PROPOSED DESIGN OF A PROTOTYPE MULTI-LEVEL AQUAPONICS FARM IN PULILAN, BULACAN

Design Project

JOHN MARK A. DULFO
EDYCHRIS E. RIVERA

College of Engineering and Information Technology
CAVITE STATE UNIVERSITY
Indang, Cavite

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Undergraduate Design Project
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JOHN MARK A. DULFO
EDYCHRIS E. RIVERA

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ABSTRACT

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The study entitled "Proposed Design of a Prototype Multi-Level Aquaponics Farm in Pulilan, Bulacan" was conducted at Cavite State University – Main Campus.

Rice is considered as the most important food crop in the Philippines. It is the main staple food in the country. However, the rice production of the country still cannot accommodate its demand. A recent study entitled "Cultivar: A Proposed Prototype Multi-Level Rice-Fish Aquaponics Farm" by Rivera, E. E. (2016) aimed to increase the rice production through vertical farming which maximizes the use of land for rice farming. This inspired the authors to design a multi-level aquaponics farm that could primarily produce rice, and also capable of producing other farm crops. The main objective of the study was to design the structural plan for the prototype multi-level rice and fish aquaponics farm. The structure is a reinforced concrete designed, three-storey building with a roof deck. It has a total floor area of 1,512 square meters. The total cost estimate of the project was P43,242,495.25. The study provided the architectural plan, structural plan, electrical and plumbing layout and detailed cost estimate and specifications of the proposed project. The sizes of structural members were designed based on the maximum forces and moments obtained from the 2D STAAD analysis. The authors recommend the use of innovative architectural and structural concepts to lessen the impact of internal and external forces on the structure. The actual soil bearing capacity of the site in Pulilan, Bulacan was recommended to be used for further developments based on this study.

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF APPENDIX TABLES

LIST OF APPENDIX FIGURES

LIST OF APPENDICES

PROPOSED DESIGN OF A PROTOTYPE MULTI-LEVEL AQUAPONICS FARM IN PULILAN, BULACAN

John Mark A. Dulfo
Edychris E. Rivera

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INTRODUCTION

Rice is considered as the most important food crop in the Philippines. It is the main staple food in the country. Half of the population in the Philippines was roughly calculated consuming rice. Since majority of the Filipinos consume rice on a daily basis, rice is embedded in the Philippine history and culture.

Rice is well-suited in the Philippines, a tropical country that is surrounded by water. However, the rice production of the country still cannot accommodate its demand. The three main factors that cause insufficiency of rice production in the Philippines are: population growth, urbanization of farm lands, and the process of rice product transportation. Given these factors, the production of rice should be increased by increasing the rice fields while consuming less land area. Also, the rice fields should be located near market areas to lessen transportation losses. With all these considerations, a study of a prototype multi-level rice and fish aquaponics farm was conducted.