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DESIGN, CONSTRUCTION AND EVALUATION OF  
A GRAVITY-TYPE DRIP IRRIGATION SYSTEM  
FOR CUCUMBER PRODUCTION

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**DESIGN, CONSTRUCTION AND EVALUATION OF  
A GRAVITY-TYPE DRIP IRRIGATION SYSTEM  
FOR CUCUMBER PRODUCTION**

Graduate Thesis Submitted to the  
Graduate School of the Cavite State  
University Indang, Cavite

In partial fulfillment  
of the requirements for the degree of  
Master of Science in Agricultural Engineering



**OLUDARE L.OPEGBEMI  
MARCH 2008**

## ABSTRACT

**OPEGBEMI, Oludare Lawson. Design, Construction and Evaluation of a Gravity-Type Drip Irrigation System for Cucumber Production.** Master Thesis. Master of Science in Agricultural Engineering, Cavite State University, Indang, Cavite. April, 2008. Adviser: Engr.Cesar C.Carriaga.

A gravity-type drip irrigation system was designed and evaluated at the Central Experimental Station of Cavite State University in Indang, Cavite with cucumber as test crop. The irrigation system was designed to deliver the peak daily crop water requirement of a cucumber plant. The discharge rate of the emitters is 1.8L/hour. The system was constructed from cheap and locally available materials. Results of the system evaluation revealed that the distribution efficiency at 1.8meters head is of 97.7% and with distribution uniformity of 98%. Such high values of distribution uniformity efficiency indicate a good design of a gravity-type drip irrigation system. Emitter clogging, which is a common problem in drip system was controlled so well by ensuring good fertilizer solubility and proper straining of the chicken manure. The drip system had an initial cost of P6, 711.50 for a total area of 84 square meters.

The treatments used were: (i) drip irrigation Method + organic manure; (ii) drip irrigation Method + inorganic fertilizer; (iii) Manual irrigation system + organic manure; (iv) manual irrigation system + inorganic fertilizer and results showed that the treatments significantly affected the plant's performance in terms of leaf width, plant height, root length and the yield. Drip irrigation system with inorganic fertilizer produced the greatest leaf width, plant height, root length and the yield.

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# **DESIGN, CONTRUCTION AND EVALUATION OF A GRAVITY-TYPE DRIP IRRIGATION SYSTEM FOR CUCUMBER PRODUCTION**

**OLUDARE ISAAC LAWSON OPEGBEMI**

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<sup>1</sup>A Graduate Thesis presented to the Department of Agricultural and Food Engineering, College of Engineering and Information Technology, Cavite State University, Indang, Cavite in partial fulfillment of the requirements for the degree of Master of Science in Agricultural Engineering, Major in Soil and Water Conservation Engineering under the supervision of Engr.Cesar C. Carriaga

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## **INTRODUCTION**

Cucumber consumption is yielding high demand rate particularly in some part of the world today due to its high nutritional value containing high percentage of water, starch protein and fat. Its production is highly dependent on inputs such as irrigation water and Nitrogen (N) fertilizer. Growers realized that these inputs must be carefully managed to ensure profits and minimal environmental impacts. Drip irrigation offers growers increased control of irrigation water applications compared to other types of irrigation methods. In addition to allowing precise control of irrigation water applications, drip systems offer the ability to use high frequency fertigation with fluid organic and inorganic fertilizers throughout the growing season. This greatly improves the potential for excellent Nitrogen use efficiency due to decreased leaching losses.