image differencing at different epochs, on the historic center of Irbid city for both the direct and non-direct impact. Recommendations to solve the current problems related to the area of study urban system will be proposed that include achieving the vision of sustainable site modeling in GIS, solving traffic problems as related to the system accessibility, parking problems, policy and regulation re-evaluation as related to the balanced interaction between historical and modern landscapes.

3. References

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