RICE TECHNOLOGY *Bulletin*

Department of Agriculture
Philippine Rice Research Institute **(PhilRice)**

1994 No. 9

PhilRice-UAF BATCH DRYER

Central Experiment Station
Maligaya, Muñoz, 3119 Nueva Ecija
Tel. Nos.: 112, 113, 277, 285, 258, 354
302-9517
Fax No.: 063 (4456) 113
(Ask for operator's assistance)

Other Offices:

PhilRice-Los Baños
UPLB Campus, College, 4031 Laguna
Tel. Nos.: 3515, 3631-33, 3635

PhilRice-San Mateo
San Mateo, 3318 Isabela
Tel. No.: 664-2140 (ATI)

PhilRice-Midsayap
Bual Norte, Midsayap, 9410 North Cotabato

PhilRice-Agusan
RTR, 8611 Agusan del Norte

Published by the Philippine Rice Research Institute.

FOREWORD

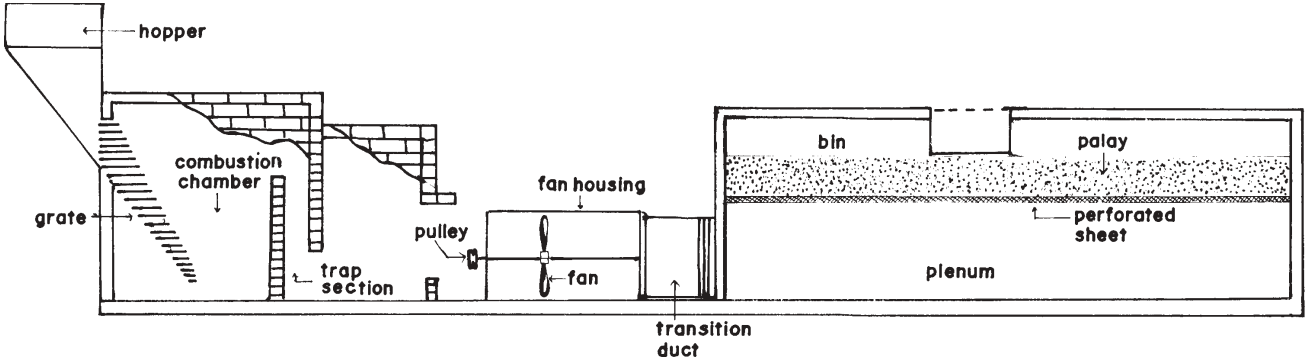
A collaborative work between PhilRice and Vietnamese agricultural engineers successfully combined two component parts designed by three agencies here and abroad: (1) the early flatbed dryers from the University of the Philippines at Los Baños (UPLB) and (2) the improved furnace fan blade blower designed by the University of Agriculture and Forestry (UAF) in Ho Chi Min City, Vietnam.

The result is a high capacity flatbed dryer which can dry 120 cavans or 6 tons of palay per batch. Fueled by rice hull and made from ordinary bricks, hollow blocks and cement, it is definitely the cheapest dryer in its class. And with regulated feeding of rice hull, the dryer can be used for drying rice seeds as well as palay for commercial milling.

Cooperatives, farmers' organizations, and even trader will greatly benefit form this innovation.

SANTIAGO R. OBIEN
Director

PhilRice-UAF Batch Dryer



Furnace : 980mm x 1185mm x 1910mm
Drying bin : 7320mm x 4320mm x 1300mm
Construction materials : hollow blocks and cement

Equipped with several windows for grain unloading. False floor is made of gauge #22 perforated sheets with 2.44 mm diameter holes and supported by 4cm x 8 cm wooden frame.

Introduction

Farmers incur heavy losses from palay harvest during the wet season crop owing to the lack of access to mechanical dryer. In spite of available dryers in the market, few farmers can afford to buy them. Many of these dryers are also expensive to maintain since they use kerosene fuel or electricity.

Thus, farmers often resort to sun drying, which contributes to further losses in harvest. It requires several farm hands for unloading, turning the seeds, and gathering the seeds during sudden downpour. Farmers also use pavements and public roads for drying, which makes it dangerous to motorists. This innovative dryer solves many of these problems.

Problems Addressed

- Inadequate drying facilities during rainy season
- Low market price for wet grains
- High investment cost of existing dryers
- Expensive fuel cost of existing dryers

Intended Beneficiaries

- Farmers, palay traders, millers, cooperatives

Cost to Beneficiaries (as of 1994)

- P80,000 (excluding shed and engine)

Outstanding Features

- High capacity dryer
- Uses rice hull as fuel
- Made from low-cost materials
- Simple and easy to operate
- Low maintenance
- Dried palay can be used as seeds
- Complete drying up to 13% moisture content (mc)
- Precise regulation of air temperature

Performance

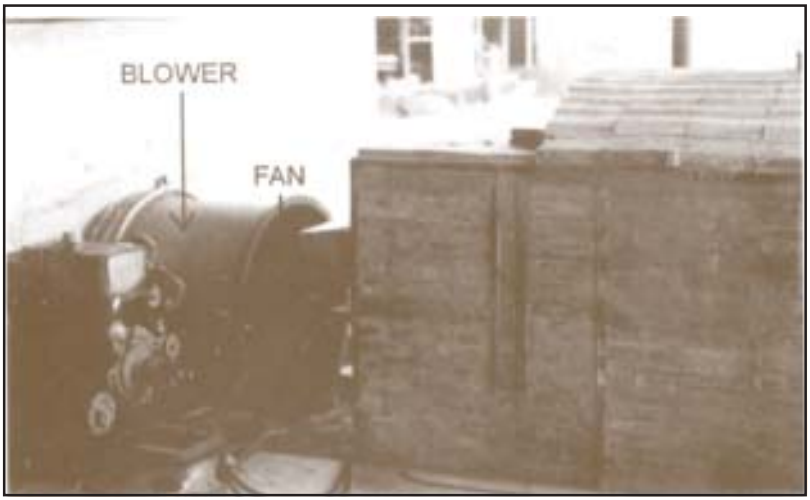
- Airflow : 0.85 cubic m/s-ton at 30 mm water static pressure
- Drying air temperature : 42 to 55^{o}C
- Grain depth : 30 to 35 cm
- Rice hull consumption : 32 to 50 kg/hr

Capacity : 6 tons palay at 20% - 26% initial mc can be dried rom 4 to 8 hr

Low drying cost of about 3.4% the cost of the palay compared with up to 15% using other mechanical dryers.

Operating Requirements

- Furnace fuel : ricehull
- Blower : powered by hand tractor diesel engine (9 HP) or 7 kw electric motor
- Fan : 750mm diameter, vane axial flow type

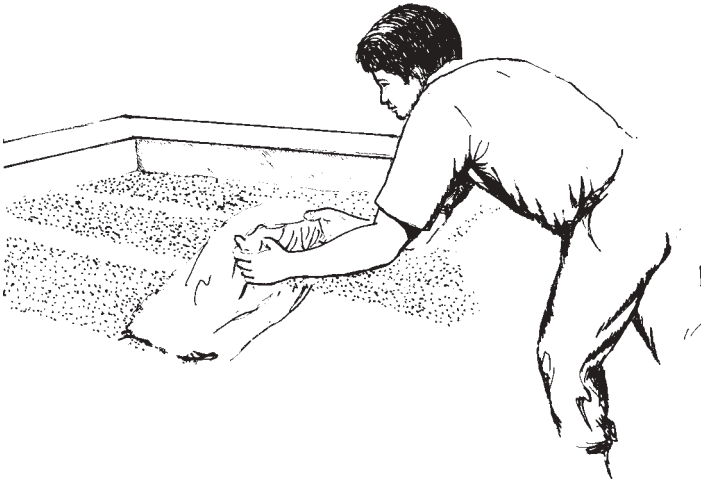


Operating Principle

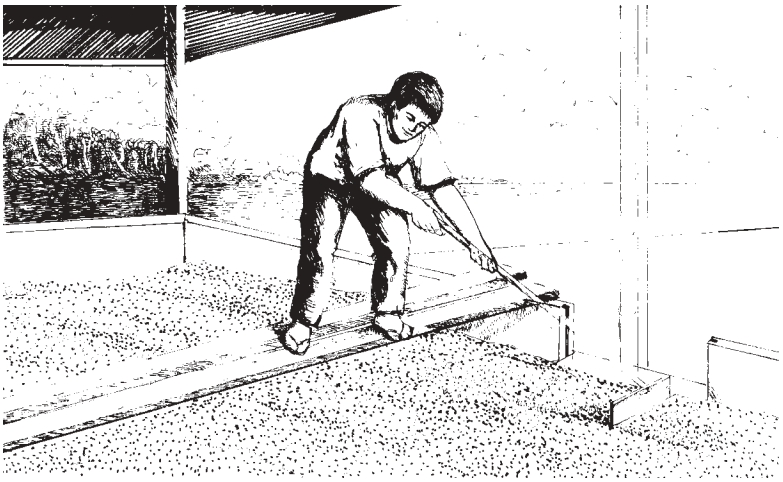
Combustion takes place in the furnace which provides heated air in the dryer. This heated air is then sucked by the blower and diverted into the plenum chamber of the drying bin. The heated air is forced into the grain mass, removing excess moisture until it reaches the safe moisture level for storage which is 14%.

Operating Procedure

1. Clean the drying bin before loading the palay.
2. Load the palay in the drying bin.



3. After loading, level the palay to have uniform air distribution.



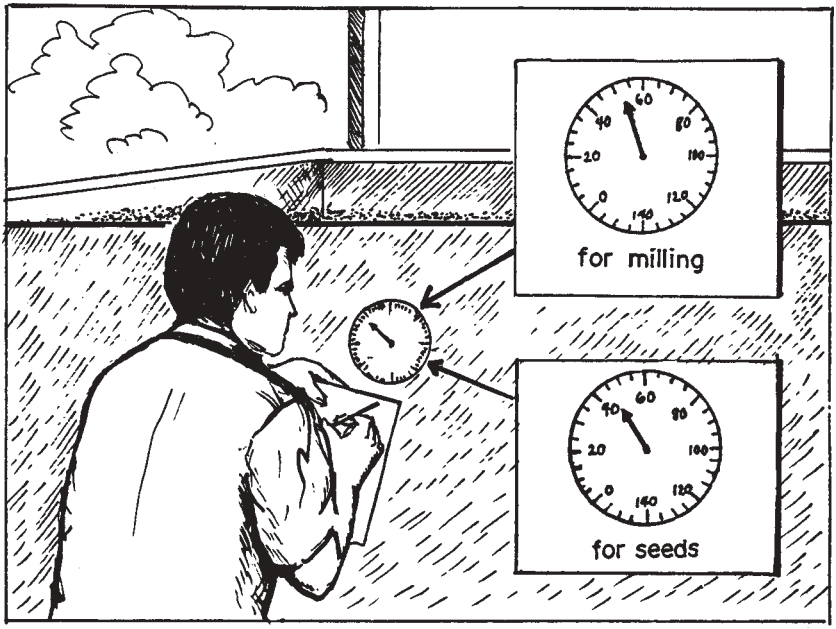
4. Load rice hull at the hopper of the furnace.

5. Place a piece of wood and paper in the combustion chamber to hasten burning, then slowly feed the rice hull into the grate.

6. Check engine fuel, oil, and water before starting.

7. Start the engine.

8. Monitor temperature. If the palay to be dried is for milling purposes, the drying air temprature should not exceed 52^{o}C. If it is for seed purposes, the maximum drying air temperature should be 45^{o}C.



9. When moisture of palay is already below 18%, lower temperature to 49^{oo}C if palay is for milling or to 43^{o}C if palay is for seed purposes.

10. When palay is already dry, stop feeding rice hull 30 min before putting off the blower to reduce the moisture content variation between the top and bottom layers and to cool the palay.

This bulletin was prepared by the following:
Roger F. Barroga, *project coordinator*
Karen Eloisa T. Barroga, *managing editor*
Eden C. Gagelonia, *subject matter specialist*
Eulito U. Bautista, *subject matter specialist*
Carlito N. Bibal, *illustrator*
Dennis Glenn L. Flores, *desktop publishing artist*

Produced by:
Communication Division
Technology Transfer Program

For further information, contact:
Rice Engineering and Mechanization Division
Philippine Rice Research Institute
Maligaya, Muñoz, 3119 Nueva Ecija
Tel Nos.: 112, 113, 277, 258, 285, 354
Cellular Phone No.: 302-9517
Fax No.: (4456) 113

PhilRice

On November 5, 1985, then president Ferdinand E. Marcos signed Executive Order No. 1061 creating the Philippine Rice Research Institute or PhilRice. His successor, former president Corazon C. Aquino reaffirmed this order on November 7, 1986 through Executive Order No. 60, which broadened and strengthened the mandate of PhilRice. Full operations began in 1987 in the University of the Philippines at Los Baños, Laguna.

To strengthen its institutional capability, PhilRice in 1988 sought assistance from the Japanese government for a grant to build its central experiment station in Maligaya, Muñoz, Nueva Ecija. Through the Japan International Cooperation Agency (JICA), a fully-equipped research complex was built and turned over to the Philippines in March 1991. These facilities were inaugurated in May 1991.

Today, PhilRice coordinates and unifies the research and developmetn activities of more than 60 agencies working on rice nationwide. This includes experiment stations of the Department of Agriculture and state colleges adn universities, strategically located in the country. PhilRice's research programs cover rice varietal improvement, planting and fertilizer management, integrated pest management, rice-based farming systems, rice engineering and mechanization, rice chemistry and food science, social science and policy research, and technology transfer. PhilRice is attached to the Department of Agriculture.

TECHNOLOGY TODAY • FOOD FOR TOMORROW •