

# بسم الله الرحمن الرحيم





# شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



# جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

## قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها  
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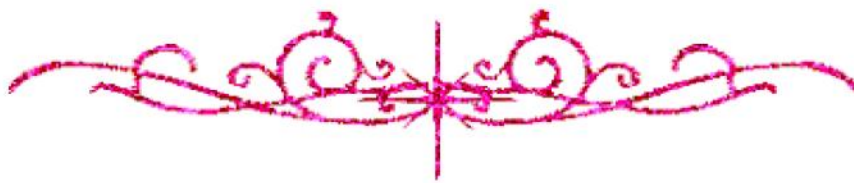
## يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار





# بعض الوثائق الأصلية تالفة





بالرسالة صفحات  
لم ترد بالأصل



**THE PERFORMANCE OF SOLAR-POWERED  
PUMP UNDER DRIP IRRIGATION  
SYSTEM**

By

**NOURHAN ANWER SADEK MOHAMMAD**

B.Sc. Agric. Eng., Faculty of Agric., Ain Shams University, 2010

**A Thesis Submitted in Partial Fulfillment  
Of  
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(On- farm Irrigation Engineering and Drainage)**

**Department of Agricultural Engineering  
Faculty of Agriculture  
Ain Shams University**

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**Approval sheet**

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## ABSTRACT

**Nourhan Anwer Sadek: The Performance of Solar- Powered Pump Under Drip Irrigation System. Unpublished M.Sc. thesis, Department of Agricultural Engineering, Faculty of Agriculture, Ain Shams University, 2020.**

Energy demand is increasing so as to meet the requirements of growing population in the world. Accessible energy is not adequate for people, because of several causes such as the developmental potential of a country, economic position and nature of the technological progression of the country. An ecosystem is contaminated heavily inasmuch the emission of different gases generated from combustion of fossil fuel which is facilely available and commonly utilized for satisfaction energy demand of the world. Fossil fuel costs are growing increasingly, while grid electricity has expensive running costs, especially in rural and remote areas.

The solar energy is the actual solution to face future challenges in the Egyptian energy demands. Due to Egypt's optimal geographic location in the global sun belt. The use of solar powered pump systems in agriculture irrigation is a viable alternative to fuel powered and electricity grid solutions.

This study aims to compare between traditional energy and solar generators in terms of energy consumption and cost-effectiveness. Pumping systems were used to operate units of drip irrigation for the onion crop, which is planted, to determine the best energy consumption and less expensive energy consumption under this system.

The hydraulic experiment and measurements were performed on a private farm at **Beni Salama, Giza**, which lies at latitude 30.32°N, 30.80°E during 2016 and 2017. Four days were selected randomly during (September 2016, December 2016, March 2017 and June 2017) for measurements. Experiment treatments were tilt angle of solar Photovoltaic

cells (PV), climate season and temperature of the PV. The results indicated that the maximum and minimum DC power output for PV system were (6398, 5755 W), while the maximum and minimum AC power were (6317, 5479 W), respectively. The maximum and minimum for hydraulic power were (3566, 3207 W). Efficiency of both photovoltaic, inverter, pump and overall system was also calculated for the selected months (September 2016, December 2016, March 2017 and June 2017). Maximum and minimum for module efficiency were (13.9%, 13.2%), maximum and minimum for inverter efficiency were (95%, 89%). Maximum and minimum for pump efficiency were (63.9%, 54.5%), while maximum and minimum for overall efficiency were (8%, 6.7%). The total cost in the PV, grid electricity and diesel-powered systems were (20126, 103222 and 117984) LE/year respectively. Saving operating economic by using solar energy and by grid electricity was 83% and 12% compared with diesel-powered. This shows that the solar system is economically viable.

**Keywords:** irrigation, Photovoltaic cells, water pumping, drip irrigation system.

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