

1971-72 Report  
COMPREHENSIVE RESEARCH ON RICE  
January 5, 1973

PROJECT NUMBER AND TITLE: RM-10. Residue Utilization - Packaging Investigations of Rice Straw and Hulls as Feed for Livestock and Fiber for Paper-making or Construction Material.

PROJECT LEADER: John B. Dobie, Agricultural Engineer

PERSONNEL: William N. Garrett, Animal Nutritionist  
J.L. Hull, Animal Scientist  
P.S. Parsons, Extension Agricultural Economist  
Howard Walker, U.S.D.A. Lab, Albany - Cooperator

OBJECTIVES

1. To continue investigations of the optimum conditions for packaging rice straw or hulls, particularly treated rice straw.
2. To determine the effect of treatment of rice straw to improve digestibility on packaging of the straw, including possible changes in need for binders and/or feed additives.
3. To determine packagability of complete rations in cooperation with Animal Scientists performing feeding trials with rice straw (treated or untreated) as the major ingredient.
4. To determine possible uses of rice straw and hulls for commercial use as fiber for building material, paper, or fuel.
5. To determine the economic feasibility of harvesting, packaging and handling systems for rice straw for either feed or fiber.

WORK IN PROGRESS

1. Although laboratory work on testing of optimum conditions for packaging rice straw has been completed, work still continues in conjunction with cubing or pelleting straw for feeding studies. Information and experience is gained each time straw is packaged, and we continue to try different binders or method of application.
2. Feeding trials are continuing, including feeding and digestion trials by Dr. Garrett with treated straw provided by the Western Regional Utilization Laboratory in Albany and by J.L. Hull and Dr. Morris with untreated straw in cubed, milled and pelleted form.
3. The Western Regional Utilization Laboratory is continuing their tests on treatment of straw to improve its digestibility, and are supplying the material for Dr. Garrett's trials from straw provided from the budget for this project.

4. Cost studies of various systems for harvesting, packaging and handling straw have been updated, and possible new equipment or systems are investigated as they become known or available. This work ties in with a new project for 1972-73 on feasibility of harvesting straw for commercial use.

#### EXPERIMENTS COMPLETED

1. Laboratory studies of optimum conditions of rice straw for packaging, particularly comparing various binders for their value with rice straw.

2. Laboratory studies comparing dry vs. liquid binders for use in packaging straw.

3. Economic study of four harvesting systems for rice straw.

4. A feeding trial during the winter of 1971-72 on value of cubed rations high in rice straw for over-wintering steer calves.

#### WORK PLANNED

1. Study of feasibility of harvesting rice straw as affected by weather, straw quality, drying rates, and economics. (New Project)

2. Feeding trial comparing rice straw, oat hay, and wheat straw in cubed, pelleted, and milled form for over-wintering cattle. Observations regarding mechanical operations, power requirements for processing and comparative quality of packaged products will affect the economic analysis for these different forms of feed.

3. Continuation of feeding work with treated rice straw.

#### MAJOR ACCOMPLISHMENTS

1. Completed initial and revised studies of potential systems for harvesting, packaging and handling of rice straw. Reports published.

2. Tested numerous binders to determine those best suited for packaging rice straw for feeding. Three reports.

3. Cubed appreciable tonnages of rice straw rations for feeding trials, using standard commercial cubing equipment.

4. Feeding trials performed by Dr. Garrett on treated and untreated rice straw and reported as completed. (See Project RH-9)

5. Feeding trial by J.L. Hull and J.G. Morris, Animal Scientists, with cubed over-wintering rations high in rice straw showing satisfactory gains with steer calves.

#### IMMEDIATELY APPLICABLE RESEARCH RESULTS

1. Information on conditions under which rice straw or rice straw rations can be cubed.

2. Information on which recommendations can be made regarding bonding agents for cubing rice straw.

3. Economics of harvesting rice straw by baling, field cubing, and stationary cubing from long straw are available.

4. Animal performance data from feeding treated and untreated straw are available for limited conditions of feeding.

#### EVALUATION OF PROJECT

The work on packaging of rice straw for feeding or for handling is nearing completion, except as additional work is needed to assist the Animal Scientists in their evaluation of rice straw as an animal feed. No additional funds were requested for 1972-73 as it was felt that carry-over funds would be sufficient for this purpose.

This project has successfully demonstrated the conditions under which rice straw can be packaged and handled. Further work should be done on the effect and value of treating rice straw for feed, and the effect of such treatment on packaging and animal performance.

Of primary interest is the ability to harvest appreciable quantities of rice straw in any given season, considering weather, potential harvesting systems, and value of the straw as feed or as fiber for manufactured products. This study was initiated in 1972-73, and should replace Project RM-10 as the major effort in the area of residue utilization.

#### PUBLICATIONS OR REPORTS

Dobie, J.B. and W.N. Garrett. Utilization of rice straw for livestock feed. ASAE Special Publication SP-01-72, 1972.

Garrett, W.N. Trial Summary, U.S.D.A./UC Rice Straw Lambs (4/72-6/72), Mimeograph, 6 pages. (See Project RM-9 report for details)

Dobie, John B. Phillip S. Parsons, and Robert G. Curley. Systems for handling and utilizing rice straw. ASAE Paper No. 72-115, ASAE, St. Joseph, Michigan 49085, 1972.

Dobie, John B. and Edgar J. Carnegie. Application of liquid binders for stationary cubing. ASAE Paper No. 72-302, ASAE, St. Joseph, Michigan 49085, 1972.

Hull, J.L., J.B. Dobie, and J.G. Morris. Steer calves can be wintered on rations high in rice straw. California Agriculture, November 1972.