# DESIGN, FABRICATION AND PERFORMANCE EVALUATION OF BATTERY- POWERED RICE PADDY GRAIN COLLECTOR

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## TABLE OF CONTENTS

## LIST OF TABLES

## LIST OF FIGURES

## LIST OF EQUATIONS

## LIST OF APPENDICES

## LIST OF APPENDIX TABLES

## LIST OF APPENDIX FIGURES

# ABSTRACT

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Post-harvest operation is an essential part of rice production. It is a sequence of rice cultivation cycle procedures involving threshing, cleaning, drying, milling, grading, weighing, and storing ("Handbook on Rice Post-Harvest Techniques," 2015). Among other operations, drying is one of the most critical post-harvest processes, which can be done manually and mechanically. Converting the manual method for post-harvest production, such as collecting rice paddy during the drying process, is one of the best ways to make the work faster and save workforce and labor costs. A battery-powered grain collector made of locally available materials using local manufacturing technology was designed, fabricated using different fabrication techniques, and tested for collecting and bagging paddy dried on concrete pavement. The battery-powered grain collector had the following major components: vacuum motor, power transmission system, bagging area, and frame. The machine was evaluated using a treatment of varying thicknesses of 0.5-1.0 cm, 1.0-1.5 cm, and 1.5-2.0 cm, respectively. Results showed a minimum collecting time of 12 mins and 33 seconds, a maximum collecting capacity of 122.84 kg/hr, and the highest machine collecting efficiency of 81.0% at 0.5-1.0 cm thickness of rice paddy. Other parameters, such as air velocity, dynamic pressure, and noise level, were not significantly affected by the varying thickness of the rice paddy. The machine entailed an investment cost of Php

12,501.76. The break-even point of the paddy was 510,606.75kg/yr at a collecting cost of 0.11 P/kg of paddy. The projected time needed to recover the cost of the machine based on 89.67 kg/hr collecting capacity was 1.65 years with a 31.36% return on investment.

Keywords: paddy grain collector, battery-operated, vacuum

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