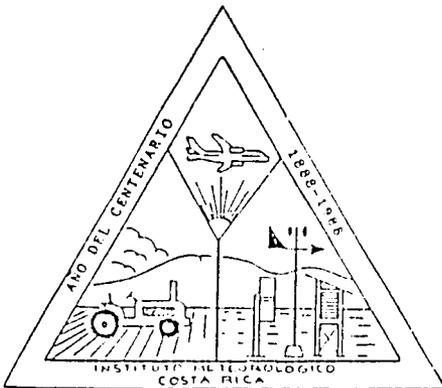


U.S. - ISRAEL CDR PROGRAM  
AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON, D.C., U.S.A.

YIELD IMPROVEMENT OF UPLAND  
RICE THROUGH MORE EFFICIENT  
UTILIZATION OF RAINFALL  
IN COSTA RICA



FOURTH PROGRESS REPORT  
MARCH 1989 - AUGUST 1989  
GRANT NO. DPE-55-44-G-SS-7026-00/01

 **TAHAL**  
**CONSULTING**  
**ENGINEERS**  
**LTD**

September 1989  
R-89-38



10th September, 1989

Scientific Attache  
U.S. Embassy  
Tel Aviv

Dear Sir,

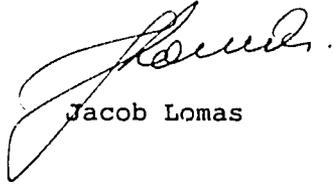
Subject: Grant No. DPE-5544-G-SS-7026-00/01  
Fourth Progress March 1989 - August 1989

Please find enclosed one copy of the fourth progress report. Two additional copies have been sent to US-Israel CDR Program, Agency for International Development, Washington, D.C.

This project has now been operational for 2 years and is progressing according to schedule. The field experiments are being set up and the field data of Liberia have been prepared for analysis.

My next visit to Costa Rica is scheduled for January-February 1990.

Yours sincerely



Jacob Lomas

BEST AVAILABLE DOCUMENT

### EXECUTIVE SUMMARY

The project continued into the fourth six-month period, March 1989 to August 1989. During this period the following basic activities were carried out:

1. Four of the planned runoff pits at the experimental sites have been constructed and are operational. Owing to difficulties in obtaining machinery the pits were constructed by hand.
2. Preliminary analysis of rainfall-runoff relationships was started and is reported
3. J.Lomas visited Costa Rica during June-July 1988.
4. Total expenditure in US\$: 18,379.

## 1. Preparation of Field Experimental Sites

The five experimental sites were selected and reported previously (Third Progress Report, p. 4).

Great difficulties were encountered in the preparation of the drainage pits as it was impossible to obtain the necessary excavation machinery. After numerous visits to Guanacaste by Mr. H. Herrera it was decided to dig the pits by hand. This proved no easy task, as during the rainless season it is almost impossible to hand-dig, while during the rainy season the pits continuously collect water.

Four experimental sites have now been prepared: two sites near Liberia, at the farm of Cappela, and two sites near Santa Cruz at the farm of the University of Costa Rica. It is expected that the drainage pits will have to be supported by reinforced concrete walls.

For soil conditions at Santa Cruz see attached photographs of drainage pits and soil profile.

## 2. Technology Transfer

H. Herrera and J. Lomas presented four lectures on the climate and rice production in the Guanacaste region to members of the National Meteorological Institute, the Ministry of Agriculture and a number of other institutions. The lectures included:

The Agroclimate of Guanacaste - H. Herrera  
The Water Requirement of Rice - J. Lomas  
Rainfall Intensity Analysis of  
Three stations at Guanacasta - H. Herrera  
Cultivation Methods, Water  
Conservation and Rice Yields - J. Lomas

Interesting discussion followed each presentation.

### 3. Preliminary Analysis of Experimental Data

The first field experiment took place at Liberia from September to November 1988. Some preliminary analysis was undertaken of the field data collected then.

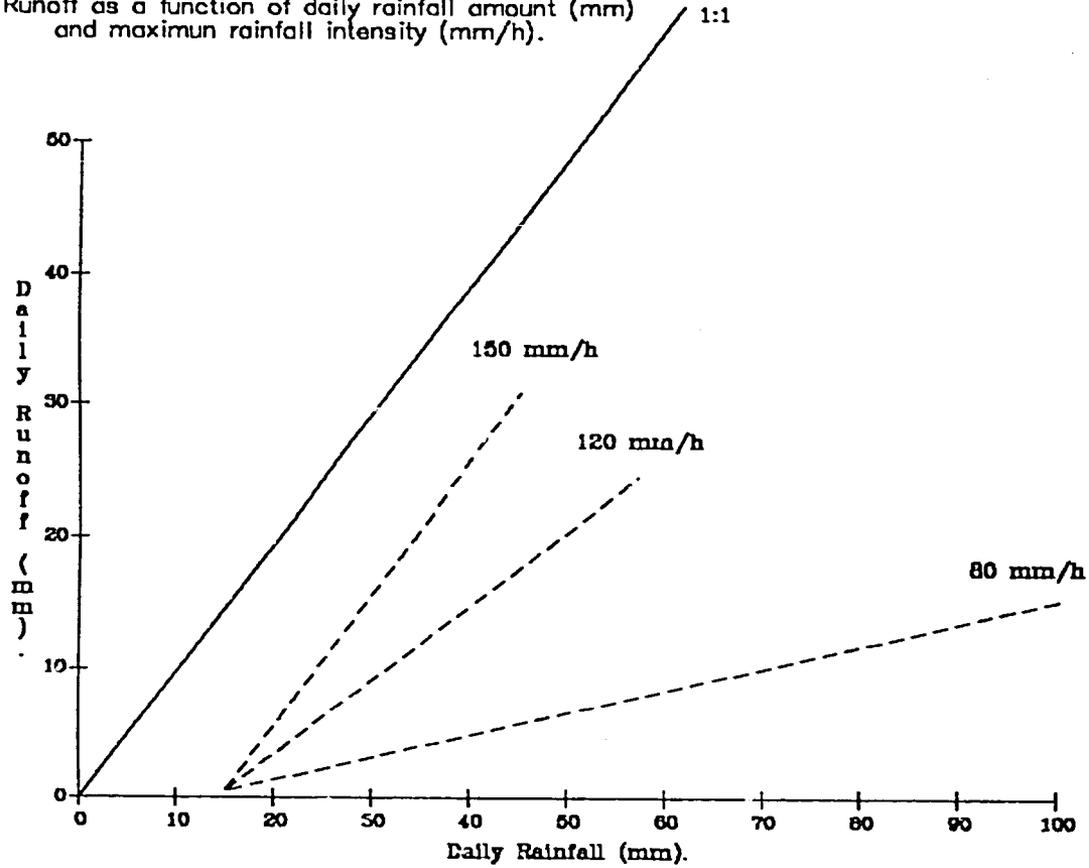
The table below summarizes the runoff results obtained from the experiment at Liberia.

| Date        | Rainfall<br>mm | Runoff in mm |        |            |
|-------------|----------------|--------------|--------|------------|
|             |                | Control      | Ridged | Difference |
| 1-10/ 9/88  | 68.0           | 2.5          | 1.4    | 1.1        |
| 11-20/ 9/88 | 201.9          | 19.5         | 6.2    | 13.3       |
| 21-30/ 9/88 | 91.0           | 33.1         | 13.6   | 19.5       |
| 1-10/10/88  | 129.2          | 42.4         | 16.2   | 26.2       |
| 11-20/10/88 | 54.4           | 4.6          | 2.9    | 1.7        |
| 21-31/10/88 | 206.1          | 30.7         | 16.2   | 14.5       |
| 1-10/11/88  | 40.9           | 6.8          | 2.2    | 4.6        |
| 11-20/11/88 | 7.6            | 0.0          | 0.0    | 0.0        |
| Total       | 799.1          | 139.6        | 58.7   | 80.9       |

The data indicate considerable differences in runoff between the ridged and control plot. Figure 1 shows the runoff (mm/day) as a function of rainfall intensities (mm/hour) for the ridged plots. As could be expected the treatment (ridging) is more effective at the higher rainfall intensities.

The yield of rice on the ridged plot was 5.778 kg/ha, as compared with 4.940 kg/ha on the control plot, i.e. an increase of 838 kg/ha in the grain yield. From a preliminary analysis of the yield component data it seems that grain weight was mostly responsible for the increase in yield.

Runoff from experimental plot - Liberia 1988  
Runoff as a function of daily rainfall amount (mm)  
and maximum rainfall intensity (mm/h).



4. J. Lomas visited Costa Rica during June July 1989.

5. Programmed Activities for the following months

|  | 1989  |   |   |   | 1990  |   |   |   |       |   |   |   |
|--|-------|---|---|---|-------|---|---|---|-------|---|---|---|
|  | S     | O | N | D | J     | F | M | A | M     | J | J | A |
| 5.1 Maintenance of runoff<br>batteries | _____ |   |   |   |       |   |   |   |       |   |   |   |
| 5.2 Field measurements                 | _____ |   |   |   | _____ |   |   |   |       |   |   |   |
| 5.3 Data analysis                      |       |   |   |   | _____ |   |   |   |       |   |   |   |
| 5.4 Programmed visit of<br>J. Lomas    |       |   |   |   |       |   |   |   | _____ |   |   |   |

Budget for the Period September 1989 to February 1990

| Item                     | Persons<br>Expenditure | Projected Disbursements |             |             |             |               |             | Sub<br>Total  | Total Till<br>Feb 1990 |
|--------------------------|------------------------|-------------------------|-------------|-------------|-------------|---------------|-------------|---------------|------------------------|
|                          |                        | 1989                    |             |             |             | 1990          |             |               |                        |
|                          |                        | Sept                    | Oct         | Nov         | Dec         | Jan           | Feb         |               |                        |
| Salaries                 | 27,471                 | 300                     | 300         | 300         | 300         | 4800          | 300         | 6300          | 33,771                 |
| Overheads                | 18,994                 | 250                     | 225         | 250         | 225         | 200           | 400         | 4050          | 23,044                 |
| Equipment                | 10,216                 | -                       | -           | -           | -           | -             | -           | -             | 10,216                 |
| Travel &<br>P.D.         | 26,026                 | 300                     | 200         | 300         | 200         | 5500          | 300         | 6800          | 32,826                 |
| Other<br>direct<br>costs | 12,262                 | 400                     | 400         | 400         | 400         | 500           | 1000        | 3100          | 15,362                 |
| <b>Total</b>             | <b>94,969</b>          | <b>1250</b>             | <b>1125</b> | <b>1250</b> | <b>1125</b> | <b>13,500</b> | <b>2000</b> | <b>20,250</b> | <b>115,219</b>         |

# SOIL PROFILE - SANTA CRUZ



# PREPARATION OF RUNOFF PITS

