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INTRODUCTION OF A TECHNOLOGY PACKAGE FOR RICE IN THE ZONE OF LES CAYES

Technical Report #3

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INTRODUCTION

Rainfed lowland rice as well as irrigated rice has been an important cash crop in the plain of Torbeck in Les Cayes. The poor yields can be attributed to the low level of technology employed by the farmers. The manual land preparation, poor water and weed management, and tall, lodging varieties like Mme. Gougouse or Decany have caused yields of 1 ton/ha to 2.5 ton/ha (table 1 and figure 1).

Table 1. Yields per plot for Decany in Charlette, 1984.

Samples	Area harvested (m^2)	Grain weight (kg)	Yield (kg/ha)
1	759	127	1,674
2	144	34.5	2,396
3	10	1.5	1,500
4	10	1.9	1,900
5	10	1.0	1,000

Mean yield - 1,694 kg/ha.

The intensive use of hand labor for cultivation and harvesting has limited the total area and production. However, production could be increased by using high-yielding varieties (HYVs) that respond to better management practices.

The approximate area under rice is relatively small (1300 ha) compared to corn (9,200 ha) or sugarcane (6,000 ha) (table 2; Desplechin, 1973). However, given the annual rainfall of over 1,500 mm and its good distribution pattern (table 3 and figure 2), there is the potential for increased production. The increasing use of irrigation is another favorable factor.

Table 2. Principal crops and approximate area cultivated on the plain of Torbeck, Led Cayes.

Crops	Approximate area cultivated (ha)
Vetiver	2,600
Plantain	1,500
Fruit tree	3,400 - 3,800
Sugarcane	6,000
Coffee	1,600 - 2,000
Corn	9,200
Sorghum	7,200
Beans	2,000
Rice	1,300
Sweet potatoes	2,600
Miscellaneous tubercles	3,000
Vegetables	1,000

Source: Desplechin J. 1973.

The major constraints to production are:

- low-tillering, tall varieties
- poor or inadequate land preparation
- inadequate weed control
- poor water management
- low input use (i.e., fertilizer)
- lodging and shattering of grains

High-yielding rice varieties (HYVs) that have high tillering ability and are very resistant to lodging and generally resistant to major pests and diseases have been introduced in Asia and other parts of the world by the International Rice Research Institute in the Philippines, where the HYVs were first developed. The potential yield of HYVs like IR-36 or IR-42 has been shown to be over 8 t/ha to 9 t/ha. Given the constraints existing in Les Cayes, even a modest yield of 4 t/ha to 5 t/ha would triple the rice yield in the zone.

Table 3. Rainfall in mm for Cerard, Torbeck,Les Cayes.

		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	A	73	21	44	375	358	101	99	127	91	140	134	113	1677
1980	B	15	10	22	125	158	35	22	77	25	30	45	31	
	C	12	4	8	12	16	11	12	11	10	13	10	10	
	A	79	62	58	87	395	185	156	273	183	110	90	63	1741
1981	B	48	35	11	50	53	90	59	60	45	20	22	34	
	C	7	9	11	9	21	16	15	17	12	13	8	8	
	A	94	67	225	102	366	36	226	147	187	204	102	34	1790
1982	B	34	13	81	47	58	10	52	38	60	92	39	14	
	C	8	11	14	12	21	6	11	17	17	13	13	6	
	A	54	79	90	104	149	361	46	146	128	252	54	48	1511
1983	B	27	37	32	17	25	80	17	34	33	50	27	20	
	C	8	5	12	12	15	18	8	11	11	13	8	4	

A = Total rainfall in mm.
B = Maximum rainfall in 24 hr.
C = Number of days of rainfall.

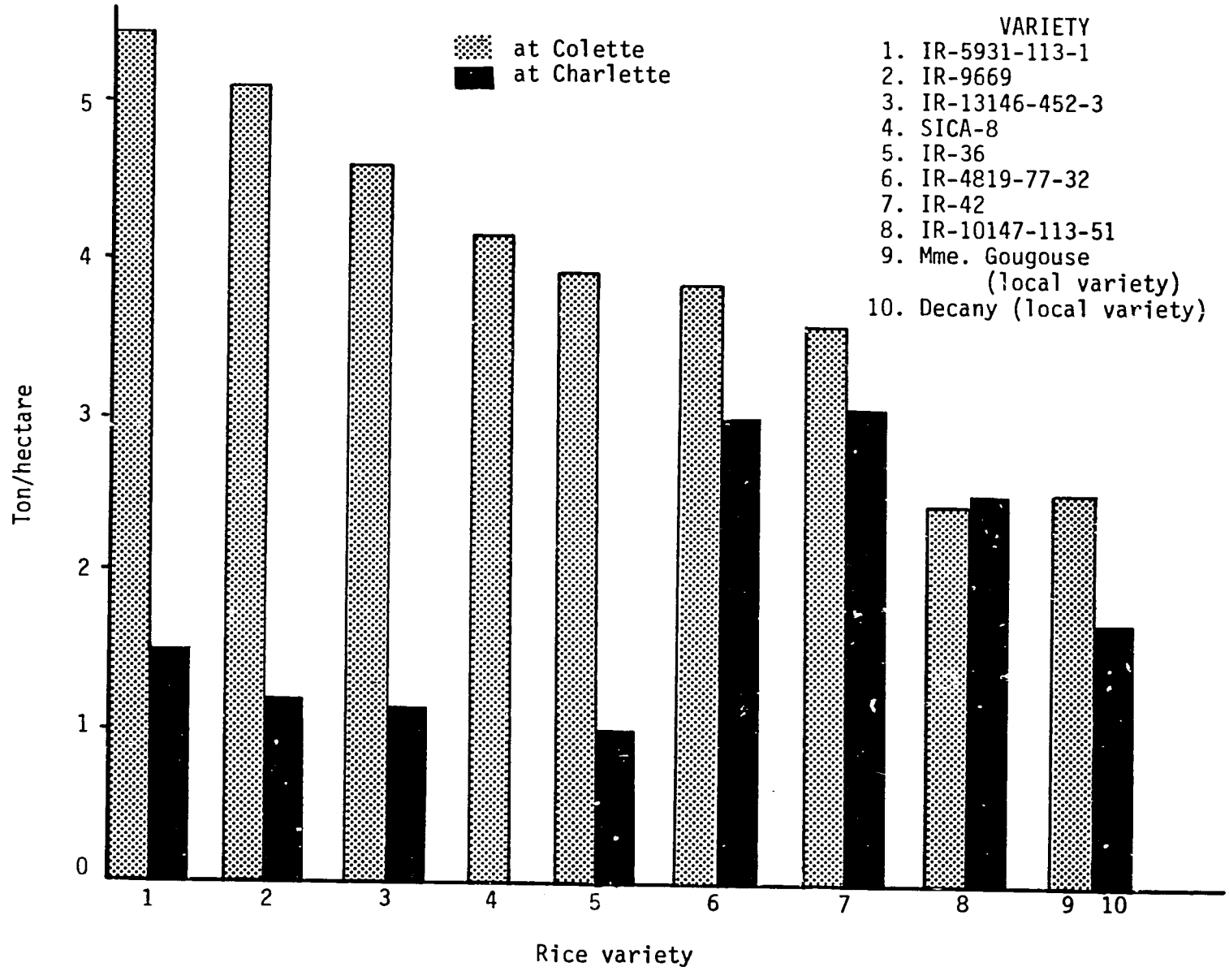

Figure 1. Bereault Zone, 1984

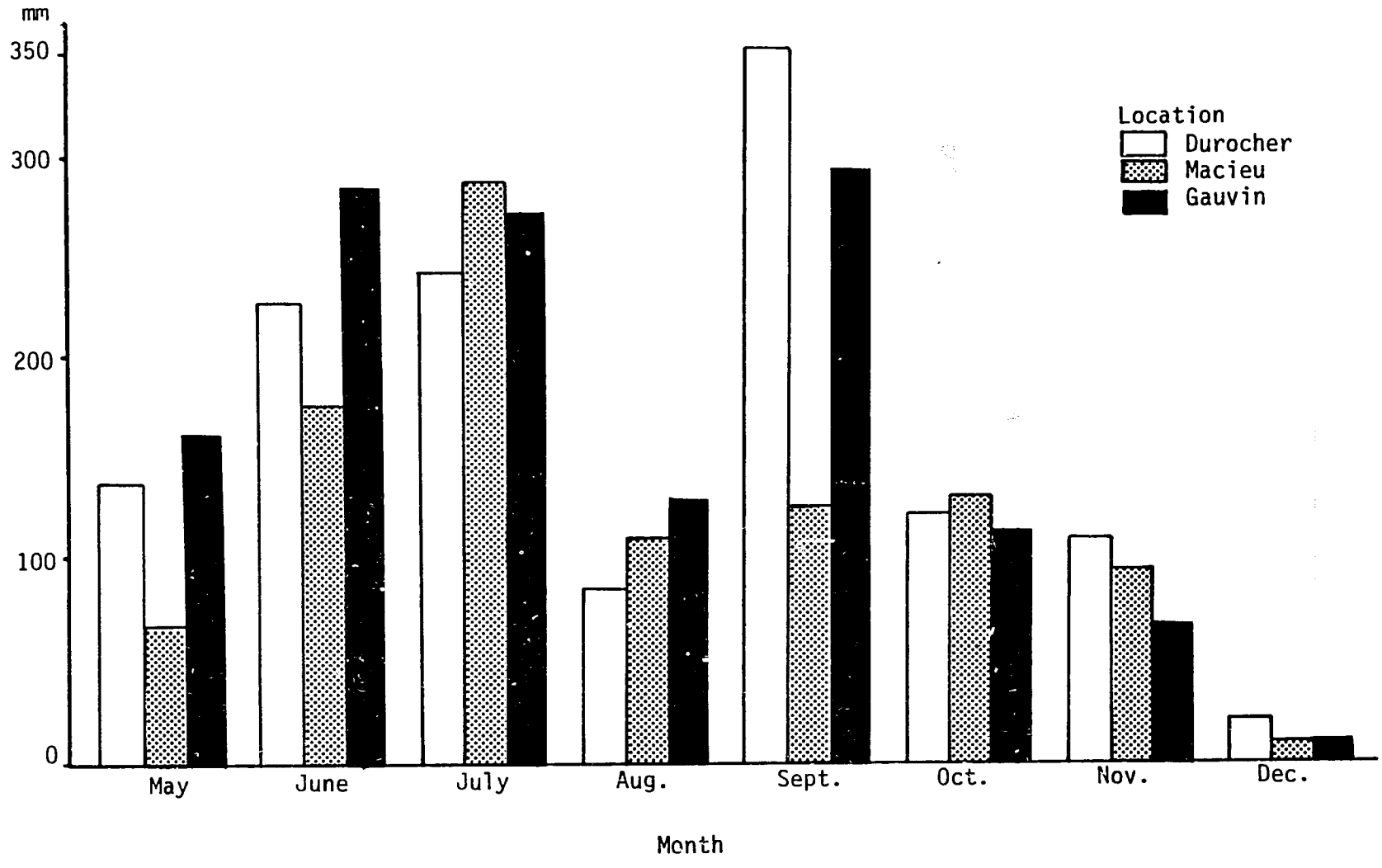

Figure 2. Annual rainfall at Bereault, 1984.

However, it is not always enough to introduce varieties alone. Considerable problems are encountered in harvesting the short varieties (less than 90 cm) by the traditional method of removing the panicles one by one because the farmers have to bend to cut the panicles. Therefore, a package approach was used in introducing new rice cultivars in Les Cayes.

In September 1984, seven high-yielding rice varieties were received from the International Rice Research Institute (IRRI) in the philippines so that their adaptability to the plain of Torbeck could be tested. These varieties were selected by the IRRI scientists based on soil type, rainfall pattern, and other agroecologic data. The seven varieties were planted by seven different farmers in Charlette and also at the Mission pour Christ farm in Colette.

MATERIALS AND METHODS

Although the seven farmers were chosen at random, they all planted the 21-day-old seedlings with 20 cm between each row. They applied a basal dose of 40 kg N and 60 kg P, and a further dose of 40 kg N at the panicle-initiation stage, which is usually 45 days after planting.

All plots were kept weed-free except one (IR-36) where the farmer had obvious management problems. He got a low yield although IR-36 is known for its high yield potential.

The seven HYVs were:
IR-5931-113-1
IR-9669
IR-13146-452-3
IR-36
IR-42
IR-4819-77-32
IR-10147-113-51

There were three reasons why a number of farmers, rather than only one or two, were chosen. 1) This plan minimized the risk of crop loss due to management constraints. 2) No farmer could give enough land to plant all seven varieties because each variety was planted on 200-300 m^2 and harvested entirely to obtain accurate yield data. 3) The area planted under each variety approximated what a farmer would normally plant or consider appropriate. This was so he could evaluate the total production from a given plot. (It is very difficult for the farmer to understand yields extrapolated from small harvest areas.)

In effect the test plots also served as demonstration plots for the farmers. However, the need to grow all seven varieties under similar conditions to evaluate their yield potential was recognized in Colette so they were planted under better management conditions.

Decany was the local variety in Charlette and Mme. Gougouse in Colette. Data were obtained on:

- plant height
- number of panicles per hill
- yield

There were no disease and insect pest problems so such data were not collected. However, in many cases moderate to severe rat damage was noted and poison was applied.

A simple portable thresher (figure 3) as usually used by farmers in the Philippines was introduced and several prototypes were made for $20 each. A sickle was used to harvest the introduced varieties because the harvesting and threshing problems with short varieties were anticipated.

Detailed data were collected on the time taken to harvest, transport, and thresh the HYVs as well as the local varieties. Data were also collected on the time required by traditional methods of harvesting both HYVs and local varieties.

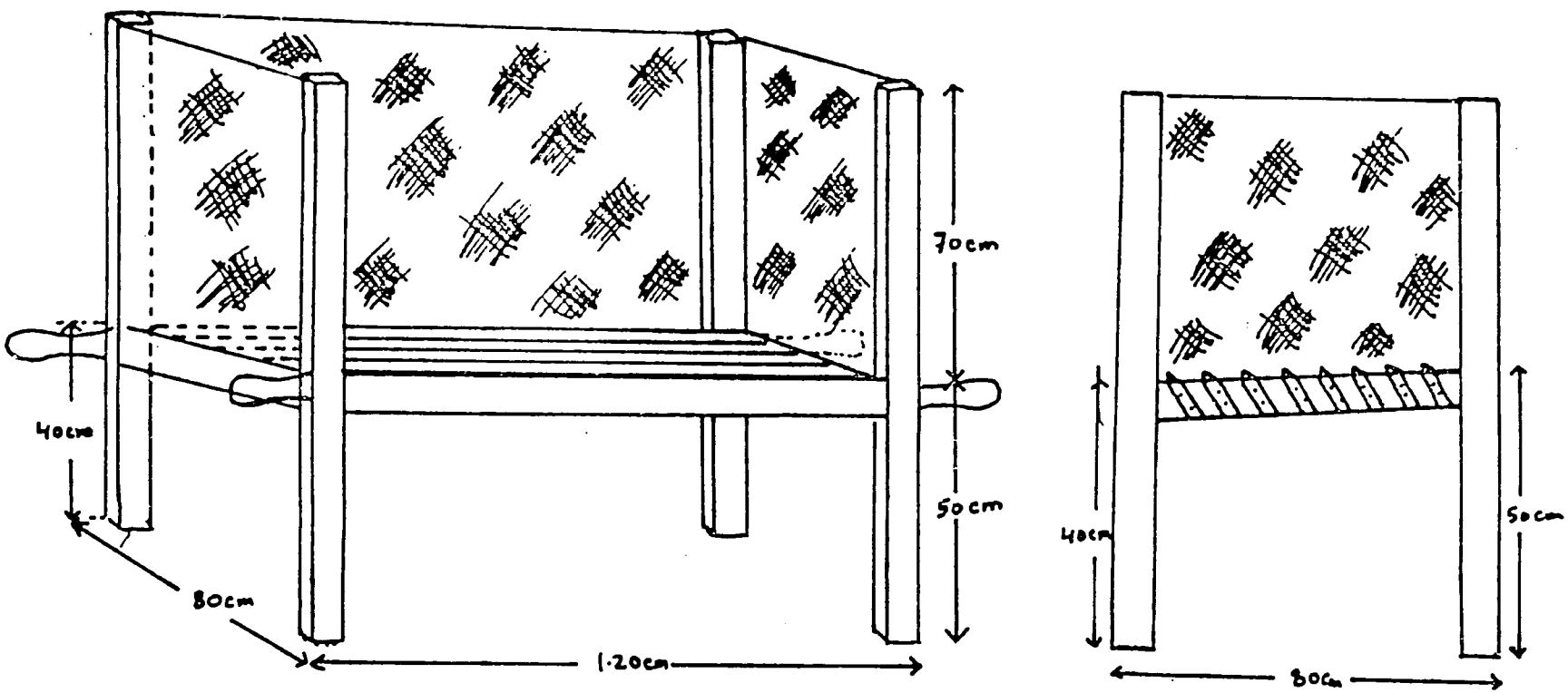

Figure 3. Philippine portable thresher

On the Colette farm of Mission pour Christ an additional variety, Sica 8, was planted to test its performance.

RESULTS AND DISCUSSION

The initial results were encouraging enough that the testing of the varieties was continued for the second season.

The HYVs were given local names so that the farmers could easily remember them:

IR-5931-113-1	Ti Rose
IR-9669	Colette
IR-13146-452-3	Yole
IR-36	Ti Marie
IR-42	Livia
IR-4819-77-32	Ti Cam
IR-10147-113-51	Amina

In Colette the highest yield was obtained from IR-5931-113-1, called Ti Rose (5.4 t/ha), followed by IR-9699, called Colette (5.1 t/ha). The local check (Mme. Gougouse) yielded 2.4 t/ha.

In Charlette the highest yield was from IR-42, called Livia (3 t/ha), followed by IR-4819-77-32 (Ti Cam). The local check (Decany) yielded on the average 1.7 t/ha. The variety IR-10147-113-52 (Amina) was liked by farmers because of its height (100.8 cm) and long, well-filled panicles (height can still be an important factor to consider when introducing varieties). Results are shown in table 5.

The time it takes to harvest by using a sickle and threshing with a portable thresher was measured for three varieties (table 4) and

Table 4. Man-days (per hectare) required to harvest and thresh rice, comparing use of a sickle and portable thresher with the traditional method.

Variety	Harvest	Transport	Threshing
IR-4819 (sickle and thresher)	16,3m/d (130h 31mn)	11,6m/d (93h 6mn)	18,6m/d (148h 58mn)
IR-10147 (sickle and thresher)	8,5m/d (68h 1mn)	5,7m/d 48h 31mn)	6,4m/d (51h)
IR-5931 (sickle and thresher)	20,2m/d (162h 2mn)	8,7m/d (69h 26mn)	13m/d 104h 10mn)
IR-42 with traditional method	113,3m/d (907h 6mn)		
Mme. Gougousse with traditional method	76,5m/d (611h 48mn)		2.6m/d (21h 6mn)
Mme. Gougousse with traditional method	88,5m/d (707h 46mn)		2.8m/d (22h 40mn)

Notes: m/d = man-day; h = hour; mn = minute.
1 man-day = 8 hours of day work.

compared with the traditional method used on other varieties. The results indicate that harvesting with sickles took, 8.5 to 20.2 man-days. The shorter time was due to the harvester's increasing efficiency as he learned to manipulate the sickle.

Table 5. Rice variety tests, 1984, Les Cayes.

Variety	Local name	Locality	Planted surface (m^2)	Lbs, fresh	% of humidity	Lbs at 14% humidity	Yield, kg/ha	Height, cms	No. of pods
IR-36	Ti Marie	Colette	282	108	11.6	111	3,936	65.3	16
		Charlette	290	27	11.0	27.9	962		
IR-42	Livia	Colette	494	174	10.7	181	3,664	73.4	14
		Charlette	368	108	11.2	111.5	3,030		
IR-4819-77-32	Ti Cam	Colette	179	66	11.6	68	3,799	78.5	8
		Charlette	110	32	11.3	33	3,000		
IR-9669	Coletie	Colette	186	93	12.1	95	5,107	77.5	12
		Charlette	103	10	11.4	10.3	1,002		
IR-5931-113-1	Ti Rose	Colette	72	38	10.7	39	5,417	98.5	8
		Charlette	110	15	11.1	15.5	1,409		
IR-10147-113-51	Amina	Colette	196	44	8.4	47	2,398	100.8	10
		Charlette	129	30	11.6	31	2,403		
IR-13146-452-3	Yole	Colette	160	71	10.7	74	4,625	83	11
		Charlette	246	28	11.0	28.9	1,175		
Sica 8	Sica	Colette	341	144	14.0	144	4,223	72.1	14
Mme. Gougouse		Colette					2,420	120	5

On the other hand the traditional method of harvesting the panicles one by one took 88.5 man-days for Mme. Gougouse. IR-42 took longer to harvest by this method because it had more panicles and because it was shorter, which the harvester found inconvenient. This showed that for the short HYVs the sickle and the thresher were a necessary part of the technological package. The advantages gained by using the technology package were as follows:

- HYVs yielded over 100% more than the local variety in some cases.
- A considerable amount of time was saved in harvesting, transporting, and threshing by using the new method.
- Fields were left clean after harvest and were ready for the next crop immediately, thus reducing the turnaround time considerably.

The farmers in Charlette have since started using the prototype thresher because they have found it more effective and easier to use.

FUTURE STRATEGY

Based on the results obtained from both Colette and Charlette the three top-yielding varieties were retained to be tested in seven farmers' fields in Charlette and seven in Durocher, which is another extensive rice-growing area.

Thus, in line with the farmers' preferences, Ti Rose, Colette, and Yole will be tested in Charlette, but Yole, Livia, and Amina will be tested in Durocher. The local control in Charlette will be Decany; in Durocher it will be Mme. Gougousse.

The four varieties will be planted in a simple RCB design with two replications and repeated in seven farms in the same area. The design is as follows:

V1	V2	V3	V4	Rep 1
V2	V1	V4	V3	Rep 2

The area of each plot will be 50 m^2.

This trial will compare the three top-yielding varieties with the local variety as control. All will be grown under similar conditions and management. In addition to the HYVs, a sickle and thresher, a new manual rotary weeder, and a portable mechanical blower are planned for the coming season to make the package more complete.

CONCLUSIONS

- The potential of doubling the rice yield is demonstrated. This can be realized if the farmers get more accustomed to the varieties and cultivation method.
- The appropriate technology for harvesting and threshing exists and seems feasible.
- The savings in harvesting and threshing costs is considerable and is in the interest of the farmer who often has to pay for these operations.
- Varieties are available that can outyield the local varieties, although they have a slightly higher production cost.
- As more and more labor-saving tools are introduced, total production costs will decrease. It is expected that such savings will partially offset the higher input costs.

REFERENCE

Desplechin, J. 1973. Enquete et demonstration agricole dans la peninsule sud d'Haiti. Situation economique et perspectives de developpement - Programme de l'ONU-FAO.