

PROTOTYPE PNEUMATIC PADDY GRAIN COLLECTOR

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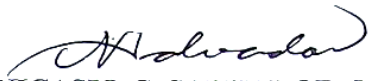
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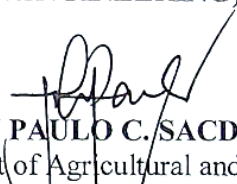

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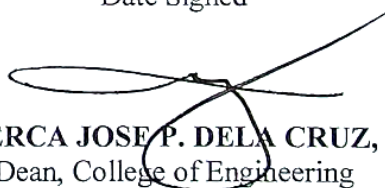

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ABSTRACT

ANTOLIN, JOSHUA REY M. and VILORIA, VIA C., Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, **July 2024, PROTOTYPE PNEUMATIC PADDY GRAIN COLLECTOR**

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The Philippines is one of the leading rice producers in Southeast Asia, and collecting and bagging sun-dried paddy grains is a crucial part of the drying process that can be carried out manually or mechanically after rice crops are harvested. The manual collection of sun-dried paddy grains using a metal scoop (panake) remained a common practice due to simplicity and affordability. Switching from manual to mechanical processes for collecting rice paddy grains during sun drying could significantly speed up the process and reduce labor intensity. A prototype pneumatic paddy grain collector made from locally available materials was designed, fabricated, and tested for its ability to collect and bag paddy grains dried on concrete pavement. This prototype included primary components such as an engine, centrifugal blower, transmission system, flexible hose, grain tank, discharge outlet, and main frame. The machine was tested with different blower speeds (3200, 3400, and 3600 rpm), and the results indicated significant differences in damaged grains and collecting capacity when varying the centrifugal blower's speed. However, collection losses and collecting efficiency remained insignificantly affected by these speed changes. The prototype pneumatic paddy grain collector achieved a collecting efficiency of 95% across all treatments with an average collecting capacity of 201.79 kg/hr. The investment cost for the prototype pneumatic paddy grain collector was Php 29,325.00,

with an operating cost of Php 1.01/kg and a custom rate of Php 1.32/kg (30% mark-up of operating cost) of paddy had a breakeven point of 19486.94 kg. The projected time needed to recover the investment cost of the machine based on 201.79 kg/hr collecting capacity was 2.60 years. Using the machine for 180 hours annually could generate an income of Php 11,259.88

Keywords: Pneumatic, paddy grain collector, sun-dried paddy grains, blower speed

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