# SMART SUNFLOWER: DEVELOPMENT OF TRAILING TYPE SOLAR POWERED WATER PUMP INTEGRATED WITH SMARTFLOWER DESIGN AND SOLAR TRACKING MECHANISM

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## TABLE OF CONTENTS

## LIST OF TABLES

## LIST OF FIGURES

## LIST OF APPENDIX TABLES

## LIST OF APPENDIX FIGURES

# LIST OF EQUATIONS

# ABSTRACT

**ABILA, LAILAH G. & LUCAS, CHRISTIAN JAY A.**, Department of Agricultural and Biosystems Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, **JUNE 2023**, **DEVELOPMENT TRAILING TYPE SOLAR POWERED WATER PUMPING SYSTEM INTEGRATED WITH SMART FLOWER DESIGN AND SOLAR TRACKING MECHANISM.**

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Solar energy is one of the most abundant and cleanest sources of renewable energy. It is freely available and is one of the most promising in which power generation has many advantages, and because if this it has been gaining prominence as an alternative energy source.

The general purpose of this study was to design a machine that can aid in optimum recovery of this energy – solar energy, and utilize it for irrigation. Hence, it employed solar tracking mechanism and smartflower design. The machine was composed of these main components namely; photovoltaic PV modules, light dependent sensors (LDR), solar tracking assembly, solar pump and controller, charge controller, battery, voltage sensor, current sensor, arduino microcontroller sets and the trailer.

In this system, 8 PV modules which were positioned in a resembling a flower-like formation were used with a working voltage of 100W (Pmax), 17.6V (Vmp) and 5.71A (Imp). Four LDR sensors were used for the dual-axis tracking of the machine. Solar pump and the controllers were the load needed to supply the machine. The load, which is the solar pump, requires one horsepower.

Results of the evaluation showed mean voltage and current of 132.65 and 1.98 respectively giving an average power of 258.1. The findings also displays that around 12 noon has the highest power accumulated. Cost of the machine was computed at Php87,251.31 which is material and labor cost. Annual fixed cost and variable cost was calculated at Php15,101.19/yr and Php9.20/hr respectively. Payback period was determined at 1.84 years

Keywords: solar energy, solar water pump, photovoltaic system, smartflower, solar tracking, arduino

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