NEAR LAST EVALUATION ABSTRACT

PROJECT TITLE(S) AND NUMBER(S)		MISSION/AID/W OFFICE
CIDERA SCHOOL OPG	XD-AAN-304-A (608-0158).	USAID/MOROCCO

PROJECT DESCRIPTION The project purposes were 1) to increase economic viability and development capability of CIDERA School's model farm; 2) to implement a pilot project to demonstrate practical rural application of solar energy at CIDERA; and 3) to strengthen the capabilities of the CIDERA dispensary in its efforts to combat malnutrition among infants and children. The project strategy focused on the provision of the necessary equipment (e.g. irrigation, cold storage, seed treater, solar collector and oven, etc), facilities (e.g. health rehabilitation center), commodities, and staff wage support to enable the CIDERA school to achieve project purposes.

AUTHORIZATION DATE AND U.S. LOP FUNDING AMOUNT	PES NUMBER	PES DATE	PES TYPE
August 31, 1979, $ 124,000	608-83-2	February 20,1983	☐ Regular ☐ Other (Specify)
ABSTRACT PREPARED BY, DATE	ABSTRACT CLEARED BY, DATE		☐ Special
Ursula Nadolny 3/8/83 Evaluation and HN Officer	Robert C. Chase USAID Director		☒ Terminal

---

This abstract narrative Summarizes the Final Evaluation Report of the CRS/OPG 608-79G-001.

Project Status and Findings

With the exception of the solar oven activity of the project's solar energy component which at this writing has not been completed, all project activities have been completed. According to the CRS evaluation (PES, Part II), the following outcomes were observed:

1) Agricultural facilities and installations (p. 21)
   - the irrigation system protected crops from the effects of Morocco's drought
   - the equipment provided allowed CIDERA to
     a) increase production
     b) increase profits
     c) train its students in the use of modern equipment and technologies
   - the project activities resulted in a model installation which demonstrated to small farmers in the neighboring area the importance of irrigation systems, correct crop rotations, and the use of fertilizers.

2) Practical rural applicators of solar energy (p. 24-29), solar captors
   - an estimated 25-50 % reduction/economy in the use of electricity to heat water could be realized
   - user comfort was increased

3) Health Rehabilitation (pp. 37-46)
   - a health center referral and feeding program, when appropriately staffed and equipped, can significantly contribute to eliminating and/or diminishing 2nd and 3rd degree malnutrition among young children
   - a regular health and nutrition education program for mothers appears to have a positive impact on their personal hygiene, and feeding habits.

Lessons Learned (not provided in evaluation report; the following comments are USAID's)

1) A highly motivated and dedicated staff is a major factor contributing to the successful outcome of project activities.

2) The technical skill/background of project managers is important to the efficiency and effectiveness of project implementation.

CRS/AID GRANT No. 608-79G-001

Table of Contents

and

Appendices

ISN-

REPORT ON
THE FINAL EVALUATION OF THE CIDERA PROJECT
AID GRANT NO. 608-79G-001

- ======= -

INTRODUCTION

The United States for International Development (AID) on 31 August 1979, granted to Catholic Relief Services - USCC (CRS) the amount of One Hundred and Eighteen Thousand Dollars ($ 118,000) for the period of 1 September 1979 to 31 March 1981, to provide support to CRS in its efforts to assist the CIDERA School, a private mid-level agricultural school located in Temara, Rabat, Morocco.

An additional sum of Six Thousand Dollars ($ 6,000.00) was later granted to the project, which was extended for another year, until 31 March 1982.

The project consisted of three components, each of which is included in this Final Evaluation Report.

These components are as follows:

Part I: Intervention to increase economic viability and development capability at CIDERA School's model farm.

Part II: Pilot project to demonstrate practical rural applications of Solar Energy at CIDERA

Part III: CIDERA Health Rehabilitation Center

3

Assessment of Part I of the Project

I. Irrigation Systems

A/ Drip Irrigation System: Tangerine Orchard

Taking the year 1978 - 1979 as average pre-project year, the following data have been noted:

(i) Manpower Requirement

During the period, two farmhands were required to move the sprinkler pipes from the orchard to other areas needing irrigation. Each farmhand received DH 15 daily, for eighty-eight days. A supervisor was paid DH 18/day during a 52-day season's work in the orchard. These personnel required total salaries of DH 3,576.00 ($715.20) per season.

Beginning in November 1979 to February 1981, the manpower requirement in the orchard had been reduced to one part-time worker who received a daily wage of DH 10.00 during a season of 88 days. The drip irrigation installation is now used permanently in the orchard and the mobile pipes of the sprinkler system on hand have been made available to the cornfield and other crop area. Reducing labor costs during the period, CIDERA was able to realize savings in salaries estimated at DH 8,288.00 ($1,657.60) which covered two 88-day seasons plus 68 work days (from November 1979 to Feb. 1980).

From March 1981 to March 1982, one full-time worker received a daily wage of DH 16 during a 120-day work season. This resulted in a saving of DH 3,840.00/season, or DH 7,680.00 ($1,536.00) for approx. two work seasons during the period.

This reduction in manpower has been made possible through the use of the drip irrigation in the orchard, from which CIDERA obtained savings of DH 15,968.00 ($ 3,193.60) during the project life.

(ii) Water Consumption

The old sprinkler system distributed water in the orchard in a spray pattern, with the pump discharging 45 m3 of water per hour of use.

The drip irrigation system functions at an average rate (pump yield) of 20 m3 of water per hour of use.

From November 1979 to Febraury 1981, the orchard was irrigated for approx. 244 days (8 months of irrigation during a 15-month period), with the equipment functioning for 5 hours per irrigation day. Taken against the norm of 300 irrigation days (10 months of irrigation during a 15-month period), at 4.7 hours of irrigation daily, some 823.5 m3 of water were saved per week of irrigation.

From March 1981 to March 1982, the number of irrigation hours per day was reduced to 3, during a period of 180 days due to the

drought and the need to save other crops. Water consumption was stabilized at 10,800 m3 for 6 months, or 1,800 m3/month of irrigation. The total water consumption per week was 450 m3, against the weekly water consumption of 762.5 m3 during the preceding period.

(iii) Reduction of Weed Growth

Prior to project implementation, the rapid growth of weeds in the tangerine orchard was observed and attributed to excess watering by the sprinkler system.

The area between trees had to be plowed twice a year, at an annual cost of DH 720.00.

Beginning in October 1979, during the First Evaluation Period*, a slow growth of weeds had been observed. Consequently, the soil was turned over only once, representing a saving of DH 360.00 for CIDERA.

During the Third Evaluation Period, the soil was again plowed, resulting in another saving of DH 360.00.

---

* The Project Evaluation Periods correspond to the following dates:

First Evaluation	Report:	1	September	1979	to	29 February	1980
Second "	"	1	March	1980	to	31 August	1980
Third "	"	1	September	1980	to	28 February	1981
Fourth "	Period:	1	March	1981	to	31 August	1981
Fifth "	Period:	1	September	1981	to	31 March	1982

Finally, during the Fifth Evaluation Period, the soil was once again plowed, at a cost at a cost of DH 500.00. The costs of machinery and labor had risen during the period.

CIDERA was able to realize a total saving of DH 1,220.00 ($ 244.00) due to the decelerated growth of weeds in the orchard.

(iv) Yield

The pre-project period gave an average annual tangerine yield of 100,000 kilograms, or slightly over 11 tons per hectare.

No facts were available for comparison during the First Evaluation Period, as the tree roots were still adapting to the new irrigation system.

During the Second Evaluation Period, an early ripening of fruits was observed.

The first harvest season since the beginning of the project occured during the Third Evaluation Period. A total yield of 151,771 kgs. of tangerines had been sold to O.C.E.* for export and domestic consumption. This yield gave CIDERA an income of DH 116,159.60 ($ 29,039.90)** for the season. Compared to the average yield of 11 tons/hectare of the previous season, this

---

* O.C.E. - Office Cherifien d'Exportation.

** 1 US Dollar = DH 4.00 during the period.

season's yield may be considered good (15.17 tons/ha.), taking into consideration the effects of drought in Morocco during this period.

The first signs of parasite infestation ("Aleurodes Citri") were observed in June 1981. Later, during that year, the parasitic attack had spread throughout the orchard, requiring the application of insecticide treatments against the "alerodes". Insecticides were sprayed twice a week, for at least three consecutive months.

A direct effect of this infestation was the forced blossoming of tangerine trees, exhibiting the extent of damage caused by the insects in the orchard. However, no tree losses occured during the project life.

During the Fifth Evaluation Period, a yield of 100,000 kgs. of tangerines had been obtained, with an estimated value of DH 19,000.00 ($ 3,800.00)* at DH 1.90 per kilogram.

The number of irrigation hours has been reduced since March 1981. This reduction, compounded by the parasitic infestation, apparently affected this crop's over-all yield for the season.

B/ Old Sprinkler Equipment: Corn, Wheat, Potato Crops

1) Corn Crop

(i) Manpower Requirement: During the pre-project period, the cornfield required the services of

---

* To facilitate computation, the dollar rate has been set at DH 5.00 per US Dollar, unless indicated otherwise.

of 3 farmhands and a supervisor during a season of 88 days, at a cost of DH 2,428.00 .

Beginning in March 1980 to August 1980, one full-time worker replaced four workers, at a cost of DH 624.00 per season. A saving of DH 1,804.00 was realized during the period.

From March 1981 to September 1981, one farm hand worked full time for 50 days, at a daily wage of DH 18.00 (DH900.00 for the season). CIDERA still had a saving of DH 1,528.00 during this period.

During the two preceding periods, a total saving of DH 3,332.00 ($ 666.40) in salaries was obtained, due to the reduction in personnel needed in the cornfield.

No figures are available during the Fifth Evaluation Period, as the planting season starts in mid-March or April 1982.

(ii) Yield: A yield of 20 quintals per hactare has been considered normal for the corn crop, which is usually planted in April and harvested in August.

No figures were available for comparison during the First Evaluation Period.

For the crop year 1979 - 1980, CIDERA obtained an average yield of 22.5 q/ha., at DH 233/quintal. Approximately 90 quintals of corn had been obtained from 4 hectares, with a market value of DH 21,213.65 ($ 4,242.73). An additional income of DH 9,000.00 ($ 1,800.00) was obtained from 45 quintals of corn

which were sold at the local souk (market). These figures indicate a total return of DH 30,213.65 ($ 6,042.73) for the season's harvest. The remaining yield was fed to the animals at the farm.

There are two possible explanations for this moderate crop yield. The seeds, which have been purchased locally, were found to be wanting in quality. Later during the year, the corn crop suffered from a variety of seed parasites, which affected ripening, despite the application of insecticides to the crop.

During the Third Evaluation Period, through the early part of the Fourth (i.e., September 1980 to March 1981), the land area planted with corn had been rotated in favor of wheat, forage cereals and potatoes. The sprinkler equipment, also, was made available for some of these crops.

From March 1981 to September 1981, the average yield of corn per hectare has been broken down as follows:

a. From four (4) hectares of land planted with selected hybrid Azure 602, an average yield of 40 q/ha. has been obtained, with a market value of DH 250/quintal. In total, approximately 160 quintals were obtained from the parcel, valued at DH 37,000.00 ($7,400.00).

b. From eight (8) hectares of land planted with an inferior forage type corn hybrid, an average yield of 20 q/ha. has been obtained. At DH 200/q, an income of DH 32,000 ($ 6,400.00) was received from 160 quintals.

These combined yields produced a total of 320 quintals, or a total income of DH 69,000.00 ($ 13,800.00) for the crop season.

2) Potato Crop

During the pre-project years, there had been no serious cultivation of potatoes at CIDERA. The crop was planted by students in 3 or 4 rows (less than ½ hectare) and was harvested for domestic consumption.

Beginning in January 1980, the cultivation of this crop (on an experimental basis) was decided upon since irrigation was now possible. Two and a half hectares of land (later, another ½ hectare was added) were planted with good quality potato seedlings from SONACOS.

During the Second Evaluation Period (May June 1980), these three hectares of land yielded 35,451 kilograms of potatoes sold at DH 1.50/kg. This gave a total income of DH 53,176.50 ($ 10,635.30) to CIDERA for this crop.

During the Third Evaluation Period (in January 1981), 3 hectares of land were once again planted with potatoes. During the harvest period, in May-June 1981, the crop gave a total yield of 50,000 kgs. at DH 0.80/kg. This produced an income of DH 40,000.00 ($ 8,000.00).

During that same year in August, another hectare was allocated for an off-season, trial planting. This extra crop was harvested in December 1981, with a total yield of 20,000 kgs. At DH 1.30/kg., an income of DH 26,000.00 ($ 5,200.00) was derived.

From 3 to 4 hectares of land, CIDERA was able to obtain a total yield of 105,451 kgs. of potatoes and an over-all income of DH 119,176.50 ($ 23,835.30). This crop would not have been cultivated at all if the sprinkler irrigation equipment were not available.

3) Wheat Crop

During the preproject years through the middle of 1980, the wheat crop at CIDERA depended on rainfall for irrigation. In view of the drought and the effort to save this crop, the wheatfield benefitted from the sprinkler irrigation system.

For the crop year 1980-1981, the yield of wheat may be analysed as follows:

a. The parcel of 5 hectares received 120 mm. of water through the sprinkler equipment. Approx. 33 quintals fo wheat per hectare were obtained, or a total of 165 quintals from the parcel. At DH 160.00/q, an income of DH 26,400.00 ($ 5,280.00) was received.

b. From the parcel of 12 hectares which received only 30 mm. of water through the sprinkler system, a yield of 15 quintals per hectare was obtained, or a total of 180 quintals for the parcel. At DH 160/q, a total of DH 28,000.00 ($ 5,760.00) was received by CIDERA.

The wheat parcel which received 120 mm. of water showed a yield advantage of 45 % over the wheat crop which received only 30 mm. of water. This was a 73 % advantage over the

non-irrigated crops of the neighboring farms. These had obtained only 9 q/ha.* during the same period, due to the drought and the absence of a viable irrigation system.

Added Gain from the Wheat Crop:

An addditional benefit was the total straw harvest obtained from the 17 hectares, which amounted to approx. 35,000 kgs. With a market value of DH 61,250.00 ($12,250.00), this represented an equal saving for CIDERA, as the farm animals require a total of 50,000 kgs. of straw per year, at market cost of DH 87,500.00 ($17,500.00).

C/ New Sprinkler Irrigation System: Vegetable Crops

This equipment was installed in the market gardening section of CIDERA farm in January 1980.

During the Second Evaluation Period, water consumption was reduced to 10 m3/hour of use against the normal consumption of 15 m3/hour of use by gravity flow (seguia). This represents water savings that vary between 15,000 m3 to 21,000 m3 of water per year in that section of the farm.

During the Third Evaluation Period, a total of 1,500 m2 of land was cultivated from which a total of 2,000 kgs. of vegetables were harvested. Valued at DH 1,500.00, the yield represents an equal saving for CIDERA.

---

* This yield is far below the 20.29 quintals per hectare harvest obtained by CIDERA. During the season, the wheatfield produced 345 quintals from which an income of DH 49,200.00 ($ 9,840.00) was produced.

During the Fourth Evaluation Period, the area planted with vegetables was reduced by about 30 %, as was the number of students working in the farm (only 8 instead of 25). The drought was a predominant cause of this reduction.

With the help of the sprinkler irrigation system, a total of 4,500 kgs. of vegetables were harvested, with a market value of DH 9,000.00 ($ 1,800.00). This harvest was considered above average, compared to pre-project periods.

During the Fifth Evaluation Period, a total yield of 4,200 kilograms of various leguminous crops were harvested, from which an income of DH 8,820.00 ($ 1,764.00) was produced.

A total yield of 10,700 kgs. of vegetables has been made possible through the use of the new sprinkler irrigation equipment. A gain of DH 19,320.00 ($ 3,864.00) was obtained during the project life.

This sprinkler equipment has been used from March to November each year. The little rainfall that was available took care of the crops from December to February.

The use of this irrigation equipment has an added benefit: it has helped contain the problem of erosion in the market gardening section of the CIDERA farm.

II. Dairy Cattle

A/ Milk Production

From April to September 1980 (20 weeks), a total of 9,500 liters of milk was obtained and sold at the Al Rhadia Cooperative in Temara, for which the amount of DH 11,875.00 ($ 2,375.00) was received.

From January 1981 to November of the same year, some 11,364 liters of milk were sold, providing an income of DH 16,875.00 ($ 3,375.17).

From January 1982 to February of the same year, the dairy cattle produced a total of 1,440 liters of milk, which were sold for DH 2,116.80 ($ 423.36).

Therefore, from April 1980 to February 1982, the dairy cattle produced a total of 22,304 liters of milk worth DH 30,867.66 ($ 6,173.53).

B/ Meat Production

From early 1980 to February 1982, there has been a total of 3 calvings: 14 calves have been produced by the five (5) original heifers.

From the first calfing which occured in early 1980, 2 calves (male and female) have been kept at CIDERA, while 3 calves were sold at DH 1,300.00 each. The sale produced an income of DH 3,900.00 ($ 780.00).

From the second calfing which occured in early 1981, 2 female calves have been kept for reproduction at CIDERA and 3 calves were sold at DH 1,500 each, for a total price of DH 4,500.00 ($ 900.00).

From the third calfing which occured in early 1982, 4 female calves have been kept at the farm; therefore, 13 cows and sires remain at the farm with a total market value of DH 42,000.00 ($ 8,400.00).

Of the five original heifers, 4 have calfed early this year. The fifth heifer, as well as the heifer born in 1980, are gestating at the time of this evaluation.

C/ Manure Production

From the five original cattle bought for this project and their young, approx. 15,000 kgs. of manure were obtained, valued at DH 3,000.00 ($ 600.00). This amount represents an added benefit from the dairy cattle.

III. Seed Treater and Separator

The seed treating and separating machine, which was purchased in the United States for CIDERA through this project, has not been used since its arrival in July 1981. The wheat and corn harvested in 1981 had been sent to SONACOS for treatment, selection and sale. The Oliver High Capacity Seed Treater and Separator will be put into use during the harvest season in 1982.

SONACOS normally charges CIDERA:

- DH 8.00/q for treatment
- DH 7.50/q for selection

During the year 1981, for example, CIDERA paid the following costs for treatment and selection of seeds:

1) Costs of Treatment

- for 340 quintals of wheat: DH 2,720.00
- for 320 quintals of corn : DH 2,560.00

2) Costs of Selection and Conditioning of Seeds

- for 340 quintals of wheat: DH 2,550.00
- for 320 quintals of corn : DH 2,400.00

3) Costs for 660 quintals of Seeds: DH 10,230.00
$ 2,046.00

This year, 1982, CIDERA estimates that the treatment and selection of seeds using the machine will cost only DH 8.00 (all charges included) per quintal. Costs, therefore, will be slashed by 45 %.

Seeds that have been cleaned and treated command higher prices than similar untreated products.

Untreated corn, for example, costs DH 233 per quintal. For the same quantity, treated and cleaned corn seeds will fetch prices ranging from DH 245 to 260. Treated wheat may be sold at DH 200/q, against the current market price of DH 160/quintal.

A multiplication of contracts for treated and cleaned seeds are expected to be obtained in the future.

IV. Cold Storage Facility

Total Tonnage Capacity: The cold storage facility has been in use at CIDERA since June 1980. To date, it has stored:

- 9,750 kgs. of potatoes
- 3,000 kgs. of tangerines
- 1,100 kgs. of various vegetables
- 7,500 eggs

The CSF has made possible a saving of approximately DH 5,257.00 ($ 1,053.40).

This facility has been particularly useful for the potato crop which is usually harvested by June. Four-fifths of the season's yield is now sold directly to O.C.E. The remaining crop is normally stored until winter time, when the prices of this crop will have increased by at least 30 %.

This same procedure is applied to the tangerine and vegetable harvests as well as the egg produce. They are sold when the supply is low and the demand high. The CSF, then,has helped CIDERA regulate the sale of otherwise perishable products.

Reduction in Transport Costs: Since its activation, the CSF enabled CIDERA to reduce the number of trips to private storage facilities in Casablanca. Two trips, for storage purposes, have been eliminated each month, saving some DH 100.00 per trip.

During the Third Evaluation Period alone, for example, CIDERA saved DH 1,285.00 ($ 321.25).*

Reduction of Food Spoilage: Harvested crops are either immediately stored until their sale, or are transported to the buyers' cooperatives/markets after weighing. Less handling and transporting of these agricultural products have reduced food spoilage by about 50 %.

Other Benefit: The old CIDERA refrigerators, which were used to keep various agricultural products prior to their sale, are now available for storing some 180 liters of milk produced weekly at the farm. Without the cold storage facility, a separate refrigeration unit, for the dairy products at CIDERA, would have been an expensive necessity.

---

* 1 US Dollar = 4 Dirhams.

OBSERVATIONS: PART I - Agricultural Facilities and Installations

The irrigation systems sustained crops during a very difficult period and helped normalize the cultivation and harvest of other crops such as corn, wheat and potatoes.

With the help of facilities acquired through this project, a strengthened CIDERA farm realized substantial profits during the year 1980 - 1981. During this year alone, the farm management was able to remit the amount of DH 147,898.00 ($ 29,579.60) to the CIDERA School Administration.

The project made available modern equipment and technologies for students continuing training in agriculture and farm management.

The Government of Morocco, through the Ministry of Agriculture and Agrarian Reform, having taken over CIDERA since January 1981, will pursue the different agricultural/farm management activities initiated through this project. Beginning in April 1982, for example, the Hassan II Institute of Agronomy and Veterinary Sciences has been given access to the farm for research and experiment purposes.

The project helped provide a model installation which shows small farmers from the neighboring area the importance of irrigation systems and correct crop rotations as well as the use of fertilizers.

a/ Visible changes in the attitude of farmers' well-drilling efforts increasing by 45 % (5 over 11 farms). This activity stressed the use of motorized farms.

b/ Thirty five percent (35 %) of the neighboring farms (4 over 11 farms) switched from traditional wheat and corn crop farming to intensive market gardening for rapid cash returns.

Appendix IA

DAIRY CATTLE

1) Milk Production

Date/Period	Yield in Liters	in DH	in US $
a/ From September 1980 to December 1980	9,500 l.	DH 11,875.00	$ 2,375.00
b/ From January 1981 to November 1981	11,364 l.	16,875.00	3,375.00
c/ From January 1982 to February 1982	1,440 l.	2,116.80	423.36
Total	22,304 liters	DH 30,866.80	$ 6,173.36

2) Meat Production

Sale Price in DH	No. of Cattle Sold	Calfing Date	Cattle on Hand	Est. Price
			5 Original Heifers	DH 25,000.00
DH 3,900.00	3 calves at DH 1,300 each	1st Calfing Early 1980	(1 heifer (1 sire	5,000.00 4,000.00
DH 4,500.00	3 calves at DH 1,500 each	2nd Calfing Early 1981	((2 heifers	4,000.00
------	------	3rd Calfing Early 1982	(2 heifers (2 sires	2,000.00 2,000.00
DH 8,400.00 ($ 1,680.00)	Total Receipts from Sale of 6 Calves		Total Value of 13 Cattle:	DH 42,000.00 (US$ 8,400.00)

3) Manure Production: The cattle kept at the farm produced a total of 15,000 kgs. of manure during the project life. Valued at DH 3,000.00, this represents an added benefit for CIDERA.

Appendix I B

COLD STORAGE FACILITY

June 1980 to March 1982

Stock	Harvest Year or Season	Production Costs	Electricity Costs due to Storage/kg.	Total Production Costs	Purchase Price at Time of Consumption	Actual Savings
Potatoes (3,200 kgs.	Dec. 1980	DH 0.50/kg.	DH 0.15/kg.	DH 0.65/kg.	DH 0.90/kg.	DH 800.00
(3,300 "	June 1981	DH 0.60/kg.	DH 0.21/kg.	DH 0.81/kg.	DH 1.50/kg.	DH 990.00
(3,250 "	Dec. 1981	DH 0.65/kg.	DH 0.24/kg.	DH 0.89/kg.	DH 1.30/kg.	DH 1,072.00
Tangerines (1,000 kgs.	Dec. 1980	DH 0.35/kg.	DH 0.15/kg.	DH 0.50/kg.	DH 0.80/kg.	DH 300.00
(2,000 "	Feb. 1982	DH 0.45/kg.	DH 0.25/kg.	DH 0.70/kg.	DH 1.90/kg.	DH 2,400.00
(4,000 pcs.	Dec. 1980	DH 0.45/pc.	DH 0.01/pc.	DH 0.46/pc.	DH 0.50/pc.	DH 160.00
Eggs (3,000 "	Dec. 1981	DH 0.48/pc.	DH 0.03/pc.	DH 0.51/pc.	DH 0.60/pc.	DH 270.00
(500 "	Mar. 1982	DH 0.55/pc.	DH 0.05/pc.	DH 0.60/pc.	DH 0.70/pc.	DH 50.00
Various (100 kgs.	Feb. 1981	DH 0.50/kg.	DH 0.05/kg.	DH 0.55/kg.	DH 0.80/kg.	DH 25.00
Vegetables (1,000 "	Mar. 1982	DH 0.70/kg.	DH 0.20/kg.	DH 0.90/kg.	DH 1.50/kg.	DH 400.00

Total Savings: DH 5,267.00
($ 1,053.40)

Appendix IC

SUMMARY OF CUMULATIVE INCOMES, SAVINGS AND OTHER GAINS: Sept. 1979 - March 1982

Source of Benefits	Yield	Incomes	Savings	Other Gains
I. Irrigation Systems				
a/ Drip Irrigation: Tangerines				
Economy of Labor			DH 15,968.00	823.5 m3 of water per irrigation week.
Eco. of Labor Due to Reduction of Weeds			DH 1,220.00	
Production Yields	251,771 kgs.	DH 135,159.60		
b/ Old Sprinkler System				
Economy of Labor - Corn			DH 3,332.00	Land planted with potatoes extended by 3½ hectares.
Yield - Corn Crop	455 quintals	DH 99,213.65		
Yield - Wheat Crop	345 quintals	DH 55,200.00		
Yield - Potatoes	105,451 kgs.	DH 119,176.00		
Production of Straw	35,000 "	DH 61,250.00		
c/ New Sprinkler: Vegetables				15,000 m3 to 21,000 m3 of water saved per year. Problem of erosion contained.
Economy of Water - Vegetables				
Production yield - "	10,700 kgs.	DH 19,320.00		
II. Dairy Cattle				
Milk Production	22,304 liters	DH 30,867.66		
Sale of 6 Calves		DH 8,400.00		
Value of 13 Cattle		DH 42,000.00		
Manure Production	15,000 kgs.	DH 3,000.00		
III. Cold Storage Facility				
Vegetables - 1,100 kgs.			DH 425.00	
Potatoes -10,750 "			DH 2,862.00	
Tangerines - 3,000 "			DH 2,700.00	
Eggs - 7,500 pcs.			DH 480.00	
TOTAL....		DH 573,586.91 ($ 114,717.38)	DH 26,987.00 ($ 5,397.40)	(1US $ = DH 5.00)

PART II

PILOT PROJECT TO DEMONSTRATE PRACTICAL RURAL APPLICATIONS OF SOLAR ENERGY - CIDERA

Purpose of Part II of the Project

The purpose of this part of the project was to demonstrate the practical rural applications of small scale solar energy.

Specific Objectives

The specific objective of this part of the project was to demonstrate small-scale rural applications of solar energy by providing CIDERA School with solar collectors to heat water in individual lodgings, and with a solar oven which will be used to produce steam for sterilization, canning, as well as electricity to operate CIDERA equipment. Other possible uses of the solar oven will be for the working of metals and alloys, baking ceramics, etc...

The Project Activities

To achieve the foregoing specific objective, the following activities have been carried out:

1) Five solar captors have been constructed and installed at the students' dormitories in CIDERA compound, under the supervision of GEFOSAT engineers. Five other captors are being constructed.

2) Various materials and testing equipment for the construction of a solar oven have been purchased. Work on this equipment started in September 1980, supervised by GEFOSAT engineers.

3) The testing and adjusting of completed solar captors have been carried out as well as regular reading of water temperature and electrical consumption related to the use of these captors.

.../...

4) Courses in plumbing, welding, metal structure design and calculus have been integrated in the school curriculum to provide students with appropriate training for the construction of solar energy equipment.

Assessment of Part II of the Project

A. SOLAR CAPTORS

In accordance with the general project design for the use and applications of solar energy at CIDERA, four student dormitories have been equipped with solar captor systems to produce hot water for domestic uses. A fifth solar captor has been installed at the farm workers' shower/washing building. Five other solar captor systems are being constructed, making available to CIDERA a total of 10 solar water-heating systems.

A testing bench has been installed in one dormitory, where captors have been in use, to determine energy generation. A meter reading system for electrical consumption has been installed in other buildings which use electricity to produce hot water.

By extrapolating the following data on electrical consumption a realistic estimate of savings can be made. Also, a projection of possible economy in electricity will be obtained when the complete network has been activated for the captor of solar energy. To obtain these results, a comparison will be made of the readings taken from 3 dormitories (no. 7, 10 and 13) using the normal system and the data obtained from Dormitory no. 11, where a solar captor system has been in use since January 1980.

.../...

Preliminary Conditions Relative to the Experiment

- All four dormitories under study here (Bldgs. No. 7, 10, 11 and 13) have been equipped with meters to accord electrical consumption.
- Data-gathering activities took place from January to November 1981.
- During this period, only Bldg. 11 had been equipped with solar captor system (the three others were installed in dormitories which are not included in this evaluation).
- The calculation of savings in electricity had been carried out by comparing the outputs of the normal system and the solar captor system.

1. Average Consumption with Use of the Normal System

The water heaters being used in Bldgs. 7, 10 and 13 have a total capacity of 75 liters and possess electrical heat resistance of 800 watts. Their thermostats are normally fixed at approx. 70° C.

The readings of electrical consumption from January 26 to November 12, 1981 (290 days) are as follows:

Dorm. No.	Meter Readings of 12/11/1982	Initial Readings	Total Consumption
Bldg. 7	1,187 KWh	- 15,5 KWh	1,117.5 KWh
Bldg. 10	1,245 KWh	- 32.5 KWh	1,212.5 KWh
Bldg. 13	1,212 KWh	- 32.5 KWh	1,179.5 KWh

Slight variations of these readings may be observed.

.../...

In effect, the three dormitories having the same type of equipment were occupied by an identical number of students (therefore, the same number of "users") who belong to the same age group. The average consumption for the period is obtained as follows:

$$\frac{\#\,7 \qquad \#\,10 \qquad \#\,13}{1{,}117.5 + \frac{1{,}212.5 + 1{,}179.5}{3}} = 1{,}188 \text{ KWh}$$

To obtain the average daily consumption for the period, the number of days of use minus the number of days in summer (when the heaters were not in use) must be established, that is:

290 days - 120 (in summer) = 170 days of water use

Or:

$$\frac{1{,}188 \text{ KWh}}{170} = 7 \text{ KWh/day of use}$$

II. Average Consumption with Use of Solar Captor System

During the same period, consumption of electricity in Bldg, 11 (which uses a combination of normal water heating by electrical resistance and by solar energy), was:

917 KWh - 76 KWh = 841 KWh

The combined system in Bldg. 11 has been used longer than those in the other buildings (under study) as this dormitory was occupied even during the summer holidays (some dormitories in CIDERA were transformed into "hotels" during summer vacation and priority for occupancy was given to buildings equipped with solar captors).

.../...

Therefore:

170 days (during the period) + 70 summer days = 240 days of water use

The average consumption per day of use was:

$$\frac{841 \text{ KWh}}{240 \text{ days}} = 3.5 \text{ KWh/day of use}$$

Or, in comparison with other buildings not equipped with solar captors, Bldg. 11 registered a saving, in electricity, of:

$$\left(1 - \frac{3.5 \text{ KWh}}{7 \text{ KWh}}\right) \times 100 = 50\ \%$$

III. Average Consumption During Short Term Periods of Observation

In order to better prove the output of the solar captor system, two short term periods of utilization have been observed:

A/ Period Between 26 January to 15 May 1981, or 110 days

During this period, the solar captor system installed in Bldg. 11 had been activated "in parallel" with the normal system, that is:

- The dormitory possesses 2 separate shower cabins
  + One shower cabin equipped with the normal system
  + The other cabin (shower) attached to the solar captor system

The readings during the period are as follows:

Bldg. No.	Readings by 15 May	-	Initial Readings	Partial Consumption
7	848.5 KWh	-	15.5 KWh	843 Kwh
10	700 "	-	32.5 "	667.5 "
11	622 "	-	76 "	546 "
13	785 "	-	32.5 "	752.5 "

.../...

1) Average Daily Consumption in Buildings Without Solar Captor System

$$\frac{843 + 667.5 + 752.5}{3} \times \frac{1}{110} = 6.86 \text{ KWh/day}$$

2) Average Daily Consumption in Bldg. 11, Equipped with Solar Captor System

$$\frac{546}{110} = 5 \text{ KWh/day}$$

Or, a saving of:

$$\left(1 - \frac{5}{6.86}\right) \times 100 = 27\ \%$$

This economy in electrical consumption, though tangible, remains small and insufficient. This stems from the fact that the users, having been free to use either systems at will, frequently used these systems simultaneously. These combined systems, therefore, may have increased the user's level or comfort but did not really represent a viable solution towards economy in electricity use.

B/ Period Between 16 May to 12 November 1981, or 180 days

During this period, the solar captor system in Bldg. 11 was used "in series" with the normal system, that is:

- The hot water produced through the solar captor shared the outlet of the normal system when the shower was in use.
- When the weather was sunny and, therefore, favorable to the operation of the solar captor, the electric accumulator (within the normal system) functioned very little or not at all.

.../...

- When the weather was cloudy and the solar captor did not function, the electric accumulator intervened, with the help of its built-in thermostat which maintains a constant water temperature.

This installation possesses a plumbing apparatus known as the "by pass system" which allows the water heater to function using only solar energy (independent of the electrical power) during days when sunlight is at maximum. This accounts for the substantial savings in electricity during the period, as the "by pass" system was constantly in operation.

Readings taken during this period are as follows:

Bldg. No.	Meter Readings as of 12 November 1981	Readings on - 16 May 1981	Partial Consumption
7	1,187	- 858.5 KWh	328.5 KWh
10	1,245	- 700 "	545 "
11	917	- 622 "	295 "
13	1,212	- 785 "	427 "

1) Average Daily Consumption in Bldgs. Without Solar Captors System

The electric water heaters in Bldgs. 7, 10 and 13 functioned during 180 days from which may be deducted the number of days in summer (when system was not used), i.e. :

180 days - 120 days (summer) = 60 days of water use

Or, an average daily consumption of:

$$\frac{328.5 + 545 + 427}{3} \times \frac{1}{60} = 7.22 \text{ KWh/day}$$

.../...

2) Average Daily Consumption in Bldg . 11

$$\frac{295}{130} = 2.27 \text{ KWh/day}$$

This daily average of consumption must be adjusted to include the supplementary period of occupancy equivalent to 70 days of use (Par. II).

The savings obtained during this period equals:

$$\left(1 - \frac{2.27}{7.22}\right) \times 100 = 68.5\%$$

The substantial savings in electricity is atributed to the "by pass system" which permits optimal use of the solar captor during sunny days. This can only mean less dependence on the normal system which relies on electrical generated energy.

C/ Correlation of Savings Calculated from Two Short Term Periods vis-a-vis the Global Estimates in Par. II

By combining the two percentages of savings to obtain the average percentage of savings during the period, the following results may be derived:

$$\frac{0.27 \times 110 + 0.865 \times 130}{240} = 0.495 \text{ or } 49.5\ \% \text{ accumulated savings over two short-term periods.}$$

This corresponds to the figures arrived at in Par. II.

.../...

IV. INTERPRETATION OF RESULTS

The solar captor system, "in series" with the normal system for hot water production, allows for a better and more efficient use of the whole installation.

It has been observed that this combined system has considerably improved the comfort of the "users". Nevertheless, it must be admitted that as soon as the users finish the hot-water content of a 75-liter tank (of the normal system), they can still make use of the solar-heated tank of 150 liter capacity (during periods of maximum sunlight input). Therefore, the users dispose of some 200 liters of water ranging between 50 to 70 Centigrade. Without the "by pass" system, these consumption figures would simply amount to zero savings. This is because the water accumulated after each use is normally cold and that a new cycle is necessary to raise water temperature. It is for this reason that the by pass system has been added to the combined installation " in series ".

Even if the increase in the user's level of comfort is not taken into consideration (which certainly makes evaluation very difficult to realize), an annual saving of 50 % over the purely normal system is still obtained. Amortization of such an installation may be projected, without neglecting the fact that these savings have been calculated for a system which has not been consistently used in the best of conditions (Par. II, from 26 January to 15 May 1981).

.../...

V. AMORTIZATION

The initial investment for a solar captor system for each dormitory is approx. DH 3,500.00, and is made up of the following parts:

- the solar captor panel
- the water tank
- the system of support
- the plumbing system and connecting pipes (valves, traps, etc..)

The consumption reading in a normal system for one year is:

7 KWh/day x 240 days of use = 1,680 KWh

If the estimated saving is roughly 50% with the use of solar captor system, then:

1,680 KWh x 0.5 = 840 KWh

may be gained per year of use.

Assuming that the cost per Kilowatt hour is DH 0.40 (all charges included) and that an annual increase in energy cost is about 20 %, the following results may be obtained:

Year	Cost of KWh	Total in DH	Annual Cost
1st year	840 x 0.40	336	739 DH
2nd year	840 x 0.48	403	739 DH
3rd year	840 x 0.57	479	1,218 DH
4th year	840 x 0.69	580	1,798 DH
5th year	840 x 0.83	697	2,495 DH
6th year	840 x 0.99	831	3,326 DH

The costs of the solar captor system will be amortized by the beginning of the 7th year of use.

The extrapolated savings and benefits from this system (in Bldg. 11) are, therefore true for the three other solar captor installations at the CIDERA campus. These savings and benefits also hold true for the solar captors which are currently under construction, as they are of the same type and siez as the others, and are to be installed in similar circumstances. These remaining five captors are expected to be completed and installed in functioning order by end June 1982.

B. SOLAR OVEN

This part of the project's solar energy component has experienced some delay (approx. 3 months). To date, the following activities have been completed:

- The concrete foundation for the solar site has been laid out for the concentrator, solar oven and heliostat. A small concrete building has also been constructed at the solar site and is being used, temporarily, to store some tools for the solar oven.
- Heliostat: The heliostat frame, its pylon and mobile service mechanism have been assembled.
- Concentrator: Its lower part and the metallic load basket have also been completed.

  These assembled parts are ready for galvanisation.
- Other materials, equipment and small parts necessary in the assembly of: the upper part of the concentrator, the support structures for the screw jack and load basket, as well as the main mast of the heliostat, have been ordered, if not already purchased.

The remaining activities represent less than 30 % of the actual work to complete this part of the project.

The solar oven will be completed and tested in June 1982.

Only then can a Final Report on this component of the project be prepared and submitted for evaluation.

PART III.

HEALTH REHABILITATION

Purpose of Part III of the Project:

The purpose of Part III of the Project was to strengthen the capabilities of the CIDERA Dispensary in its efforts to combat malnutrition among infants and children. This necessitated the establishment of a Health Rehabilitation Center for intensive care of malnourished infants.

Specific Objectives:

The specific objectives of the project were as follows:

1) To eliminate third degree malnutrition
2) To provide education in basic nutrition and health to mothers
3) To provide routine medical treatment to an average of 100 out-patients (daily)
4) To lower the birth rate among the targeted families.

Main Project Activities:

To achieve the objectives, the following activities have been undertaken:

1) A Health Rehabilitation Center has been constructed and equipped. This Center can accomodate fourteen children in need of daily care and observation. An additional number of children can be cared for but not kept at the center for the whole day.

.../...

A small dispensary attached to the Rehabilitation Center attends to infants from birth to two years.

2) A questionnaire, prepared at the beginning of the Project, was used in the vicinity of the Center to identify cases of severe malnutrition among infants and children.

3) Children with second or third degree malnutrition have been enrolled in the program. Their weight and height have been measured and individual weight charts have been introduced.

4) An education program, for mothers of the children enrolled in the program, has been introduced. This covered nutrition and food preparation, hygiene and sanitation.

5) Routine medical treatment has been provided at CIDERA Dispensary for a daily average of 80 to 100 outpatients.

6) An expert on Natural Family Planning has given a course to CIDERA staff and others on methods to be used in the teaching of natural family planning to illiterate women.

Assessment of Progress:

1) Weight Surveillance

As mentioned in the first progress report for the period September 1, 1979 to February 29, 1980, 27 children

.../...

with second and third degree malnutrition were enrolled in the program. By August 1980, the weight charts of 33 infants between the age of three to twenty five months were checked. These infants had been enrolled in the program for no less than three months. Of the 33 children, eleven had had third degree malnutrition and 22 second degree malnutrition at the time of enrollment. By the time of the screening of the weight charts, the number of severely malnourished children had decreased from eleven to only two. The rest had moved from third or second degree malnutrition to a lesser degree of malnutrition for a normal weight for age. Thus, considerable improvements in the nutritional status of the children had already been achieved during the first year of the Project.

An evaluation of project achievements at the end of February 1981, included 37 infants and children from three to thirty months of age. Of these 37 children, 21 children suffered third degree malnutrition and 16 children second degree malnutrition at the same time of their admission to the center. At the time of the evaluation, after about six months in the program, the number of children with third degree malnutrition had decreased to three. Most of the other children had moved from one to a lesser degree of malnutrition, or, in two cases, to a normal weight for age.

A screening of weight charts in January 1982 of 59 children who had been enrolled, but were no longer

.../...

in the program, showed that 18 of the 59 children had suffered third degree malnutrition at the time of enrollment. Fourteen children had moved from third to second of first degree of malnutrition, while the weight of four children was still below 60 % of Harvard Standard when they left the program.

Of twenty-nine children in the 60/70% of weight for age range, twenty one had increased their weight for age, while seven remained in the 60/70% weight range and the weight of one child had decreased to below 60 % of Harvard Standard of weight for age at the time of leaving the program.

That 35 of the 59 children or 59% had moved from one to a lesser degree of malnutrition within a relatively short time (mostly in less than nine months) is an indication of the importance of the services rendered by the Health Rehabilitation Center.

A screening of weight chart of 39 children still enrolled in the program in January 1982 showed that twenty of these children suffered third degree malnutrition at the time of admission to the Center. Many of these children showed weights far below the 60% line. Though the weight of one child appeared normal according to the recordings on the weight chart, that child was likely suffering from edema as his weight dropped upon admission to the Center.

The other fourteen children had second degree of malnutrition at the time of enrollment. After a

.../...

period of rehabilitation, varying from two to twenty months, with the majority of the children in the program from four to six months, the number of children suffering from third degree malnutrition had decreased from twenty to seven. Of the seven children who remained severely malnourished, three children had been in the program only for two months, while one child had been in the program for twenty months, but still remaining below 60 % of H.S. of weight for age. Three of the seven children had increased their weight for age, but were still below 60 % of H.S. of weight for age.

Of the remaining thirteen children who had suffered third degree malnutrition at the time of enrollment, ten children had increased their weight to 60/70 % and three children to 70/80 % of H.S. of weight for age. One child who had weighed only five kgs. at the age of three years had increased her weight to above 60 % of H.S. within four months.

Of nine children in the 60/70 % weight range, the weight of three children increased to above 70 %, the others are remaining below 70 %, one of them increasing his weight within the 60/70 % range.

Of nine children between 70/80 %, four are remaining in that weight range and three have increased to above 80 %, while the weight of two children decreased to 60/70%, as did also the weight of the only child whose weight at enrollment had been above 80 % and then declined to 60/70 %, thus indicating that the child most likely had suffered from oedema at the time of enrollment.

.../...

Of the 39 children presently enrolled in the program, 14 children are being kept at the Rehabilitation Center during the day, where they receive adequate feeding and care by the staff. The children spend the night at their own homes. The remaining 25 children receive food at the Center, but do not remain at the Center for the whole day.

The poor nutritional health of the target group raises questions as to its causes, as also for the slow progress of some of the children enrolled in the program.

The answers to the questionnaire used at the interviews of mothers at the beginning of the program revealed some practices that were apt to contribute to the unsatisfactory state of health among the children. While breastfeeding was common for the first months of a child's life, this was often followed by abrupt weaning. In several cases, foods other than breast milk were introduced only from the age of eight or nine months.

A number of mothers stated that they fed their infants and children only three times a day.

The lack of adequate hygiene and sanitation and unsatisfactory living conditions of the poor families in the area contributed to the frequency of diarrhea and malnutrition.

.../...

The fact that the children cannot remain at the Rehabilitation Center also during the night (until they have regained sufficient strength to cope with their own environment) is likely one of the factors contributing to the slow progress of some of the children. The limited space of the Rehabilitation Center, that can only accomodate fourteen infants at any one time, allows for day-care of less than half of the severely malnourished children in the area, the remaining children being brought to the Center only for daily feeding and medical attention.

Problems encountered in the treatment and care of the enrolled children are dealth within the education program for the mothers.

2) Education of Mothers

The education program for the mothers has been attended by an average of 27 mothers per week. At the beginning, classes were held three times per week, with one lesson on nutrition, one on hygiene and one on natural family planning. This schedule was later changed to one weekly session. Some mothers living at some distance from the Center found it difficult to attend lessons on three days of the week. The new arrangement was found to be more satisfactory to the mothers, who looked forward to their weekly meetings at the Center.

.../...

Subjects covered during the discussions on nutrition have included the following topics:

1) Diet of the pregnant and lactating mother
2) Breastfeeding
3) Weaning foods - recipes
4) How to feed a sick child
5) Meals for the rest of the family
6) How to choose the best foods in season.

The lessons on hygiene have stressed the following:

1) Importance of personal hygiene and factors affecting health
2) Importance of good health habits to the individual and the community
3) Personal cleanliness - care of skin, mouth, teeth, hair, hands, nails, feet, clothing and body
4) Importance of using clean water to prevent illness
5) Proper methods of waste disposal.

Some of the lessons have been accompanied by the showing of slides. Mothers have participated in the preparing of meals for the children, the bathing of infants and the treatment of minor ailments.

The discussions on natural family planning included the following topics:

1) Pattern of micus symptoms - typical
2) Range of normality
3) Method of observation of change - How and when ?

.../...

4) Identifying the quality of mucus
5) Sensation of dryness, moistness and wetness
6) Other symptoms of ovulation
7) Basic infertile pattern
8) Peak type mucus, Peak (dry), Double Peak
9) Recording symptoms, describe

Of the 27 women who attended these lessons, five mothers showed a particular interest in this program. They were given individual instructions which they shared with their husbands.

3) CIDERA Dispensary

The Dispensary at CIDERA has attended to patients six mornings per week. A medical dootor who was also the Rector of CIDERA, assisted by a qualified nurse, has attended to an average of 80 patients per day. The patients have been treated free of charge.

Sick people not able to walk to the dispensary have been visited in their own homes. Serious cases have been referred to hospitals in Rabat.

In addition to the CIDERA Dispensary, there is a small dispensary as part of the Health Rehabilitation Center. Infants from birth to two years have been attended to at this small dispensary, with an average of 37 children per day. Older children have been referred to the adjoining dispensary. Infants found in need of special care have been kept under observation all day at the Rehabilitation Center, provided there was available space available.

.../...

Follow-up visits have been made to the homes of the children enrolled in the program, especially to those who were sick.

During the project period, there was a market decline in the prevalence of sickness among infants in the neighborhood. According to the staff at the Health Rehabilitation Center, the mothers who have participated in the education program have now a greater ability to attend to their sick infants at home. They therefore do not have to visit the dispensary as often as before.

There is now a noticeable difference in cleanliness between children who have attended the Center and those who are newly enrolled.

The devoted service of the Sister in charge and her co-workers has resulted in important changes and promoted nutritional health among the children of some of the poorest families in the area reached by the Project.

In summary:

1) Of the 59 children who had been, but are no longer involved in the program, 18 children were below 60 %; 29 children between 60/70 %; 11 children between 70/80 % and one child 80/90 % of H.S. weight for age at the time of enrollment.

   Of the 18 children below 60 % of H.S., 4 children remained below 60 %; 6 children increased to 60/70 %; 5 children increased to 70/80 % and 3 children to 80/90 %.

   Of the 29 children in the 60/70 % range, 7 children remained 60/70 % (two of these children remained in the program for only two months); 7 children increased to 70/80 %; 12 children increased to 80/90 %; 2 children increased to 90/100 %; 1 child decreased to below 60 %.

   Of the 11 children in the 70/80 % range, 4 remained 70/80 %; 4 increased to 80/90 %; 2 increased to 90/100 %, and 1 decreased to 60/70 %.

   One child at 80/90 % increased to 90/100 %.

2) Of the 39 children still enrolled in the program: 20 children were below 60 % (some of them far below 60 %); 9 children were between 60/70 %; 9 children between 70/80 % and 1 child was between 80/90 % of the H.S. at the time of enrollment.

   Of the 20 children below 60 %, 10 children have increased to 60/70 %; 3 children have increased to 70/80 %; 7 children remain in the 60/70 % range. 3 of these children have increased their weight for age but are still below 60 % of H.S.

   Of the 9 children between 60/70, 6 children remain 60/70 %; 1 child has increased to 70/80 % and 2 children have increased to 80/90 %. Of the 6 children who remain in the 60/70 % range, 1 has increased his weight for age within the 60/70 % level.

   Two of the children whose weight has not yet increased, have only been in the program for 2 months.

   Of the 9 children between 70/80 % at the time of enrollment, 4 children remain 70/80 %; 3 children have increased to 80/90 %, and 2 children have decreased from 70/80 % to 60/70 %.

   The only child between 80/90 % has decreased to 60/70 %.

   Thus, of the 39 children, 19 have, by January 1982, increased their weight sufficient to move them from below 60 to above 60 % or from 60/70 % to above 70 %.

PART III: HEALTH REHABILITATION CENTER, CIDERA

List of Appendices:

III A - SUMMARY OF WEIGHT SURVEILLANCE
Changes in the Percentage of Harvard Standard of Weight for Age During Enrollment in the Program at CIDERA Health Rehabilitation Center

III B - WEIGHT SURVEILLANCE
Percentage of Harvard Standard of Weight for Age at the Time of Enrollment and After a Period of Treatment (as indicated in the margin)

B1/ Children No Longer Enrolled in the Program

B2/ Children No Longer Enrolled in the Program

B3/ Children Enrolled in the Program - January 1982

Appendix III A

SUMMARY OF WEIGHT SURVEILLANCE
Changes in the Percentage of Harvard Standard of Weight for Age During Enrollment in the Program at CIDERA Health Rehabilitation Center

Percentage of H.S. of Weight for Age	1. Children No Longer Enrolled in the Program	2. Children Still Enroll in the program
80/90 increasing to 90/100	1	-
80/90 decreasing to 60/70	-	1
70/80 remaining 70/80	4	4
70/80 increasing to 80/90	4	3
70/80 increasing to 90/100	2	-
70/80 decreasing to 60/70	1	2
60/70 remaining 60/70	7	6
60/70 increasing to 70/80	7	1
60/70 increasing to 80/90	12	2
60/70 increasing to 90/100	2	-
60/70 decreasing to Below 60	1	-
Below 60 remaining Below 60	4	7
Below 60 increasing to 60/70	6	10
Below 60 increasing to 70/80	5	3
Below 60 increasing to 80/90	3	-
Total.....	59	39

1/ - Children No Longer Enrolled in the Program

N°	90/100	80/90	70/80	60/70	Below 60	90/100	80/90	70/80	60/70	Below 60	Age in months
1				✓		✓					11 - 19
2			✓				✓				19 - 22
3				✓				✓			10 - 16
4					✓		✓				3 - 9
5					✓		✓				23 - 31
6					✓				✓		9 - 22
7			✓					✓			12 - 16
8			✓					✓			16 - 22
9			✓				✓				5 - 18
10			✓							✓	12 - 24
11				✓						✓	19 - 21
12			✓				✓				15 - 20
13		✓				✓					4 - 16
14			✓				✓				12 - 18
15			✓					✓			18 - 21
16			✓					✓			5 - 25
17			✓						✓		18 - 25
18			✓					✓			23 - 31

N°	90/100	80/90	70/80	60/70	Below 60	90/100	80/90	70/80	60/70	Below 60	Age in Months
19					✓			✓			9 - 13
20				✓		✓					6 - 18
21					✓			✓			6 - 19
22			✓			✓					12 - 17
23				✓			✓				15 - 23
24				✓			✓				12 - 20
25					✓		✓				6 - 19
26					✓					✓	11 - 13
27				✓			✓				13 - 17
28					✓				✓		16 - 19
29			✓				✓				16 - 21
30				✓			✓				24 - 30
31				✓					✓		8 - 14
32					✓				✓		13 - 19
33					✓					✓	13 - 17
34				✓			✓				16 - 24
35				✓			✓				16 - 24
36				✓					✓		16 - 24
37					✓				✓		6 - 15
38				✓			✓				5 - 9
39			✓			✓					10 - 14
40					✓				✓		15 - 17

2/ - Children No Longer Enrolled in the Program

N°	90/100	80/90	70/80	60/70	Below 60	90/100	80/90	70/80	60/70	Below 60	Age in months
1			✓					✓			13 - 15
2				✓				✓			13 - 24
3				✓			✓				8 - 19
4				✓					✓		25 - 28
5				✓					✓		
6				✓				✓			19 - 32
7				✓			✓				20 - 25
8					✓			✓			25 - 31
9					✓				✓		24 - 35
10					✓			✓			23 - 30
11					✓			✓			24 - 31
12				✓			✓				25 - 32
13					✓					✓	19 - 28
14				✓				✓			16 - 19
15				✓					✓		11 - 17
16			✓						✓		14 - 16
17				✓					✓		23 - 28
18				✓				✓			16 - 23
19			✓				✓			50	12 - 14

3/ - Children Enrolled in the Program - January 1982

N°	90/100	80/90	70/80	60/70	Below 60	90/100	80/90	70/80	60/70	Below 60	Age in Months
1			✓				✓				18 - 22
2		✓								✓	3 - 9
3				✓				✓			7 - 12
4					✓					✓	12 - 17
5			✓					✓			9 - 15
6			✓				✓				14 - 16
7			✓					✓			4 - 17
8				✓					✓		14 - 18
9			✓					✓			3 - 9
10					✓				✓		26 - 33
11				✓					✓		20 - 24
12					✓				✓		16 - 19
13				✓					✓		12 - 19
14			✓				✓				9 - 21
15					✓			✓			12 - 16
16					✓			✓			7 - 1[illegible]
17					✓				✓		9 - 1[illegible]
18					✓				✓		2 - [illegible]
19					✓				✓		36 - 4[illegible]

N°	90/100	80/90	70/80	60/70	Below 60	90/100	80/90	70/80	60/70	Below 60	Age in Months
20				✓					✓		5 - 22
21				✓			✓				2 - 5
23			✓						✓		7 - 19
24					✓				✓		18 - 23
25					✓					✓	12 - 32
26					✓					✓	8 - 13
27					✓					✓	12 - 17
28					✓				✓		13 - 15
29					✓				✓		18 - 23
30			✓						✓		3 - 4
31					✓					✓	12 - 13
32					✓			✓			13 - 19
33					✓				✓		9 - 14
34					✓					✓	12 - 13
35				✓					✓		20 - 23
36				✓					✓		18 - 20
37			✓					✓			8 - 12
38				✓			✓				17 - 21
39					✓				✓		24 - 27

Appendix IV

CRS/CIDERA AID GRANT 608-79G-001

FINAL FINANCIAL REPORT

1 September 1979 - 31 March 1982

Approved Budget $ 124,000.00

Receipts

Date	Amount	Rate of Conversion	Amount in Local Currency
11/27/79	$ 65,000.00	3.8507	DH 250,295.50
3/24/80	26,000.00	3.8744	100,734.40
4/28/81	10,000.00	4.8945	48,945.00
9/11/81	7,000.00	5.6713	36,699.10
3/17/82	8,400.00	5.7305	48,136.20
	$ 116,400.00		DH 484,810.20
12/3/81	7,420.70	(remitted to CRS/New York for U.S. purchase of equipment)	
	$ 123,820.70		
Unused Portion of Total Approved Budget	$ 179.30		
Total Amount Received	$ 123,820.70		
Total Dollar Expenditures	$ 123,816.33		
Balance on Hand	$ 4.37		

Appendix IV 4

CRS/CIDERA AID GRANT 608-79G-001 (U.S. Dollar Report)

Total Approved Budget
$ 124,000.00

Final Financial Report
1 September 1979 - 31 March 1982

	Approved Budget:	Total Expenditures	Balance
A. Irrigation systems	$ 43,000.00		
- Cold Storage Facility		$ 14,741.53	
- (5) Heifer Cows		6,002.35	
- Drip Irrigation system		16,201.94	
- Sprinkler Irrigation system		1,961.75	
- Seed Selector Calibration		78.76	
- 1) Oliver Hi-Cap Gravity Separator Model 5C-A/Proforma 79-342		7,420.70	
2) Gustafson Seed Treator			
		$ 46,407.03	($ 3,407.03)

( ) Denotes Deficit

54

CRS/CIDERA AID GRANT 608-79G - 001 (U.S. Dollars Report)

Total Approved Budget
$ 124,000.00

Final Financial Report

1 September 1979 - 31 March 1982

	Approved Budget	Total Expenditures	Balance
B. Health Rehabilitation Center	$ 45,000.00		
- Construction Material and Labor Costs		$ 27,170.48	
- Staff Wages		12,604.94	
- Stove		324.13	
- Refrigerator		452.82	
- Electric Heater		129.66	
- Washing Machine		201.68	
- Kitchen Equipment		253.54	
- Thermometers		23.77	
- Stationary and Supplies		33.02	
- Photos and Slides		152.13	
- Wall Cupboard		384.16	
- Translation Costs		120.05	
		$ 41,850.38	$ 3,149.62

CRS/CIDERA AID GRANT 608-79G-001 (U.S. Dollars Report)

Total Approved Budget

$ 124,000.00

Final Financial Report

1 September 1979 - 31 March 1982

	Approved Budget	Total Expenditures	Balance
C. Solar Energy	$ 30,000.00		
- Construction Materials		$ 27,674.05	
- Tools and Equipment		2,328.35	
- Water Heaters		1,702.64	
- Solar Mirrors		2,823.49	
- Pulley Block		1,029.59	
- Expense for Certified Check		.80	
		$ 35,558.92	($ 5,558.92)

	Approved Budget	Total Expenditures	
D. Contingency	$ 6,000.00		
- Irrigation system Deficit		$ 3,407.03	
- Solar Energy Deficit		5,558.92	
Health Rehabilitation Center Surplus		$ 8,965.95	$ 183.67
		- 3,149.62	
		$ 5,816.33	( ) Denotes Deficit

CRS/CIDERA AID GRANT 608-79G-001

(Moroccan Dirhams)
Expenditure Report

Final Financial Report

1 September 1979 - 31 March 1982

	Approved Budget	Total Expenditures	Balance
A. Irrigation Systems	DH 179,096.55*		
- Cold Storage		DH 61,399.00	
- (5) Heifer Cows		25,000.00	
- Drip Irrigation System		67,481.65	
- Sprinkler Irrigation System		8,170.75	
- Seed Selecter Calibration		328.00	
- 1) Oliver Hi-Cap Gravity Separator Model 50-A/Proformas 79-342			
2) Gustafson Seed Treator		30,907.49**	(This was a US Dollar Expense. Dirham Amount included only for Budget comparison purposes)
		DH 193,286.89	(DH 14,190.34)

* Average Rate of Exchange $ 1.00 = DH 4.165036

CRS/CIDERA AID GRANT 608-79G-001

(Moroccan Dirhams)
Expenditure Report

Final Financial Report

1 September 1979 - 31 March 1982

	Approved Budget	Total Expenditures	Balance
B. Health Rehabilitation Center	DH 187,426.62*		
- Construction Material and Labor Costs		DH 113,166.00	
- Staff Wages		52,500.00	
- Stove		1,350.00	
- Refrigerator		1,886.00	
- Electric Heater		540.00	
- Washing Machine		840.00	
- Kitchen Equipment		1,056.00	
- Thermometers		99.00	
- Stationary and Supplies		137.50	
- Photos and Slides		633.59	
- Wall Cupboard		1,600.00	
- Translation Costs		500.00	
		DH 174,308.09	DH 13,118.53

* Average Rate of Exchange $ 1.00 = DH 4.165036

CRS/CIDERA AID GRANT 608-79G-001

(Moroccan Dirhams)
Expenditure Report

Final Financial Report
1 September 1979 - 31 March 1982

	Approved Budget	Total Expenditures	Balance
C. Solar Energy	DH 124,951.08*		
- Construction Materials		DH 115,263.49	
- Tools and Equipment		9,697.70	
- Water Heaters		7,091.62	
- Solar Mirrors		11,760.00	
- Pulley Block		4,288.35	
- Expense for Certified Check		3.36	
		DH 148,104.52	(DH 23,153.44)

Total Local Currency Expenditures	DH 515,699.50	** (This was US Dollar expense. Dirhams Amount included only for Budget comparison puposes)
	- 30,907.49	
	484,792.01	
Local Currency Acct. # 20-40-136 Balance	18.19	
	DH 484,810.20	

* Average Rate of Exchange $ 1.00 = DH 4.165036

(Denotes Deficit)

Appendix V

CRS CONTRIBUTIONS

1/ MA-OD-001 Solar Energy Technicians, CIDERA

In February 1980, CRS/New York received a grant in the amount of $ 10,000.00 from Operation Rice Bowl for the support of Solar Energy technicians assigned in CIDERA to implement this part of the OPG. The funds have been expended as follows:

Expenditures	in Dirhams	in US $
a. Salaries	DH 13,200.00	$ 3,393.66
b. Wage Taxes	482.46	124.04
c. Rent	7,600.00	1,953.93
d. Air Travel	6,284.39	1,615.69
e. Inland Travel	8,800.00	2,262.44
f. Administrative Costs (Photos, duplication, etc.).....	2,529.15	650.23
Total:	DH 38,896.00	$ 10,000.00 (rounded)

(Rate of Exchange: 1 US Dollar = DH 3.8896)

Appendix VI

2) MA-OD-023 Solar Energy Technicians, CIDERA

This is a continuation of project MA-OD-001, this time financed by the Geneva Travel Loan and Development Fund through the efforts of CRS/Geneva. The funds defray travel costs and administrative expenses being incurred during implementation of the Solar Energy component of this OPG. The project was approved in June 1981, for the amount of $ 9,000.00.

Expenditures	in Dirhams	in US Dollars
a. Inland Travel	DH 10,092.00	$ 2,048.00
b. Air Travel and related Expenses	11,458.00	2,325.22
c. Rent	5,600.00	1,136.43
d. Operating Expenses (Photocopies, postage, manuals, etc.).....	2,024.90	410.92
Total:	DH 29,174.90	$ 5,920.58

Total Amount Received:	DH 44,349.30	$ 9,000.00
Total Expenditures :	29,174.90	5,920.58
Balance (as of 30 March 1982) :	DH 15,129.40	$ 3,079.42

(Rate of Exchange: 1 US Dollar = DH 4.9277)

Appendix VII

3) MA-9D-016 Monitoring of AID Grant 608-79G-001

This project was approved and funded by the Regional Micro Fund to enable CRS/Morocco to undertake regular monitoring of the different activities related to the project in CIDERA. The grant in the amount of $ 2,500.00 is being used as follows:

Expenditures	in Dirhams	in US Dollars
a. Translation Costs	DH 429.00	$ 111.41
b. Office Supplies	611.00	158.67
c. Educational Materials, etc	338.23	87.83
d. Inland Travel	2,268.00	588.98
e. Photos	2,434.55	632.24
Total:	DH 6,080.78	$1,579.13

Total Amount Received:	DH 9,625.75	$ 2,500.00
Total Expenditures:	6,080.78	1,579.13
Balance:	DH 3,545.97	$ 921.87

(Rate of Exchange: 1 US Dollar = DH 3.8507)

CRS/AID GRANT No. 608-790-001

PART I: Intervention to Increase Economic Viability-
CIDEBA School Model Farm

The market gardening section of CIDEBA's model farm has greatly benefited from the sprinkler irrigation system acquired through this project.

CRS/AID GRANT No. 608-79G-001

Part I: Intervention to Increase Economic Viability - CIDERA School Model Farm

Photos on the right and below show the lettuce and cabbage crops responding well to the new sprinkler irrigation system.

CRS/AID GRANT No. 608-790-001

PART II: Pilot Project to Demonstrate Practical Rural Applications of Solar Energy

Photo on the right shows Christophe Cordelle, GEFOSAT technician, continuing work on the solar oven.

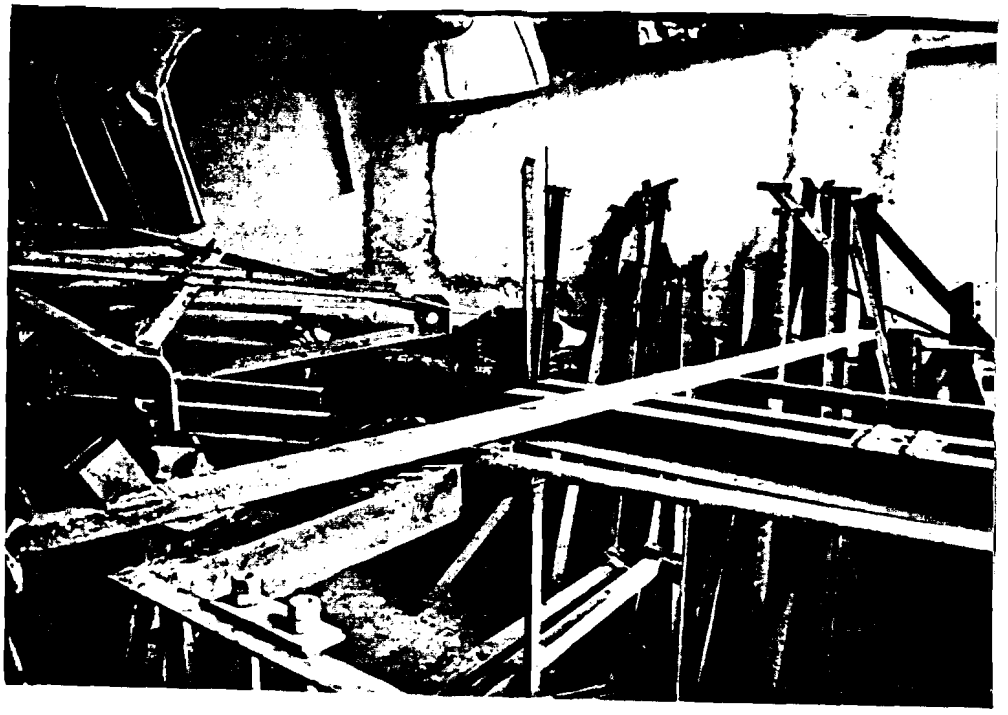
Below, a solar captor system, complete with a 150-liter tank, is installed on the roof of the students' workshop.

CRS/AID GRANT No. 608-79G-001

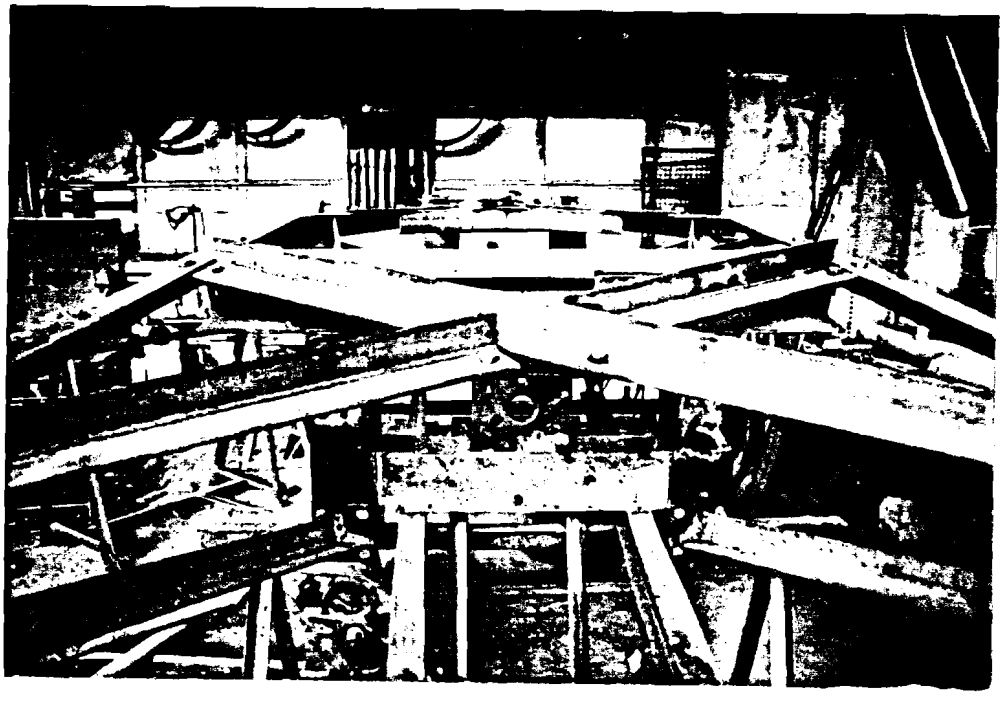
PART II: Pilot Project to Demonstrate Practical Rural Applications of Solar Energy

Two views of the solar heliostat frame during assembly.

PART II: Pilot Project to Demonstrate Practical Rural Applications of Solar Energy



Background, far left: The service mechanism is partly shown.
Foreground, right: The pylon for solar heliostat during welding phase.



A full frontal view of the service mechanism (mobile part) of the heliostat.

CRS/AID GRANT No. 608-79G-001

Part III: Health Rehabilitation Center

A mother awaits free medical treatment service for her child.

This child, Gemal, has moved from 3rd degree of malnutrition to 1st degree, thanks to the food and care he has received through this project.

CRS/AID GRANT No. 608-79G-001

PART III: Health Rehabilitation Center

Some of the children who benefit from the project's nutrition program.