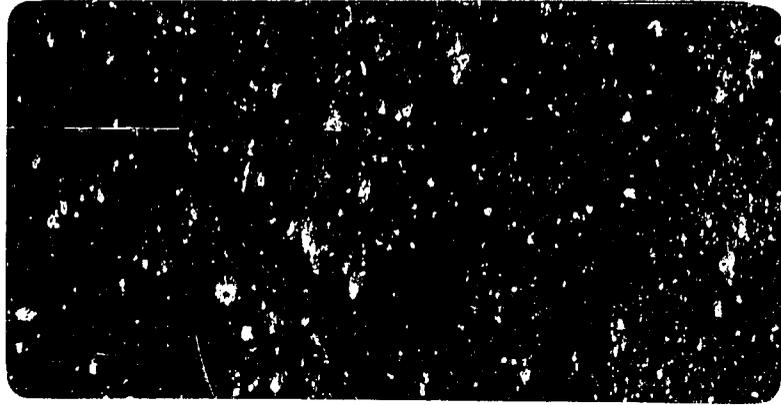


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**University of Arkansas,  
Fayetteville**

COMPARISON OF TRADITIONAL  
AND FSR/E INTRODUCED TECHNIQUES  
FOR HARVESTING AND THRESHING RICE

Report #42

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COMPARISON OF TRADITIONAL AND FSR/E INTRODUCED TECHNIQUES FOR  
HARVESTING AND THRESHING RICE

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## COMPARISON OF TRADITIONAL AND FSR/E INTRODUCED PRACTICES FOR HARVESTING AND THRESHING RICE

### OBJECTIVES

This study was initiated to determine the economic benefits and costs of introduced practices of harvesting and threshing rice relative to traditional methods in the Les Cayes region of Haiti. Its purpose, undertaken under the auspices of a farming systems research and extension project (FSR/E) in the area, was to assess the value of such practices to rice farming households. It was hoped that the results of the study could be used in the development of a planned extension program of FSR/E recommended practices.

### BACKGROUND

Since 1984, the Agricultural Development Support Project Number Two (ADS II) FSR/E component in Les Cayes, Haiti has been developing practices to increase the productivity and reduce the costs of rice farming. To this end, the project has obtained a number of experimental rice varieties from the International Rice Research Institute (IRRI) and the International Center for Tropical Agriculture (CIAT). The results of on-farm trials comparing performance of these with local varieties are presented in the annual reports of the ADS II project and in the ADS II technical report number three. To date, several varieties have been found to be both higher yielding than local rice varieties and acceptable to Haitian tastes. One variety, Amina, is currently in the multiplication phase for large-scale distribution.

In addition to the introduction of improved varieties, the project has introduced such practices as; planting of rice with the aid of markers to make weed management easier, the use of a sickle for harvesting, and the use of a portable thresher. The sickle method of harvesting is designed as a labor saving practice for farmers who traditionally employ contract labor to harvest their crop by cutting the rice panicles individually by hand. The portable thresher, for use of rice harvested by sickle, is an alternative to the traditional practice of treading the rice panicles to remove the grains. Following the introduction of the sickle method of harvesting, farmers have, however, developed their own types of threshers which include the reverse side of chairs, doors, and car tires. These are used by placing sacks on the ground where the rice is to be threshed, in order to catch the grains, and then pounding the freshly cut plants against the blunt edges of the co-opted thresher.

## METHODOLOGY

To evaluate the costs and benefits of the FSR/E harvesting and threshing practices, trials were undertaken in March and September of 1987 to measure the time taken to harvest and thresh rice using traditional and introduced practices. In addition, a comparison was made between the ADS II portable thresher and a co-opted one.

The trials involved the selection of seven different sized rice paddy fields with collaborating farmers in the Les Cayes Plain representing in total area some 0.75 ha. Five of these fields were harvested and threshed using ADS II methods and two with traditional techniques. A greater number of fields for recording the traditional methods of harvesting and threshing rice could not be obtained since very few farmers are still using the traditional techniques. The data recorded in the trials which includes the area of the fields, the quantity of rice harvested, and the hours employed in harvesting and threshing are presented in Table 1.

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Table 1. Area of land, Quantity of Rice Harvested, and Time Employed using ADS II and Traditional Harvesting and Threshing Methods.

	<u>ADS II</u>	<u>Traditional</u>
Area (ha)	0.5722	0.1646
Yield (kg)	2840	282
Harvesting (Man Hours)	68.2	27.0
Threshing (Man Hours)	62.0	11.6

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In a complementary trial, the time employed and quantity of rice threshed using the ADS II portable thresher was compared to that of a co-opted thresher (door). The average quantity of rice threshed by the two threshers per hour was then used to evaluate the efficacy of the ADS II thresher.

## RESULTS AND DISCUSSION

To adequately compare the two methods of harvesting and threshing rice it is first necessary to convert all values to equivalent units. First, this involves converting the yields and man hours employed from the trials to a per hectare basis. Further, if the yields in the trials between the ADS II and traditionally harvested and threshed rice are significantly different, one must then convert the values to equivalent yields per hectare. The converted values of the data given in Table 1. are presented in Table 2.

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Table 2. Time Employed for ADS II and Traditional Rice Harvesting and Threshing Methods on Per Hectare and Per Hectare/Equivalent Yield Basis

	<u>ADS II</u>	<u>Traditional</u>
<u>Per Hectare Basis</u>		
Yield (kg)	4963	1713
Harvesting (Man Hours)	119	164
Threshing (Man Hours)	108	70
<u>Per Hectare/Equivalent Yield</u>		
Yield (kg)	1400	1400
Harvesting (Man Hours)	34	134
Threshing (Man Hours)	30	57

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N.B.

All the per hectare values are converted to a per hectare/equivalent yield basis by multiplying by the proportion of the equivalent yield (1400 kg) to the respective per hectare yields.

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The equivalent yield of 1400 kg/ha, obtained from the ADS II National Agricultural Survey, is the average seasonal yield, based on farmers' recall, for the Southern Department of Haiti from the intensive plain strata for the years 1985-86 (see ADS II Report # 28).

Using the now comparable data on a per hectare/equivalent yield basis, one can assign a value to the hours employed in harvesting and threshing rice equal to that of the existing rural wage rate. The cost comparisons between the FSR/E and traditional practices for harvesting and threshing rice are presented in Table 3.

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Table 3. Labor Costs of Harvesting and Threshing Rice using Traditional and ADS II Techniques (US \$/ha).

<u>Activity</u>	<u>ADS II</u>	<u>Traditional</u>	<u>Difference</u>
Harvesting	6.80	26.80	20.00
Threshing	6.00	11.40	5.40
	----- \$12.80	----- \$38.20	----- \$25.40

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 Assumptions:

1. Daily wage rate for a six hour/day is \$1.20.
  2. Household and contract labor are valued at the existing wage rate.
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Consulting Table 3., we see that a household may save about \$20/ha harvesting its rice with a sickle and \$5.40/ha in threshing using a portable thresher. Using the average area of paddy rice farmed by households of 0.65 ha, obtained from an ADS II survey of 185 households in its sites on intervention (see ADS II Report # 43), one can calculate the average savings per household per season in using the introduced techniques. On this basis, the implicit and explicit labor saving to the average rice farming household is some \$13 with harvesting by sickle, and \$3.50 with the use of the portable thresher. Since there are at least two seasons for growing rice each year, the annual labor saving to the household could be twice this amount or some \$33/year. However, since domestic labor is an important component in both the traditional and introduced practices, the actual cash saving to the household would probably be less than this amount.

The extra costs associated with the introduced techniques are presented in Table 4. Although some farmers do use their own knives as sickles for harvesting rice, in this analysis it is assumed that farmers purchase sickles for this purpose.

Using Tables 3. and 4., and evaluating the harvesting and threshing techniques as separate practices, we see that harvesting by sickle can provide the average rice farming household with a saving in labor of some \$26.00/year while costing an extra \$5.00/year, a net benefit of \$21/year. On this basis, therefore, it is not surprising that the sickle harvesting method has been widely adopted since its introduction in the Les Cayes region by the ADS II project.

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Table 4. Marginal Costs of Using FSR/E Introduced Techniques of Harvesting and Threshing Rice (US \$/farm household)

Activity	Marginal Cost
Harvesting	\$ 5.00
Threshing	20.00
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	25.00

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Assumptions:

1. Average area in rice per farm household is 0.65 ha.
  2. Five rice sickles are used per household per year at a cost of \$1.00/sickle.
  3. One portable rice thresher per farm household at a cost of \$20.00/thresher with an average life of 5 years.
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The labor savings from using the ADS II thresher are around \$7/year for an average rice farming household while the cost of the thresher is \$20. Although the average life of the thresher is probably at least five years, since the cost of borrowed capital in the informal rural credit market is at least 100%/year and perhaps as high as 200-300%/year, it would be unprofitable for the average household to invest in a thresher assuming a pay-back period over five years and a discount rate of 100%. Further, households who adopt the ADS II sickle-harvesting method are able to use alternative but inferior methods of threshing their rice, such as doors and car tires. Hence, perhaps a more valid comparison for the profitability of the ADS II portable thresher is between it and a co-opted thresher rather than with traditional threshing techniques.

In one trial comparing the ADS II portable thresher and a co-opted thresher (door) it was found that the ADS II thresher was about twice as fast, threshing some 52 kg rice/hour compared to 28 kg rice/hour. On the basis of a rice farming area of 0.65 ha and yield of 1400 kg/ha, the use of the ADS II thresher could provide a labor saving of about 15 hours per season. On an annual basis with two rice growing seasons and evaluating the labor at an assumed rural wage rate of \$1.20/6 hour day, this would represent a saving to the farmer of \$6/year. Such an amount would be insufficient to make it worthwhile to purchase a \$20.00 thresher. It should be noted, however, that the ADS II thresher being some 3 feet off the ground does provide other benefits to the user than quicker threshing. For instance, by enabling the user not to bend his/her back as is the case with co-opted threshers it is physically much easier.

Based on the results of the trial it appears the benefits for rice farming households from adopting the FSR/E harvesting techniques are considerable. This does not appear to be the case

for the introduced portable thresher priced at \$20. A recommendation, therefore, would be to encourage the use of the sickle in harvesting rice and to develop a much lower priced thresher for \$10 or less that could be used by households. One suggestion for such a thresher is the use of the reverse end of bottle caps arranged on planks of wood.

Although the harvesting of rice with a sickle is of undoubted benefit to rice farmers, it should be appreciated that the widespread adoption of such a practice would have a significant impact upon those persons employed in harvesting rice by hand. That is to say, the labor saving to the farmer from the use of a sickle would equal the loss in earnings to the farm laborers. Since the majority of hand-harvesting of rice is undertaken by female and generally landless laborers, this would represent a redistribution of a community's wealth to its richer members. On an intra-household level where the females in rice farming households contract their labor to harvest rice, this would represent a shift in earnings from women to the male of the household. However, given the fact that the Haitian price of rice fell by over 50% between May of 1986 and June of 1987 due to a massive increase in illegal imports, the failure of rice farmers to adopt cost saving techniques and/or practices for increasing their productivity could mean the elimination of domestically produced rice. In such a scenario, all parties concerned, rice farmers and farm laborers would suffer the consequences from not adopting improved management practices.

#### SUMMARY .

A trial was conducted to compare traditional practices with introduced techniques of harvesting rice with a sickle and threshing of rice with a portable thresher. By implicitly and explicitly valuing the cost of labor, it was shown that the net benefits to rice producing households from adoption of the sickle method of harvesting may be as high \$21/year. These savings to the farmer would represent a corresponding loss to farm laborers traditionally employed to pick the rice harvest by hand. The labor saving from the use of a portable thresher was not sufficient to cover its cost. It appears that a much lower priced thresher must be developed before it will be beneficial for most rural households to purchase portable threshers.

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