شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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HANAA ALY

INTEGRATED SUSTAINABLE SYSTEM FOR IMPROVING GROUNDWATER QUALITY IN EL-WAHAT EL-BAHARIYA

Submitted By

Mohamed Ahmed Mohamed Fahmy El-Barad

B.Sc. of Civil Engineering (Public Works Sector), Faculty of Engineering,
Ain Shams University, 2010
Master in Civil Engineering (Public Works Sector), Faculty of Engineering,
Ain Shams University, 2015

A Thesis Submitted in Partial Fulfillment
Of
The Requirement for the Doctor of Philosophy Degree
In
Environmental Sciences

Department of Environmental Engineering Sciences
Institute of Environmental Studies and Research
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APPROVAL SHEET

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ABSTRACT

In terms of the importance of constructing mega integrated sustainable projects in Egypt, this research was initiated with the impartial of investigating an integrated sustainable system for improving groundwater quality in El-Bahariya Oases. A methodology with 5 investigations was designed. During the ***"Theoretical Investigation"***, literature was reviewed about sustainable communities. Throughout the ***"Field Investigation"***, site visits were carried out and site data was assembled. All through the ***"Modeling Investigation"***, a water sub-system model (treatment by oxidation), an Energy sub-system model (solar Energy) and a food-sub-system model (aquaponic) were established in Bahariya Oases and Heliopolis University (HU). In the ***"Analytical Investigation"***, the samples were analyzed and a geostatistical analysis was done to determine iron concentration in Bahariya . Moreover, ANN was tooled to transfer the model from HU in Cairo to Bahariya Oases, where the proposed location was determined by GIS analysis. Likewise, a platform concept for Water, Energy and food Nexus was developed to determine future projects budget. During the ***"Inferential Investigation"***, conclusions were deduced and recommendations were suggested for future research so as the Engineering Practice. The results ***flagged out*** that the whole system needs 101 polycrystalline solar panels and an inverter 14-kilowatt. In addition, the results ***highlighted*** the importance of the availability of 288 volts to the system. The results ***proposed*** 2 sites for aquaponic system in the northwestern region. The results provided the iron concentration in the

groundwater, which is beneficial to integrated system planning in Bahariya Oases. In addition, the results indicated that the real model will improve the groundwater quality by eliminating iron concentration. Moreover, the results provided a design to the sustainable model to provide the required energy to the system. Likewise, the results reflected the importance of implementing aquaponics, as a food supply source. Similarly, results designated that Sustainable Development Goals and Egyptian vision 2030 will be met. Besides, a new application for WEF management was developed. ***Innovative about this research***, is designing a mobile app for WEF management to estimate sustainable projects budget.

KEY WORDS:

Water Treatment – Sustainable Development – Geographic Information System – Underground water

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