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Analysis of oasis ecosystem dynamic with emphasis on environment degradation (Nefzaoua, south of Tunisia)

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The study is conducted to develop an appropriate methodology to assess the impact of anthropogenic activities on oases ecosystem dynamic and discuss which indicators are valid. It concerns Nefzaoua region representing about half of the Tunisian oases surface. The oases in southern Tunisia, where human activities in water utilization have a long history, are important sources of income in one hand and they are fragile ecosystems in another hand. Within the last 30 years, policy changes, technological development (increased mechanisation of pumping) and market pressure (cash crop products) led to changes in the use of natural resources. The ground water mismanagement has induced a soil degradation processes (water logging and salinity) and water quality deterioration, thus the pressure on water resources is growing. To overcome these problems and maintain the functionality of these ecosystems an adequate knowledge of the oasis system and a tools to predict its evolution are needed. This study tries to indicate the essential factors driving the oases ecosystem and to model the interaction between water resources and farmland evolution. It also involves the establishment of spatial database and modelling methods which enable to investigate the relationships among factors and a close collaborative feedback with the water planning authorities and farmers. The primarily results indicate that the expansion of farmland surface and the high density of groundwater abstract causes land and water quality degradation of these oases. The high degree of land parcelling and agricultural practices would be an additional cause of land degradation and the low water use efficiency. Therefore, to predict the evolution of oases ecosystems it seems essential to consider precisely

its land use and its temporal evolution. In this context, the combination of the remote sensing, GIS-environment and modelling methods would be an effective means for oases dynamic research in arid region.

Keywords: oasis ecosystem, water management, sustainability, arid environment, Tunisia.