1970 Project Report

COMPREHENSIVE RESEARCH ON RICE

PROGRAM AREA: Engineering

PROJECT NUMBER & TITLE: 69-15 Combine Performance Investigations in Rice Harvesting

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OBJECTIVES:

For 1970-71, determine harvesting losses for a representative sample of rice harvesting operations in California and present this information in conferences and meetings to interested people in and associated with the rice industry.

WORK IN PROGRESS:

During the month of October, 1970, blanket tests to determine rice harvester performance in four locations were conducted. When the laboratory work has been completed the following combine performance parameters and crop characteristics can be calculated:

Combine Performance Parameters:

1. Harvesting rate in terms of acres and bags of wet or dry (13.5% moist.) rice per hour.
2. Harvesting losses at the header and from the rear of the harvester in pounds dry rice per per acre and percent of harvested rice yield.
3. Combine feed rate in pounds of wet and dry straw per minute.
4. Header width of cut efficiences.
5. Rice seed to rice straw and chaff ratios on wet and dry basis for material cut by the header.

Crop Characteristics:

1. Total and harvested yield per acre.
2. Height of crop, cut stubble, and a calculated estimate of straw and chaff production per acre.
3. Milling yield and quality of harvested rice and rice lost in the straw and chaff.

General information about the 16 paired tests (32 individual tests) is shown in the following table.

LOG OF PAIRED COMBINE BLANKET TESTS

LOCATION	DATE	VARIETY	CROP CONDITION	HARVESTER MAKE
Woodland	10/6	Calrose	Standing	Massey Harris 510 (1)
"	"	"	"	" " (1)
Richvale	10/9	"	"	J. Deere 105
"	"	Calousa	" (2)	IHC 503
Firebaugh	10/12	Calora	Lodged	J. Deere 7700
"	"	"	Standing	"
"	"	"	"	J. Deere 105
"	"	Calrose	"	Gleaner Mod. G
"	"	"	"	Massey Harris 510
Richvale	10/16	Calora	"	J. Deere 105 RC
"	"	"	"	J. Deere 7700 (3)
"	"	"	"	" (3)
Delvan	10/29	Calrose	"	Hardie (4)
"	"	"	"	" (4)
"	"	"	"	" (4)
"	"	"	"	" (4)

(1) Two different machines
(2) Severe stem rot
(3) Same machine with grain loss monitor
(4) Same machine with ASL chaffer

EXPERIMENTS COMPLETED:

Laboratory analyses of the rice and material collected from the rear of the combine have not been completed. Determination of the amount of separation and cylinder loss for each test is a slow and tedious process. About 160 beet pulp sacks packed full of rice straw have to be hand fed in two passes over a No. 7 Clipper Cleaner to recover the lost rice collected for the 32 tests. This is being done by several Agricultural Engineering students on a part-time work basis.

WORK PLANNED:

1) Complete laboratory work, analyze data and write a report on the field work. Each grower and custom operator who cooperated in the field testing will receive a detailed data sheet for each test they participated in.

2) Arrange and conduct combine operation, adjustment, and performance conference for farm advisors and interested rice industry personnel.

3) Arrange and conduct combine operations meetings for growers, custom operators and combine drivers.

4) During 1971 harvest season continue testing combines to determine:

    a) range of normal harvesting losses,
    b) performance of the shoe and straw separating components of the combine, and
    c) combine modifications to improve performance for high and low seed to straw and chaff ratios.

EVALUATION OF PROJECT:

Specific information on combine performance for the current makes and models of combines used to harvest rice will permit optimization of combine capacity to maximize net income for a range in size of rice farming operations and given probabilities of the number of good harvesting days. The liklihood of developing combine modifications to significantly increase grain saving capacity (performance) is an unknown quantity. However, since all machines currently in use can be readily overloaded resulting in losses exceeding 10 percent of the crop and approaching 20 percent; there is a real need to search for methods and modifications to achieve significantly greater performance.

PUBLICATIONS OR REPORTS:

Except for this preliminary report, none have been made for the 1970 field tests.