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ANNUAL TECHNICAL PROGRESS REPORT

October 1, 1993 - September 30, 1994

**Moroccan Cooperative Agricultural Development
Project**

Grant Number HNE-0158-G-00-2075-00

Submitted to the

Bureau for the Near East
United States Agency for International Development

Submitted by the

San Diego State University Foundation
San Diego, California 92182

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This Annual Technical Report for the Moroccan Cooperative Agricultural Development Project was prepared by the San Diego State University Foundation utilizing input from participants in the Kingdom of Morocco, the State of Israel and the United States of America.

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OVERVIEW

Project Description

The Moroccan Cooperative Agricultural Development Project is funded by the Agency for International Development Bureau for the Near East. Initiated July 1, 1992, the Moroccan Project is being accomplished by participants from the Kingdom of Morocco, the State of Israel and the United States of America and is designed to meet a number of national development priorities set by the governments of Morocco and Israel.

The goal of the project is to promote world peace through cooperation in agriculture. Specific objectives are to contribute to the development of Morocco's agricultural sector by the introduction of new technology, training and demonstration. The project constitutes a new stage in the Middle East Regional Cooperation program, introducing a new partner with Israel and the United States.

Accomplishments

Progress in comparison with the work plan and in comparison to the goals and objectives outlined in our original proposal, has been satisfactory for the period of October 1, 1993 - September 30, 1994. Accomplishments include:

General

- Steering Committee members met in Morocco on October 26-27, 1993; participants visited the farm site in Azemour, Morocco prior to the Committee meeting in Casablanca; project accomplishments were reviewed;
- Amaris Nursery and Demonstration Farm was approved by the Steering Committee as a name for the project site in Morocco; the name stands for America, Morocco (Maroc in French) and Israel, the three cooperating partners;
- the third draft of the Economic and Marketing study was completed;
- the third and fourth Morocco project newsletters were issued;
- contract required reports were submitted to USAID;
- Technical Committee members met in Morocco on June 24-26, 1994; members visited the project site prior to the committee meeting; work plans for 1994-1995 were prepared; and project accomplishments were reviewed;

Morocco

- **Objective - Speedling Nursery:** commercial speedling production commenced in June 1994; production of 686,050 speedlings was accomplished between Oct. 1993 and March 1994; the nursery was expanded from 1000 to 3000 square meters in May 1994; commercial production began in June 1994.
- **Objective - Pot-Plant and Hardening Nurseries:** 1000 peach plants were produced from seeds in Feb. 1994; mother plant production through September 1994 totaled 2,204;

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- **Objective - Open-field Production:** one hectare of Melaleuca was planted in February and one half hectare of Strelitzia in November; asparagus and artichokes were planted in April; raspberries, green beans, eggplants and peppers were planted in January; raspberries were harvested in May 1994;
- **Objective - Green-house Production:** melons were harvested in May and sold in export and local markets; commercial production of green-house cucumbers was completed May 25, 1994;
- **Objective - Training and Extension:** in September 1994, two Moroccan engineers, Ms. Fatima Agdid and Mr. Moulay Sadiq, completed seven months training at Ben Gurion University in agro-management practices and tissue culture propagation; Ms. Agdid is receiving an additional three months of training in pot-plant propagation; seven Moroccan technicians completed their training at the project site in April; a demonstration for 200 local farmers was held in early June 1994, - speeding production activities, irrigation and agro-management practices, new varieties of tomatoes grown under low tunnels were demonstrated; a promotional campaign for speeding products was accomplished in June 1994; outreach efforts have continued; and daily visits of local farmers to the project site have continued.

Israel

- **Objective - Tomato research:** variety testing continues in Israel and at the project site in Morocco;
- **Objective - Verticordia and Ornamental Eucalyptus research:** new verticordia plant materials were collected and are being tested in Israel; tissue culture propagation was initiated; propagation of ornamentals continued;
- **Objective - Truffles research:** new materials were collected in Morocco in March and are being tested in Israel;
- **Objective - Collaboration:** in support of the production activities at the project site in Morocco and the research activities in Israel, twelve technical visits were made during the last quarter of 1993 through September 30, 1994: eight visits were made by Israeli scientists, two visits by a Moroccan and two visits by a U.S. scientist. In addition, meetings of the project Steering Committee and Technical Committee were held in Morocco. Additional information about the collaborative activities are presented in the section, "Meetings and Collaborative Activities."

In summary, the project has successfully accomplished all activities described in the work plans included in the annual report submitted last October 1993, with one exception, the micro propagation laboratory. This activity was delayed due to unforeseen storm losses and subsequent financial losses. (See "Problem" section for more information.) However, the implementation of this activity now has been re-scheduled as detailed in the following section.

Specific technical accomplishments, in comparison to stated goals and objectives, are detailed in the next section entitled, "Progress Report."

PROGRESS REPORT, WORK PLANS & IMPLEMENTATION SCHEDULE for MOROCCO

The following is a summary of the **Objectives** for each activity that is to be carried out at the project site in Azemour, as detailed in the grant.

Following the description of each objective is a **Progress Report to Date**. The progress report covers the period from October 1, 1993 - September 30, 1994.

SPEEDLING NURSERY

Objective:

The high root/shoot ration production by speedling technology allows for optimal production from drip irrigation and a high rate of germination of expensive hybrid seeds. Planting of speedlings one month later than direct field sowing reduces environmental stress on the plants and results in savings of water, fertilizer, herbicides and field preparation. Thus, introduction of this technology is intended to result in yield gains to the vegetable industry.

A speedling nursery will be erected in phases, with an initial capacity of one to two million seedlings per rotation supplied to farms in the target region. The size will increase five-fold during the project period. This activity is intended to influence the construction of similar nurseries in the country.

The nursery will specialize in the production of tomatoes, peppers, cucumbers, melons, and other crops to be identified. Experimentation will be directed towards the evaluation of locally produced growing media, utilization of fertilizers from various sources, and refinement of irrigation and management.

Progress to Date:

- the first greenhouse of 1000m² was erected in July 1993;
- the mixing & sowing machines arrived from Israel in Sept. 1993 and were installed;
- the germination chamber and preparation area were constructed;
- heater was installed and heat tubes to germination room in June 1994;
- heater enclosure was completed in July 1994;

Speedling Nursery continued

- the total production of speedlings since October 1993- March 1994 includes:

tomatoes	109,250	
melons	487,000	(130,000 were sold)
asparagus	30,000	
peaches	3,000	
cucumbers	41,800	
watermelons	14,000	
<u>squash</u>	<u>1,000</u>	
Total seedling production	686,050	
- from the initial pilot speedling production, evaluations were made of varietal responses, media mixes, and cultural practices;
- commercial production began in June 1994; orders for 2,000,000 transplants of melons, tomatoes, peppers and artichokes were realized;
- extension and outreach activities continued: visitors toured the site; informational brochures were developed and distributed to growers in Azemour and Agadir; fertigation guideline-handbook was distributed to growers in Azemour.
- screening, selection and training of the in-house manager.

Work Plan:

- continued technical training of nursery manager;
- continued marketing of speedlings and provision of follow-up assistance to clients; an annual production target is 2,000,000 transplants of year-round production; products for spring season will be identified;
- modification of cultural practices to improve quantity and quality of product, operational management and quality of personnel will be emphasized in order to realize self-sufficiency of the nursery production activities;
- informational bulletins will be expanded;
- market analysis of peppers will be made.

POT-PLANT NURSERY

Objective:

This activity will seek to utilize Morocco's comparative advantage of mild winter temperatures, high level of radiation, and low labor costs to (a) compete for markets in Europe and neighboring countries and (b) expand the local market.

Pot-Plant Nursery continued

The pot-plant nursery will generate two types of products: rooted seedlings and finished pot-plants. It will include both a mother plantation and a production unit. The mother plantation, based on the highest quality species available, will provide propagation material for the production unit. The production nursery will be divided into a rooting section and a pot-plant production section.

Linkages will be developed with leading European nurseries, and ornamental lines, mostly rooted seedlings, will be produced according to orders from these nurseries. Production for the local market will concentrate on a line of easy to produce plants, with high quality seedlings being made available to local pot-plant producers and finished pot-plants also being produced.

Experiments will include the effects of dwarfing agents, utilization of local materials for plant growth medium, nutrition, and optimization of light and temperature. The nursery will be used for on-the-job training of a large number of farmers in the art of pot-plant production. It will also assist Moroccan farmers who wish to start their own nurseries.

Progress to Date:

- The nursery greenhouse was erected in July 1993;
- tables were fabricated and retractable shade cloth was installed in November 1993;
- technical personnel are being trained - Ms. Fatima Agdid is receiving an additional 3 months of training in Israel in pot-plant propagation;
- 1000 peach plants were produced from seeds in February 1994;
- stock selection and procurement of the following has been made between October 1993 and September 1994:

Aglaonema maria		Ficus benjamina	(50)
Bougainvillea		Hybiscus	
Canna lily		Lantana montevidensis	
Chamedora	(937)	Maranta leuconeura	(87)
Croton	(395)	Melaleuca	
Cycus	(2)	Potus	
Dieffenbachia	(48)	Schefflera	(150)
Dracena	(492)	Syngonium	(43)
- total mother plant production through September 30, 1994: 2,204;
- 500 m² of greenhouse was erected for Mother plants of ornamentals. This greenhouse was provided to the project as a donation from MultiSerre Company by their manager, Mr. Juabri from Berchid;
- extension activities includes initial contacts with local nurseries(Sept. 1994); interested clients have toured the facilities; product samples were distributed to local nurseries;
- market analysis initiated in summer 1994 but is not complete.

Pot-Plant Nursery continued

Work Plan:

- complete the market analysis for ornamentals, cut flowers and rooted propagules; the production activities will focus on mother plants and rooted cutting propagules not finished plants;
- make follow-up contacts with local nurseries;
- continue to distribute product samples to local nurseries;
- tailor environment and management to improve quality and cost effectiveness;
- continued on-site training of Moroccan technician who received initial training in Israel;

MICRO-PROPAGATION (Tissue Culture) LABORATORY AND HARDENING NURSERY

Objective:

Commercial cultivars of bananas and carnations can be multiplied only by means of vegetative propagation. Because micro propagation provides a means of quickly propagation disease-free material, banana and carnation growers in Morocco are importing expensive micropropagules since such material is not produced in Morocco.

Micro propagation is also used in the pot-plant industry. The intention of this activity is to develop commercial micro propagation capability in Morocco that will produce micropropagules from a variety of foliage and other pot-plants. The importance of this technology to Morocco and its availability in Israel make this activity an excellent opportunity for cooperation.

Progress to Date:

- 1000 m² hardening nursery was erected in July 1993;
- plans for building the tissue culture laboratory are being deferred to February 1995 due to cost and longer term budget impact;
- two Moroccan trainees received seven months of training in Israel including tissue culture propagation beginning January 1994;
- propagules were ordered - ornamentals & pot-plants and raspberries; ordering of other propagules was deferred until 1995 (carnations, bananas and strawberries);
- hardening studies of raspberries began in July 1994;
- banana hardening activities were deferred by the technical committee;
- review of market demand was made.

Micro propagation Laboratory continued

Work Plan:

- secure bids for tissue culture laboratory by March 1995;
- place order for equipment by May 1995;
- delivery and construction in July 1995;
- construction complete by September 1995;
- order propagules in September 1995;
- refined production technology;
- continue on-site training of Moroccan technicians.

OPEN-FIELD PRODUCTION OF ORNAMENTALS

Objective:

This activity will focus on the production of hardy woody ornamentals since (a) out-of-doors production of ornamental is attractive to small farmers due to low investment requirements, and (b) this segment of the ornamental industry is little known in Morocco. Species to be tried will include melaleuca spp., eucalyptus spp., leptospermum spp., leucodendron spp., and wax flower.

Seedlings will be purchased in California and Israel. Trials on the 20-hectare site will be devised to produce optimal irrigation and fertilization regimes and post-harvest treatment.

Progress to Date:

- 5000 m² of Strelitzia was planted in October 1993;
- The following Melaleuca varieties were shipped from Ben-Gurion University and planted in one hectare of open-fields in February 1994:
Melaleuca nesofila 3,000 plants
Melaleuca hugeli 3,300 plants
Melaleuca sp 3,000 plants
- 500 square meters of shading was installed in November 1993;
- existing personnel are receiving in-house training;
- on-going evaluation of cultural practices.

Work Plan:

- develop successful weed control at field site;
- testing and product management of strelitzia and melaleuca will continue;
- chamaerops palm will be established in the field from mother plant stocks in the nursery;
- evaluate market potential of cut branches of melaleuca;

Open-field Ornamentals continued

- improve cultural practices - on-going;
- market analysis for cut flowers/ornamentals will be developed (Dec. 1994).

OPEN-FIELD and GREEN HOUSE PRODUCTION OF VEGETABLES

Objective:

This component will include experimentation, demonstration, and application of modern methodologies and technologies of open-field-crop production, addressing parameter of crop rotation, soil preparation, manuring and basic fertilization, seed-bed preparation, irrigation, herbicide application, planting, fertigation, insect and disease prevention and controls, pollination, harvest timing, and post-harvest treatment.

The activity will seek to introduce a range of species and cultivars of vegetables for the processing industry. The main crops to be tested, improved and disseminated are fresh salad tomatoes and also onions, cucumbers, and artichokes for the processing industry. Varietal trends for each group will be thoroughly assessed.

Progress to Date:

Open-field

- field prepared and drip lines installed - plastic mulch;
- training of existing personnel in on-going;
- identification of stocks/cultivars to exploit foreign & domestic markets was made and seeds were purchased;
- The following seedlings were sown, hardened and transplanted:

melons	.7 hectares	June 1994
tomatoes	.8 hectares	June 1994
	.3 hectares	Aug. 1994
artichokes	2 hectares	Oct. 1993
asparagus	1.7 hectares	Mar. 1994
raspberries	2.6 hectares	Feb. 1994
watermelon	.1 hectare	June 1994

Open-field and Geen House Vegetables continued

Commercial Green-house Vegetable Production

- the following stand was established:
melons 2.9 hectares Aug. 1994

Demonstration Activities

- low tillage system an fusarium control (Sept. 1994);
- new large-fruit tomatoes for open-field production (Sept. 1994);
- Israeli black plastic mulches for open-field establishment of tomatoes.

Work Plan:

- continue production of raspberries, artichokes, asparagus, melons (3 hectares) and tomatoes (1000 square meters only for demonstration);
- peppers will be grown in the field and speedling nursery;

TRAINING AND EXTENSION

Objective:

Training at the Azemour Project Site

All training at the project site will be carried out by a cadre of 10-15 Moroccan extension workers, drawing also on professionals from the Hassan II Institute of Agriculture and Veterinary Medicine and from the National Institute for Agricultural Research. Groups of farmers and farm technicians will be selected for extended on-the-job training at the project site in Azemour. Training will be provided on agronomic topics of general importance, and a training plan will be developed for each component. The Technical Committee will design the training, evaluate its effectiveness, and advise on equipment needs.

Short-term Project Site Courses of up to one week will be given on topics related to site activities. Examples are methods of plant propagation, maintenance of irrigation systems, fertilization, pest and disease control, farm management and marketing.

Extension Program

In addition to providing training as discussed above, the extension specialists will conduct an advisory service to farmers who cooperate with the project. They will be employed by the project and will work in various activities; their extension work will be in addition to their every-day job obligations.

Training and Extension continued

Extension will be carried out in at least three areas; plant protection, vegetables and ornamental production. The extension program will be devised by the Technical Committee.

Progress to Date:

- **weekly meetings** are held at the farm with technicians and the farm manager to review plans and provide in-depth discussion and direction;
- **training** of seven Moroccan technicians from selected agricultural institutes began at the project site in Azemour in November 1993 for a period of six months; they received instruction in irrigation, cropping methods and cultivation; five other trainees received in-depth training at the site in order to assume greater project responsibility;
- **demonstrations** are held on the farm; more than 100 farmers participated in demonstrations offered in December and January 1993-94; another demonstrations were given in June 1994; the following topics were presented:
 - plant protection low tillage system and fusarium control in melons, nematode resistance in tomatoes;
 - vegetable production new large-fruited tomatoes for open-field;
 - ornamental production Israeli black mulches for open-field;
- **visits** to the project site are made daily by local farmers and potential clients.
- **publications** and informational bulletins have been produced and distributed to local farmers; these materials include the Amaris speedling informational leaflet, the fertigation guidelines; and the project newsletter;
- **technical short courses topics** have been identified by the technical committee in June 1994; topics include: farm management, irrigation & chemigation systems, marketing strategies, pest and disease control, plant propagation, plasticulture technologies, post-harvest handling.

Work Plans:

- weekly meetings to continue;
- training to continue;
- demonstrations to continue;
- visits to continue;
- publications to continue;
- technical short courses will be developed; currently technical committee members are developing course content, timing, duration and participants;
- equipment needs for extension work will be evaluated; procurement will be made from revenue funds as recommended by the technical committee.

Training and Extension continued

Objective:

Training Abroad

The extension workers will initially be trained for three to four months in Israel, participating in classes, tours, and on-the-job training that focuses on extension methods. The project will also train the leading staff of the tissue culture laboratory in Israel and train project research in the United States and Israel as needed.

Progress to Date:

- **training in Israel** for two Moroccan engineers, Ms. Fatima Agdid and Mr. Zoubir Moulay Sadiq, began in January 1994. They received instruction at Ben Gurion University of the Negev for seven months. Ms. Agdid is worked at the tissue culture laboratory at Ben Gurion University of the Negev, under the supervision of Dr. David Mills. Mr. Zoubir was trained in several subjects including ornamental propagation, seedling nursery production and irrigation.
- Ms. Agdid received an additional three months of training (Aug.-Oct. 1994) as recommended by the technical committee in June, in order to receive additional instruction in pot-plant propagation.

Work Plan:

- **training in Israel** will continue; two trainees left in October for three months of training;
- Israel Division of International Relation of the Ministry of Agriculture will sponsor a two month short course on modern irrigation methods and techniques; the course will be offered in the spring of 1995, and up to twenty Moroccan will be selected to attend.

A Time Table for Implementation
Year three - Morocco October 1994 - September 1995

Activities	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Speedling Nursery												
Production Activities	_____											
Marketing and Follow-up	_____											
Market Study for Peppers					_____							
On-site Training of Manager	_____											
Pot-Plant Nursery												
Market Study						_____	_____					
Contact Local Nurseries	_____											
On-site Training of Manager	_____											
Production Activities	_____											
Micro-propagation Laboratory												
Bids						_____						
Order Equipment								_____				
Delivery and Construction										_____	_____	
Start-up												_____
Order Propagules												_____
Production												_____
Open-field: Ornamentals												
Weed Control	_____											
Testing: Melaleuca/Stelitzia	_____											
Chamaerops Palm Planting				_____	_____							
Market Study			_____									

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A Time Table for Implementation
Year three - Morocco October 1994 - September 1995

Activities	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Open-field & Green House												
Raspberries	_____											
Tomatoes	_____				_____						_____	
Artichokes & Asparagus	_____				_____						_____	
Melons	_____				_____						_____	
Peppers	_____				_____						_____	
Training & Extension												
Weekly Training on Farm	_____											
Training Moroccan Technicians					_____							
De monstration					_____							
Visitation by Local Farmers	_____				_____							
Develop Short Courses					_____							
Informational Publications	_____											
Two Trainees to Israel	_____											
Twenty Moroccans Attend Short Course in Israel												

PROGRESS REPORT, WORK PLANS & IMPLEMENTATION SCHEDULE for ISRAEL

Breeding of High Quality Tomatoes for Morocco

Objective:

The average yield of processing tomatoes in Morocco is 30 tons per hectare, while in Israel it is 80 tons per hectare. The studies on tomatoes to be carried out at the Moroccan site will be supplemented by the breeding of high quality tomato hybrids in Israel that are adapted to the environment of the Middle East.

Progress to Date:

- open-field and green house tomatoes were planted and tested in April, November and December 1993;
- selection of eight varieties of tomatoes was made in Israel from a total of 140 varieties;
- these eight varieties of tomatoes are being tested in Azemour;
- site visits to Morocco were made by two Israeli and one American Scientist in December 1993, January 1994 and September 1994. The scientists evaluated the on-going production activities and discussed the subsequent planting schedules;

Work Plans

- evaluations on varietal tests for adaptation to Moroccan conditions will continue, including disease resistance qualities and the agro-management practices;
- research efforts to breed hybrid tomatoes will continue.

Development of Verticordiaas an Ornamental Plant

Objective:

This genus has many species which produce attractive flowering branches and has good potential for becoming a novel product in the floral markets of Europe and North America. Studies will be conducted on the effects of environmental and seed treatment on germination; edaphic and other environmental effects on plum growth and yield;

Verticordia Study continued

formulation of appropriate agro-management procedures; post-harvest studies; and markets. (The verticordia species of ornamental plant has not yet been introduced in Europe. The branches are very good for decoration with good vase-life. The plants are wild and indigenous to Australia. However, it takes up to two years to germinated and therefore, it is a challenge to domesticate.)

Progress to Date:

- research and testing of species of ornamentals with flowering branches commenced - species: Verticordia and Melaleuca;
- Melaleuca seedlings (10,000) were shipped to Morocco for testing in January 1994;
- germination tests were made for eleven varieties of Verticordia in five medians and in three seasons (Winter 1992; Spring and Summer 1993); only one species germinated;
- October 1993, three varieties (500 seeds) were purchased; Nov. 2 and Dec. 12, 1993 the seeds were planted in three different media;
- Israeli scientist visited Australia in January 1994 to survey local varieties of Verticordia and collect new plant materials to be tested in Israel and Morocco and refine research plans; ten varieties were purchased and have been planted in five different media; all were propagated and are doing well;
- three species have been established at the Azemour site.

Work Plan:

- research and evaluation will continue based on the second year's accomplishments;
- new species will be introduced at the project site in Azemour;
- additional weed control efforts at the project site will be done.

Micro propagation of Ornamental Eucalyptus

Objective:

This work will be conducted at a tissue culture laboratory of the Ben Gurion University which will also be responsible for training Moroccan technicians in methods of micro propagation, and advising on the construction and operation of the laboratory in Morocco. Results of this research will be applicable to the open-field ornamental production activity in Morocco.

Ornamental Eucalyptus Study continued

Progress to Date:

- studies on the micro propagation of ornamental species of Eucalyptus and bananas commenced in Israel;
- tissue culture propagation was initiated in Israel
- delays occurred in the testing of nine selected varieties due to poor sprouting in the Spring of 1993;
- from 100 seeds of Eucalyptus calophila - ornamental species, approximately 60 shoot cultures were initiated and established;
- a selection of superior varieties of Eucalyptus was made;
- two Moroccan trainees went to Ben Gurion University Israel in January 1994 to receive seven months of intensive training in tissue culture propagation technology and agro-management practices.

Work Plans:

- testing in Israel will continue;
- varietal selection will continue; field tests in Azemour will continue;
- Moroccan trainees will continue on-site training tissue culture propagation in Azemour after their return from Israel.

Commercial Production of Truffles

Objective:

Truffles are well-known and highly appreciated commodity in Morocco, and in Israel there is an on-going research aimed at the "domestication " of desert truffles. Intensive production of truffles will potentially introduce a new field on intensive agriculture production for both Morocco and Israel. This activity will seek to identify Moroccan scientists who would be interested in cooperating with Israeli research in this area, and to expand direct ties between involved research institutions in both countries.

Progress to date:

- one Moroccan truffle was sent to Israel in April 1993 for testing; using this simple truffle, mycorrhization of local Negev annual Helianthemum edifolium was achieved under growth room conditions;
- Israeli scientist visited Morocco in March to collect additional truffles, seeds of Moroccan plant symbionts and soil samples for analyses; truffle sites were observed; contacts with Moroccan researchers were established;
- to date, eight fruiting bodies have been secured.

Truffle Study continued

Work Plans:

- tests will continue in Israel on the commercial production possibilities of the Moroccan truffle;
- additional tests will be made with other varieties of truffles.

Economic and Marketing Study

Objective:

This component will seek to demonstrate that satisfactory markets exist for the products being studied under the project. The Economic study will include and evaluation of the costs of the different products developed in the project, especially at the Project site in Azemour; yields and prices in the local and export markets; and returns to farmers for increasing the efficiency of the production will be developed.

The primary elements that will be considered in the marketing analysis are as follows: population projections of potential beneficiaries of the project; the numbers of beneficiaries that will be reached by the Project site activities; the income per farm unit among these beneficiaries; the long-term increase in income that can be projected as a result of project outreach; the internal rate of return on investment; the income generated from the three nurseries operated by the project (seedling, pot-plant and micro propagation); data on European Community import and consumption of project crops; and potential profitability of the project.

Progress to date:

- third draft of the study was completed and is being reviewed;

Work Plan:

- updates to the report will be provided as project activities expand;
- initial market survey information is being used to guide the project.

Physiological and Nutritional Studies of Onions

Objective:

Onions are a major crop in the countries of the semi-arid Middle East. Recently developed onion hybrids have increased the potential yield of onions and their dry matter production. This activity will contribute to realizing this potential in full by developing management procedures on the basis of a better understanding of plant physiology and nutritional requirements.

Progress to Date:

- experimental plots were planted in Morocco and Israel in January 1993;
- evaluation of the storage quality of onions began in Morocco;
- preliminary selection of best varieties made.

Work Plans:

To date, the work has been directed mostly for processing onions. However, the project is shifting priorities toward production of fresh market products in response to market demands. Therefore, the Technical committee recommended in June 1994, that this project be discontinued as of October 1994. In place of the onion research, an alternative study on Argon was proposed by the Technical Committee. After the Steering Committee reviews these recommendations, the proposal will be submitted to USAID for approval.

**A Time Table for Implementation
Year three - Israel October 1994 - September 1995**

Activities	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Breeding of High Quality Tomatoes for Morocco Research and Testing												
Development of Verticordiaas Reseach and Testing												
Micro propagation Eucalyptus Research and Testing Training in Azemour												
Commercial Truffle Production Reserach and Testing												
Economic & Marketing Study Review & Type 3rd Draft Distribution Report updates												
Argon Study Discussion by Steering Comm Approval by USAID Commence Research												

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CHANGES IN PERSONNEL

Project Secretary

Ms. Jan M. Hollensbe, half-time project secretary for the San Diego State University Foundation office ended her employment with the project on May 31, 1994. Ms. Sandra Keys was hired as a half-time project assistant on June 8 for a period until October 31, 1994.

MEETINGS AND COLLABORATIVE ACTIVITIES

The attached provides information on meetings, field trips and technical visits accomplished during this reporting period.

MEETINGS

Steering Committee and Related Meetings and Field Trips October 1993

Meeting

- Members of the Steering Committee and other participating individuals from the US, Morocco and Israel met in Morocco on October 26-27, 1993. The purpose of this trip was to attend the Steering Committee Meeting as well as to visit the project sites in Azemour.

Steering Committee Members present at the meetings were Mr. Driss Lahlou and Mr. Hassan Alami from Morocco; Dr. Samuel Pohoryles, Dr. Dov Pasternak and Mr. Itzhak Peretz from Israel; Mr. Harry Albers and Ms. Freya Sladek from the United States. Others in attendance were Mr. Itzhak Ayalon, Israeli Technical Advisor; Professor Lehaïm Naggan, Vice-President and Dean of Research and Development, Ben Gurion University of the Negev in Israel.; Dr. Bonnie Stewart, U.S. Project Director; Ms. Davene Gibson, Assistant General Manager, San Diego State University Foundation; and Ms. Stephanie Barnett, Director of Public and Community Relations, SDSUF.

Field Trips

Amaris Nurseries

Steering Committee members visited the farm on the morning of October 26. Mr. Lahlou and Mr. Ayalon provided a detailed review of project activities to date; they summarized the results of varietal tests performed and reviewed different agri-management practices employed.

Desert Summit Preparatory Meeting Delegates

Participants from ten countries in the Middle East region visited the project site in Azemour on October 28. Mr. Lahlou was very gracious to host the group. Mr. Ayalon provided information on project activities.

These delegates were in Casablanca during this time in order to participate in preparing for a Desert Summit, a planning conference for cooperative development of desert resources, sponsored by the Fred J. Hansen Institute for World Peace. They were impressed by the project accomplishments and appreciated Mr. Lahlou's hospitality.

Technical Committee and Related Meetings and Field Trips June 1994

Meeting

Members of the Technical Committee and other participating individuals from the US, Morocco and Israel met in Morocco on June 24-26, 1994. The purpose of this trip was to attend the Technical Committee Meeting as well as to visit the project sites in Azemour. Project accomplishments were evaluated and work plans prepared for the next year.

Technical Committee members present were:

Mr. Hammoutou El-Mekki, Dr. Mohamed Nadir and Mr. Allal Chibane from Morocco; Dr. Dov Pasternak, Dr. Ben Ami Bravdo, Dr. Yoseph Elkana, Dr. Irit Rylski and Mr. Eliezer Spiegel from Israel; and Dr. Richard Jones, Dr. Michael Reid and Dr. Leon Garoyan from the United States. Others attending were: Dr. Bonnie Stewart, U.S. Project Director; Mr. Itzhak Ayalon, Technical Director and Mr. Uri Drori, Engineer.

Field Trips

Amaris Nurseries

Technical Committee members visited the farm on the morning of June 24, 1994. Mr. Lahlou and Mr. Ayalon provided a detailed review of project activities to date; they summarized the results of varietal tests performed and reviewed different agri-management practices employed.

In addition to the Technical Committee member, many other participants visited Amaris Nurseries including:

Technical Committee members

Domaine Royaux

USAID, Rabat - Jeffrey Allen, Project Officer, Agriculture & Natural Resources

International Executives Service Corps - Amal Bouhmouch, Business Development Services

Institut National de la Recherche Agronomique (INRA), Rabat - Kamal Mohamed

Ministry of Agriculture, Rabat

Hassan II Institute, Agadir - Dr. Abderrahmane Hilali

Agribusiness Marketing Investment - Moroccan Agribusiness Promotion Project

USAID, Casablanca - Rodrigo Brenes, Agribusiness Specialist

Private farmers in the Azemour region

Visits to Farms South of Casablanca - June 25, 1994

**Société NAJD - banana production
Oulja de Chtouka area**

**KhamisMdouhha - grape production
Douhhah area**

**Gladiola and Melon production
Douhhah area**

**Apple, peach, nectarine and grape production
Sidi BiNour area**

TECHNICAL VISITS

Technical visits and meetings accomplished during this reporting period include the following:

- **Dr. Irit Rylski**, from the Volcani Institute and Technical Committee member, and **Mr. Moshe Bar**, from the Volcani Institute, traveled in December to provide consultation on tomato and vegetable production activities;
- **Mr. Hanaya Arakrat** and an associate from Shorashim Nurseries in Israel installed the mixing and sowing machines for the speedling nursery in December; this nursery has been best known for the promotion and commercialization of the speedling technology;
- **Dr. Richard Jones**, from the University of California, Davis, and Technical Committee member, visited Morocco in January 1994 to evaluate the vegetable production activities, and to provide consultation on raspberry and asparagus agri-management techniques.
- **Ms. Varda Tsur** from the Ben Gurion University of the Negev traveled to Morocco in March 1994, to collect additional varieties of Moroccan truffles as part of her research project on the development of commercial truffles;
- **Mr. Yosi Ben-Dov** of Ben Gurion University of the Negev traveled to Australia in February in order to collect 70 varieties of ornamental eucalyptus to be tested for their adaptability to Moroccan agriculture;
- **Mr. Itzhak Ayalon** traveled to Israel to assist the two Moroccan trainees in beginning their training at Ben Gurion University. He also secured bids for materials for the speedling nursery expansion and discussed project technical details with Israeli Project Coordinator and Technical Committee Chairman.
- **Mr. Karim Lahlou** traveled to Israel to attend an "International Course on Planning, Management and Enterprise." He also went to France to assess market opportunities for Amaris farm products. He met with CTS Pidoux, a distributor for fruits and vegetables;
- **Dr. Dov Pasternak**, Chairman of the Technical Committee, and **Mr. Uri Drori**, Israeli design engineer, visited the project site in April for review of technical progress and for consultation on the installation of the heating system for the speedling nursery;
- **Dr. Irit Rylski**, from the Volcani Institute and Technical Committee member, and **Dr. Richard Jones**, from the University of California, Davis and Technical Committee member, visited the project site in September 1994 for technical review and consultation on vegetable production activities.

TRAVEL COSTS

The attached summaries detail the costs, dates, names, origins and destinations for the project related travel that took place during this report period: October 1, 1993 - September 30, 1994.

Travel Costs: Dr. Richard Jones and Dr. Irene Rylski
September 1 - 9, 1994
Casablanca, Morocco

Purpose: Travel to Casablanca for technical review and consultation regarding project vegetable production activities

DATE	PARTICIPANT NAME	ORIGIN/DESTINATION	DESCRIPTION	EXPENSES
Aug. 30 - Sept. 5, 1994	Dr. Irene Rylski	San Diego/Casablanca/San Diego	Transportation (air/ground)	\$2,253.70
			Lodging	\$570.00
			Per Diem	\$420.00
			Miscellaneous (phone, supplies FAX, etc.)	\$230.00
			Total for Dr. Irene Rylska	\$3,473.70
Sept. 1 - 9, 1994	Dr. Richard Jones	Sacramento/Casablanca/Sacramento	Transportation (air/ground)	\$1,534.43
			Lodging	\$776.24
			Per Diem	\$633.00
			Total for Dr. Jones	\$2,943.67

Travel Costs: Technical Committee Members
June 23 - 27, 1994
Casablanca, Morocco

Purpose: Travel to Morocco for Technical Committee Meeting.

DATE	PARTICIPANT NAME	ORIGIN/DESTINATION	DESCRIPTION	EXPENSES
June 18 - July 2, 1994	Dr. Bonnie Stewart	San Diego/Casablanca/San Diego	Transportation (air/ground)	\$2,072.75
			Lodging	\$910.25
			Per Diem	\$824.31
			Total for Dr. Stewart	\$3,807.31
			June 22 - June 28, 1994	Dr. Dov Pasternak
Lodging	\$613.88			
Per Diem	\$450.97			
Miscellaneous (phone, supplies, FAX, etc.)	\$25.50			
Total for Dr. Pasternak	\$2,489.00			
June 26 - June 30, 1994	Dr. Michael Reid	Sacramento/Casablanca/Sacramento	Transportation (air/ground)	\$1,420.00
			Lodging	197.32
			Per Diem	\$258.00
			Total for Dr. Reid	\$1,875.32
June 24 - 26, 1994	Mr. Allal Chibane		Transportation (air/ground)	\$0.00
			Lodging	\$204.00
			Per Diem	\$173.00
			Total for Mr. Chibane	\$377.00
June 24 - 26, 1994	Mr. Hammouton El-Mekki		Transportation (air/ground)	\$0.00
			Lodging	\$204.00
			Per Diem	\$173.00
			Total for Mr. El-Mekki	\$377.00

Travel Costs: Technical Committee Members
June 23 - 27, 1994
Rabat, Casablanca, Morocco

Purpose: Travel to Morocco for Technical Committee Meeting.

DATE	PARTICIPANT NAME	ORIGIN/DESTINATION	DESCRIPTION	EXPENSES
June 22 - 28, 1994	Mr. Eliezer Spiegel		Transportation (air/ground)	\$1,264.57
			Lodging	\$613.88
			Per Diem	\$434.97
			Miscellaneous (phone, supplies, FAX, etc.)	\$125.34
			Total for Mr. Spiegel	\$2,538.76
June 22 - 27, 1994	Mr. Uri Drori		Transportation (air/ground)	\$1,315.10
			Lodging	\$613.88
			Per Diem	\$434.97
			Miscellaneous (phone, supplies, FAX, etc.)	\$107.33
			Total Mr. Drori for	\$2,471.28
June 20 - 28, 1994	Dr. Richard Jones		Transportation (air/ground)	\$1,887.91
			Lodging	\$713.32
			Per Diem	\$466.92
			Total for Dr. Jones	\$3,068.15
June 24 - 27, 1994	Dr. Mohamed Nadir		Transportation (air/ground)	\$16.00
			Lodging	\$0.00
			Per Diem	\$211.00
			Total for Dr. Nadir	\$227.00
June 22 - 27, 1994	Dr. Ben Ami Bravdo		Transportation (air/ground)	\$1,292.15
			Lodging	\$516.00
			Per Diem	\$340.82
			Miscellaneous (phone, supplies, FAX, etc.)	\$233.52
			Total for Dr. Bravdo	\$2,382.49
June 19 - 28, 1994	Dr. Irit (Irene) Rylski		Transportation (air/ground)	\$1,365.43
			Lodging	\$613.88
			Per Diem	\$434.97
			Miscellaneous (phone, supplies, FAX, etc.)	\$129.83
			Total for Dr. Rylski	\$2,541.11
June 22 - 28, 1994	Dr. Yoseph El-Kana		Transportation (air/ground)	\$1,405.09
			Lodging	\$613.88
			Per Diem	\$434.97
			Miscellaneous (phone, supplies, FAX, etc.)	\$125.33
			Total for Dr. El-Kana	\$2,579.27
June 22-28, 1994	Meeting expenses		Total for Meeting Expenses	\$947.55
TOTAL EXPENSES FOR JUNE 1994 TECHNICAL COMMITTEE MEETING				\$25,681.24

Travel Costs: Dr. Bonnie Stewart
April - May 1994
Casablanca, Morocco

Purpose: Project Review Meeting with representatives in Morocco for the Cooperative Agreement Research Programs.

DATE	PARTICIPANT NAME	ORIGIN/DESTINATION	DESCRIPTION	EXPENSES
Apr. 22 - May 1, 1994	Dr. Bonnie Stewart	San Diego/Casablanca/San Diego	Transportation (air/ground)	\$2,532.93
			Lodging	\$546.50
			Per Diem	\$472.97
			Miscellaneous (phone, supplies FAX)	\$58.23
			Total Expenses for Dr. Stewart	\$3,610.63

Travel Costs: Dov Pasternak
April 1994
Casablanca, Morocco

Purpose: Travel to Casablanca, Morocco for Project Review Meeting of the Cooperative Agreement Research Programs.

DATE	PARTICIPANT NAME	ORIGIN/DESTINATION	DESCRIPTION	EXPENSES
April 24 - 27, 1994	Dr. Dov Pasternak	Israel/Casablanca/Israel	Transportation (air/ground)	\$1,052.54
			Lodging	\$305.68
			Per Diem	\$185.80
			Federal Express	\$8.50
			Total Expenses for Dov Pasternak	\$1,552.52

Travel Costs for Dr. Varda Kagan Zur
February-March-April 1994
Casablanca and other locations in Morocco

Purpose: To collect truffle samples for research pertaining to Cooperative Agreement Programs.

DATE	PARTICIPANT NAME	ORIGIN/DESTINATION	DESCRIPTION	EXPENSES
Feb., Mar., April, 1994	Dr. Varda Kagan-Zur	Israel/Morocco/Israel	Transportation (air/ground)	\$1,896.78
			Lodging	\$638.94
			Per Diem	\$849.31
			Miscellaneous (phone, supplies FAX)	\$415.32
			Total Expenses for Dr. Kagan-Zur	\$3,808.85

TRAVEL COSTS**January 1994, Dr. Yossi Ben-Dov****Tel-Aviv//Melbourne, Australia/Tel-Aviv**

PURPOSE: Travel to Australia to collect 70 species of *Verticordia* to be used in a research study as part of the Morocco project scope of work.

DATE	PARTICIPANT NAME	ORIGIN/DESTINATION	DESCRIPTION	EXPENSES
Jan. 16-Feb 17	Dr. Yossi Ben-Dov	Tel-Aviv/Melbourne/Tel Avi	Transportation (Air/Ground)	\$2,312
			Lodging	\$1,441
			Per Diem	\$2,144
			Misc. (airport tax, money change)	\$211
			Total Expenses for Mr. Ben-Dov	\$6,108

TRAVEL COSTS**August 1994, Dr. Bonnie Stewart****San Diego/Casablanca/san Diego**

PURPOSE: Travel to Casablanca for project evaluation and review.

DATE	PARTICIPANT NAME	ORIGIN/DESTINATION	DESCRIPTION	EXPENSES
Aug 1-7, 1994	Dr. Bonnie Stewart	San Diego/Casablanca/SanD	Transportation (Air/Ground)	\$1,474
			Lodging	\$498
			Per Diem	\$394
			Misc. (airport tax, money change)	\$36
			Total Expenses for Dr. Stewart	\$2,402

TRAVEL COSTS

January 1994, Mr. Karim Lahlou

Casablanca/Paris/Casablanca

PURPOSE: Travel to Israel to attend conference, "Planning, Management and Extension of Agricultural Projects and Enterprises." Travel to France to meet with distributors for fruits and vegetables and to establish market linkages for Amaris Nursery products.

DATE	PARTICIPANT NAME	ORIGIN/DESTINATION	DESCRIPTION	EXPENSES
Dec 2-9, 93	Mr. Karim Lahlou	Casablanca/Paris/Casablanca	Transportation (Air/Ground)	\$526
			Lodging/Per diem	\$2,097

Total Expenses for Mr. Lahlou for Technical Travel December 1993 **\$2,623**

Jan 5-Feb. 28 1994	Mr. Karim Lahlou	Casablanca/Tel Aviv/Casabla	Transportation (Air/Ground)	\$894
			Lodging/Per diem	\$2,100

Total Expenses for Mr. Lahlou for Technical Travel January 1994 **\$2,994**

TRAVEL COSTS

December 1993, Dr. Irit Rylski and Mr. Moshe Bar

Tel-Aviv//Casablanca/Tel-Aviv

PURPOSE: Travel to project site in Azemour to provide consultation in vegetable crop production and marketing. Moroccan Trainees in relation to the Morocco Project.

DATE	PARTICIPANT NAME	ORIGIN/DESTINATION	DESCRIPTION	EXPENSES
Dec. 3-12	Dr. Irit Rylski	Tel-Aviv/Casablanca/Tel Av	Transportation (Air/Ground)	\$1,190
			Lodging	\$455
			Per Diem	\$573
			Miscellaneous (phone, wire fee)	\$28

Total Expenses for Dr. Rylski for Technical Visitation December 1993 **\$2,247**

Dec. 3-12	Mr. Moshe Bar	Tel-Aviv/Casablanca/Tel Av	Transportation (Air/Ground)	\$1,169
			Lodging	\$422
			Per Diem	\$573
			Miscellaneous (phone, wire fee)	\$1

Total Expenses for Mr. Bar for Technical Visitation December 1993 **\$2,164**

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TRAVEL COSTS

December 1993: Mr. Hananaya Avakrat
Casablanca Morocco

PURPOSE: Assist in assembling the sowing and mixing machines.

DATE	PARTICIPANT NAME	ORIGIN/DESTINATION	DESCRIPTION	EXPENSES
Dec. 12-20, '93	Mr. H. Arakrat	Tel Aviv//Casablanca/Tel Av	Transportation (Air/Ground)	\$633
			Hotel/Lodging	\$717
			Per Diem	\$294
			Miscellaneous (fed express,phone)	\$12
			<i>Total Mr. Arakrat</i>	\$1,656
Total Expenses for Visit December 1993				\$1,656

TRAVEL COSTS

December/January 1994 & March 1994, Itzhak Ayalon
Tel-Aviv/ London/Casablanca

PURPOSE: Travel between Casablanca/Tel Aviv/Casablanca for Marketing Research, Order Equipment and assist Moroccan Trainees in relation to the Morocco Project. Meet with Israeli Project Coordinator and Tech Com Chairman.

DATE	PARTICIPANT NAME	ORIGIN/DESTINATION	DESCRIPTION	EXPENSES
Dec 31-Jan 10 1993-1994	Mr. Itzhak Ayalon	Casablanca/Tel Aviv/Casabl	Transportation (Air/Ground)	\$2,403-
Total Expenses for Technical Visitation Dec to January 1994				\$2,403
March 19-28 1994	Mr. Itzhak Ayalon	Casablanca/Tel Aviv/Casabl	Transportation (Air/Ground)	\$1,517
Total Expenses for Technical Visitation March 1994				\$1,517

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TRAVEL COSTS

Morocco Steering Committee

October 1993 - Casablanca Morocco

PURPOSE: Moroccan, Israeli and U.S. Participants attended the Oct 25-30, 1993 Steering Committee Meeting in Casablanca. The project site in Azemour was visited by the participants on Oct. 26, 1993.

DATE	PARTICIPANT NAME	ORIGIN/DESTINATION	DESCRIPTION	EXPENSES
<u>U.S. PARTICIPANTS</u>				
10/22 - 10/30	Dr. Bonnie Stewart	San Diego/Casablanca/San Die	Transportation (Air/Ground)	\$1,555
			Hotel/Lodging	\$573
			Per Diem	\$380
			<i>Total Dr. Stewart</i>	\$2,508
10/24 - 10/29	Mr. Harry Albers	San Diego/Casablanca/San Die	Transportation (Air/Ground)	\$1,656
			Hotel/Lodging	\$472
			Per Diem	\$264
			<i>Total Mr. Albers</i>	\$2,392
10/24 - 10/29	Ms. Frea Sladek	San Diego/Casablanca/San Die	Transportation (Air/Ground)	\$1,701
			Hotel/Lodging	\$198
			Per Diem	\$264
			<i>Total Ms. Sladek</i>	\$2,163
<u>ISRAELI PARTICIPANTS</u>				
10/22 - 10/30	Dr. Dov Pasternak		Transportation (Air/Ground)	\$1,080
			Hotel/Lodging	\$485
			Per Diem	\$509
			<i>Total Dr. Pasternak</i>	\$2,074
10/24 - 10/30	Mr. Itzhak Peretz		Transportation (Air/Ground)	\$1,505
			Hotel/Lodging	\$382
			Per Diem	\$289
			<i>Total Mr. Peretz</i>	\$2,176
10/23 - 10/31	Dr. Sam Pohoryles		Transportation (Air/Ground)	\$1,243
			Hotel/Lodging	\$573
			Per Diem	\$452
			<i>Total Dr. Pohoryles</i>	\$2,268
10/25 - 10/31	Dr. Lechaim Naggan		Transportation (Air/Ground)	\$1,279
			Hotel/Lodging	\$377
			Per Diem	\$330
			<i>Total Dr. Naggan</i>	\$1,986

TRAVEL COSTS

Morocco Steering Committee

October 1993 - Casablanca Morocco

PURPOSE: Moroccan, Israeli and U.S. Participants attended the Oct 25-30, 1993 Steering Committee Meeting in Casablanca. The project site in Azemour was visited by the participants on Oct. 26, 1993.

DATE	PARTICIPANT NAME	ORIGIN/DESTINATION	DESCRIPTION	EXPENSES
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MISCELLANEOUS BUSINESS EXPENSE

10/24 - 10/31	SC Members		Misc. Meeting/Trip Expenses (Film, film developing, telephone, and Meeting Room/Luncheon)	\$1,315
			<i>Total Miscellaneous Expenses</i>	\$1,315

TOTAL EXPENSES FOR OCTOBER 1993 STEERING COMMITTEE MEETING **\$16,881**

TRAVEL COSTS

January 1994 Dr. Richard Jones

Casablanca Morocco

PURPOSE: Travel to Project Site in Azemour for technical consultation for vegetables, to provide Raspberry Plants and asparagus seeds, and to assist in planting.

DATE	PARTICIPANT NAME	ORIGIN/DESTINATION	DESCRIPTION	EXPENSES
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Jan 28-Feb 4	Dr. Richard Jones	Sacramento/Casablanca	Transportation (Air/Ground)	\$1,468
			Hotel/Lodging	\$359
			Per Diem	\$447
			Miscellaneous Business Expenses (Telephone Charges)	\$1
			<i>Total Dr. Jones</i>	\$2,275

Total Expenses for Visitation January/February 1994 **\$2,275**

PROCUREMENT

Attached is an updated list of equipment, materials and supplies procured for the project.

EQUIPMENT FOR AZEMOUR

Maghreb Agriculture					
List of Materials and Supplies Actual vs. Planning			Actual	Actual	
July 1, 1992 - September 30, 1994			Purchased	Purchased	Source
	Approved		First Year	Second Year	Origin
1	Infrastructure & Machinery				
	a. Meteorological Station	\$20,000		\$6,587	USA
	b. Electrical Generator	\$18,000			
	c. 110 HP Tractor	\$25,000	\$28,351		M/USA
	d. 60 HP Tractor	\$15,000			
	e. Subsoiler	\$3,000	\$3,230		M
	f. Rotovator	\$5,000	\$1,170		M
	g. Disk Harow	\$2,000	\$2,107		M
	h. Riverside Triple Head Plough	\$7,000			
	i. Boom Sprayer 500 liter stainless	\$4,000	\$3,564		M
	j. Fertilizer Spreader	\$1,000			
	k. Fogger			\$5,500	M
	l. Organic Spreader	\$4,000			
*	m. Water Development (not in original approved List)		\$1,752	\$27,713	M
	Sub Total	\$104,000	\$40,174	\$39,800	
2	2000 m2 "Speedling Nursery"				
	a. 2000m2 Steel Structure (3000m2)	\$15,000	\$20,470	\$31,000	ISR
	b. Plastic Cover IR AF	\$12,000			
	c. Concrete Paths & Works	\$10,000		\$6,152	M
	d. Benches & Trays	\$68,000	\$22,422	\$38,952	ISR
	e. Heating system	\$25,000	\$16,050		ISR
	f. Cooling & Ventilation	\$22,000		\$3,100	ISR
	g. Irrigation & Fertilization	\$25,000	\$10,000	\$12,432	ISR
	h. Electrical Works	\$8,000		\$9,549	M
	i. Preparation Area & Germination Roo	\$10,000		\$64,752	M
	j. Automatic Seeding System	\$14,000	\$17,550	\$9,320	ISR
	k. General Supplies			\$4,718	M
	Sub Total	\$209,000	\$86,492	\$179,975	
3	10,000 m2 Open Field				
	a. Initial Field Treatment, Drains, Pipe	\$20,000		\$43,326	M
	b. Drip Irrigation System	\$120,000	\$38,187	\$31,944	M/ISR
	c. Automation & Main Head	\$25,000			
	Sub Total	\$165,000	\$38,187	\$75,270	
4	1,000 m2 Pot Plant Nursery				
	a. Galvanized Steel Structure	\$8,000	\$18,920		ISR
	b. Cover	\$10,000			
	c. Benches & Trays	\$50,000	\$11,658		ISR
	d. Concrete Path & Works	\$10,000			
	e. Root Heating System	\$14,000	\$2,100		ISR
	f. Space Heating System	\$10,000			
	g. Cooling System	\$15,000			
	h. Thermal Screen	\$8,000		\$372	M
	i. Irrigation & Fertilization	\$10,000	\$7,000		ISR
	Sub Total	\$135,000	\$39,678	\$372	
5	Micropropagation Laboratory				
	a. Construction	\$160,000			
	b. Air Conditioning & Positive Pressure	\$65,000			
	c. Light, Electricity, Gas and Vacuum	\$20,000			
	d. Internal Furniture	\$20,000			
	e. Equipment including five hoods, aut	\$35,000			
	f. Hardening nursery (included in construction budget)		\$18,920		ISR
	Sub Total	\$300,000	\$18,920	\$0	

PUBLICATIONS

Attached are the following: a list of publications submitted to USAID, the spring and the fall project newsletters, a copy of the first news bulletin that is being distributed to farmers in Morocco and a copy of a promotional brochure for seedling nursery products.

PUBLICATIONS SUBMITTED TO USAID

The following Technical Reports have been submitted to USAID, as requested by the Moroccan Cooperative Agricultural Development Project grant.

<i>Technical Reports Required by Grant</i>	<i>Date Submitted</i>
• Quarterly Technical Progress Report	
October 1, 1992 - December 31, 1992	January 10, 1993
April 1, 1993 - June 30, 1993	July 10, 1993
October 1, 1993 - December 31, 1993	January 3, 1994
April 1, 1994 - June 30, 1994	July 10, 1994
• Semi-Annual Technical Progress Report	
July 1, 1992 - September 30, 1992	October 10, 1992
October 1, 1992 - March 31, 1993	April 10, 1993
October 1, 1993 - March 31, 1994	April 10, 1994
• Annual Technical Report	
July 1, 1992 - September 30, 1992	October 10, 1992
October 1, 1992 - September 30, 1993	October 10, 1993
October 1, 1993 - September 30, 1994	November 10, 1994
• Semi-Annual and Annual Technical Report	
November 1992 Update	November 30, 1992

Financial Reports Required by Grant

• Quarterly Financial Report	
July 1, 1992 - September 30, 1992	October 10, 1992
October 1, 1992 - December 31, 1992	January 10, 1993
January 1, 1993 - March 31, 1993	April 10, 1993
April 1, 1993 - June 30, 1993	July 10, 1993
July 1, 1993 - September 30, 1993	October 10, 1993
October 1, 1993 - December 31, 1993	January 10, 1994
January 1, 1994 - March 31, 1994	April 10, 1994
April 1, 1994 - June 30, 1994	July 10, 1994
July 1, 1994 - September 30, 1994	October 10, 1994
• Projection of Funding Requirements Report	
Fiscal Year July 1, 1993 - September 30, 1994	
Fiscal Year October 1, 1994 - March 31, 1995	

The "Morocco Report" Newsletters

Spring and Fall 1993

Spring and Fall 1994

(copies attached)



AMARIS Nurseries

America - Morocco - Israel

Morocco Project Newsletter

Fall 1994

Technical Experts Meet in Morocco

Casablanca

Experts from Israel, Morocco and the United States met in Casablanca on June 23-26, 1994, for the annual Technical Committee meeting and site visits. Project accomplishments were reviewed and follow-up recommendations made.

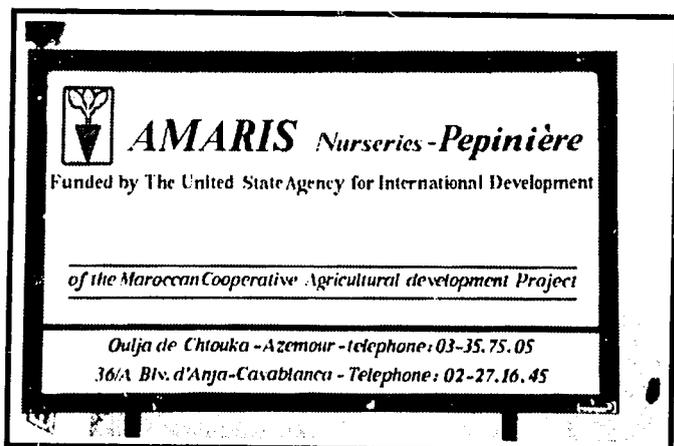
Noted were the many impressive achievements at the project site in Azemour. It was evident to all the participants that the investments in infrastructure, personnel training and production-related research are beginning to pay dividends.

Given constraints of time and money, the committee identified priority activities to be pursued in the coming months. All

(Continued on Page 2)



Technical Committee members meet in Casablanca, June 26, 1994. Left to Right: Mr. Uri Drori, Israeli Design Engineer and advisor to the Technical Committee; Dr. Leon Garoyan, U.S. Marketing Specialist; Dr. Ben Ami Bravdo, Israeli Fruit Tree Specialist; Dr. Richard Jones, U.S. Vegetable Specialist; Mr. Eliezer Spiegel, Israeli Ornamental Specialist; Dr. Michael Reid, U.S. Ornamental and Extension Specialist; Dr. Irit Rylski, Israeli Vegetable Specialist; Mr. Allal Chibane, Moroccan Vegetable Specialist; Dr. Mohamed Nadir, Moroccan Extension Specialist; Mr. Driss Lahlou, Moroccan Project Coordinator; Dr. Bonnie Stewart, U.S. Project Director; Dr. Dov Pasternak, Chair of the Technical Committee; Mr. Hammoutou El-Mekki, Moroccan Ornamental Specialist; Mr. Itzhak Ayalon, Israeli Technical Director; Dr. Yoseph Elkana, Israeli Extension Specialist.



The AMARIS Nursery sign at the entrance to the project site in Azemour, Morocco. The name Amaris stands for America, Morocco (Maroc in French) and Israel, the three cooperating partners in the project.

The Moroccan Cooperative Agricultural Development Project is being accomplished by participants from the Kingdom of Morocco, the State of Israel and the United States of America.

The goal of the Morocco Project is to promote world peace through cooperation in agriculture. Specific objectives are to contribute to the development of Morocco's agricultural sector by the introduction of new technology, training and demonstration.

The Moroccan Cooperative Agricultural Development Project
Funded by the Agency for International Development/Bureau for the Near East
Administered by San Diego State University Foundation, SD, California 92182

Technical Experts continued

recommended courses of action capitalized on the previous successes and were felt to have the highest probability of realizing the overall project objectives. Two major activities were targeted: production and extension.

Expanded production requires a thorough marketing and sales assessment of targeted crops and potential markets. Local and export markets will need to be studied. Demonstration and extension of new production technologies will provide local farmers with new tools to help them improve and expand their farming businesses. Research results obtained to date will be used to further expand demonstration activities.

Technical Experts & Local Visitors Tour Amaris

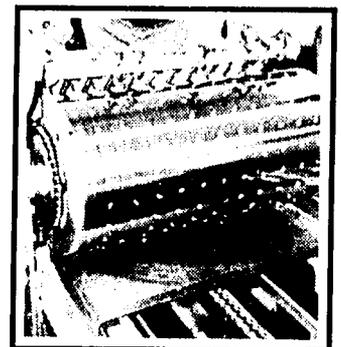
Joining the Technical Committee members for a tour of the project site, recently named Amaris Nurseries, were local farmers and representatives from private, governmental and international agencies. Organizations present included Domaine Royaux, Intitut National de la Recherche Agronomique, Ministry of Agriculture, Hassan II Institute, United States Agency for International Development, Moroccan Agribusiness Promotion Project and the International Executives Service Corps. The visit was made on June 24, 1994.

Mr. Itzhak Ayalon, Israeli Technical Director, gave an informative tour of the entire project site. The speedling nursery production facilities were impressive. The facility was expanded recently to 3,000 square meters in size. Mr. Ayalon demonstrated how the mixing and sowing machines were used in the speedling production process.

Next, the pot-plant nursery was visited. The main activity of the pot-plant nursery is the production of mother plants and rooted cutting propagules. It is expected that the propagules will be sold to Moroccan nurseries once production activities are expanded. Currently, samples of many finished pot-plants are on display and are being used for demonstration purposes to prospective clients visiting Amaris.

The visitors then toured the open-fields and greenhouses. Forty varieties of tomatoes had been planted in order to test their adaptability to Moroccan conditions as well as their resistance to salinity and drought. Varietal testing of artichokes and asparagus was observed. Of particular interest to participants were the eleven varieties of raspberries being tested for their adaptability to Moroccan growing conditions.

After the tour of the farm, the visitors met under a traditional tent for refreshments and informal conversation. Everyone expressed interest and appreciation to the project personnel for their hard work and the accomplishments achieved to date.



Views of the mixing and sowing machines used for preparing the trays of speedlings. Top: Mr. Itzhak Ayalon, Israeli Technical Director, explains to Technical Committee members and other visitors, how the machines operate. Bottom left: view of a speedling tray being filled with soil by the the mixing machine. Bottom right: a close-up view of the drum sowing the speedling trays with melon seeds.



Dr. Richard Jones from the University of California, Davis and Technical Committee member, shows raspberries produced by Amaris Nursery. Raspberries are being tested at the project site to evaluate their adaptability to Moroccan conditions.

Amaris Production Update ...

Nursery Activities

Speedling Nursery: commercial production began in June 1994, accompanied by demonstration and extension training. The nursery was expanded from 1000 to 3000 square meters in May 1994. Additional effort is being devoted to the demonstration of this technology to Moroccan farmers, distributing samples of speedling plants and promoting future speedling sales.

In fact, current demand for speedling transplants greatly exceeds operational capacities. Growers have voiced complete satisfaction with the quality of the transplants and the number of growers placing repeat orders is dramatically expanding.

Pot-Plant Nursery: 1000 cuttings of Ficus Benjamina were propagated in May 1994. An additional 4,000 plants have been propagated including the following varieties: Ficus Goldenking, Scheffera, Croton goldstar, Croton Red and Maranta. In February 1994, 1000 peach plants were produced from seeds.

Open-field and Green House Production

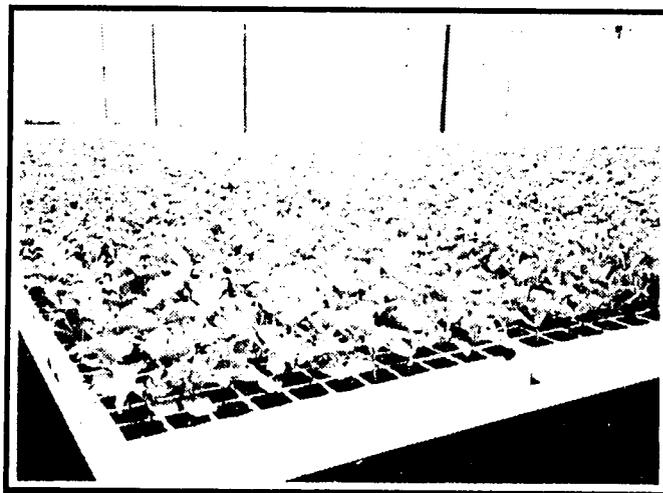
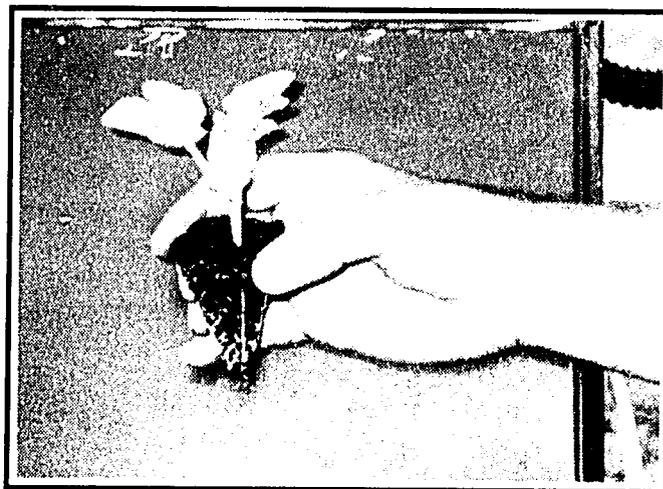
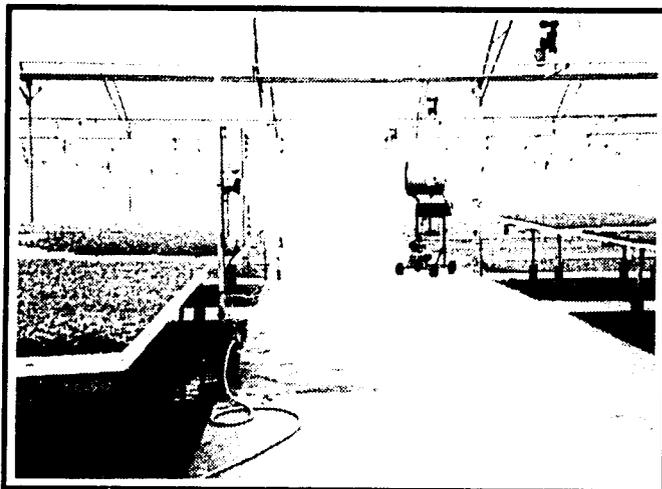
Melaleuca was planted on one hectare in February and one-half hectare of Strelitzia was planted in November in open fields. Other crops produced in the open-field included asparagus, artichokes, raspberries, tomatoes melons and peppers. Melons, cucumbers and tomatoes also were grown in green houses. Products were sold in the local and export markets.

Speedling Technology Promoted in Agadir

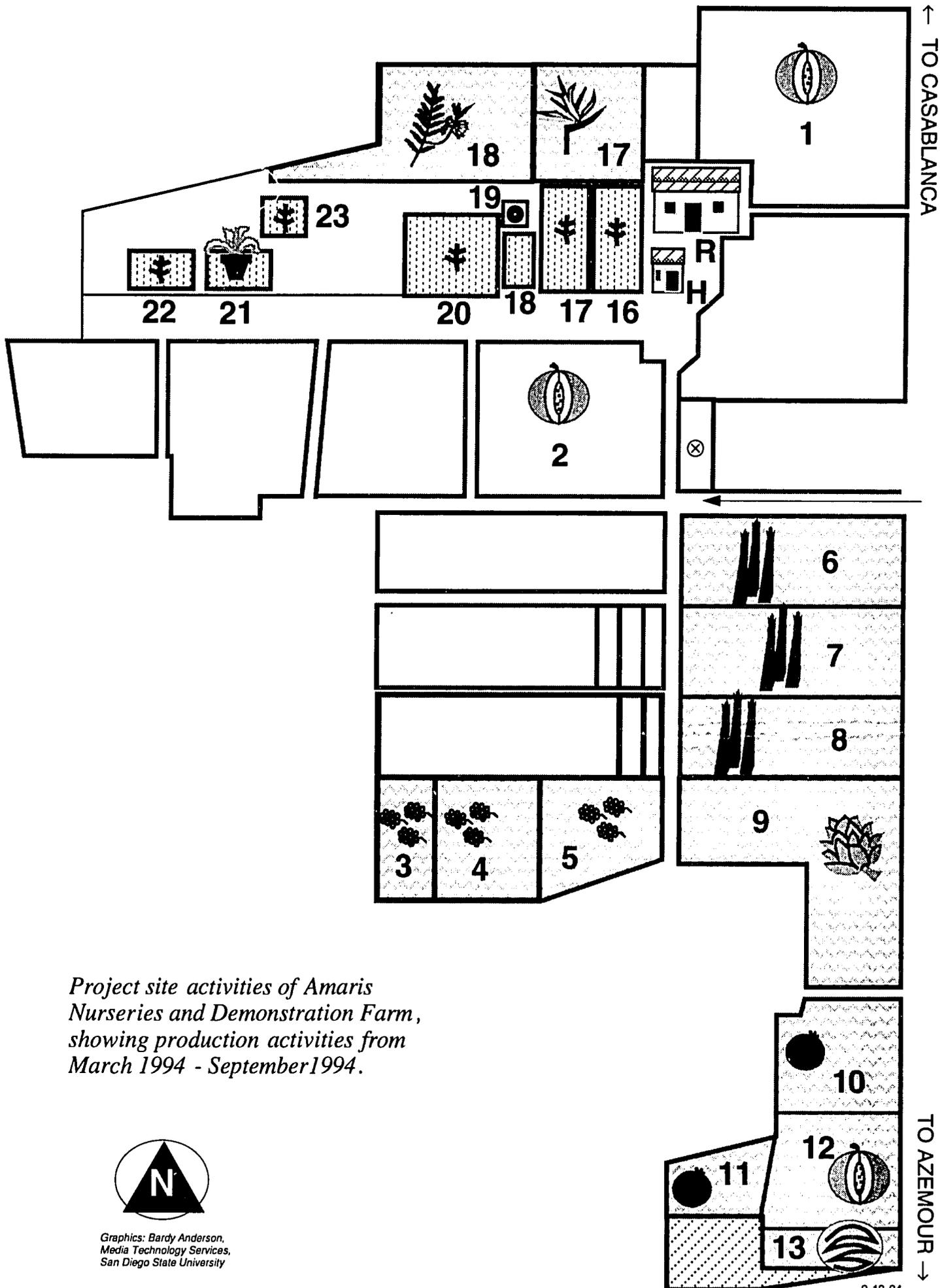
Following a recommendation of the Steering Committee to expand awareness of the project, Mr. Itzhak Ayalon, Israeli Technical Director, initiated a promotion campaign in Agadir on June 2, 1994, demonstrating speedling nursery products. Mr. Ayalon met with about 200 farmers. He distributed samples of speedling plants as well as 300 brochures that described the advantages of planting speedlings over the direct sowing of seeds. The farmers showed great interest in this technology, reflected in part by their buying speedlings from Amaris Nurseries.

Steering Committee Meeting

The Steering Committee is scheduled to meet on October 11, 1994, in Casablanca. The Steering Committee members will review project activities accomplished to date. The Committee will also evaluate the work plans prepared by the Technical Committee in June 1994. Site visits will be made to the project site in Azemour and also to various agricultural sites in Morocco.



Views of the Speedling Nursery at the project site in Azemour. Top: interior view of the expanded nursery. Middle: close-up of a single melon speedling. Bottom: a table of melon speedlings.

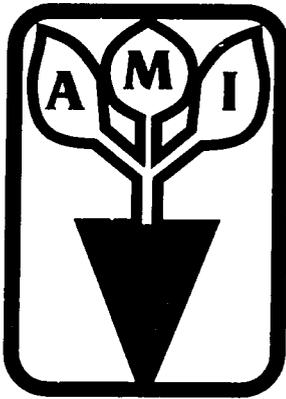


Project site activities of Amaris Nurseries and Demonstration Farm, showing production activities from March 1994 - September 1994.



Graphics: Bardy Anderson,
Media Technology Services,
San Diego State University

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AMARIS Nurseries—Pépinière

Funded by The United States Agency for International Development

of the Moroccan Cooperative Agricultural Development Project

Oulja de Chtouka - Azemour - telephone: 03-35.75.05

36/A Blv. d'Anfa-Casablanca - telephone: 02-27.16.45

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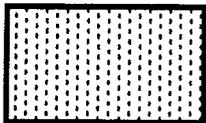
GREEN HOUSES

- 1 Melons • 1.8 hectares planted 8-28-94
- 2 Melons • 1.1 hectares planted 8-28-94



OPEN FIELD PRODUCTION

- 3 Raspberries • .4 hectares planted 7-1-94
- 4 Raspberries • .1.7 hectares planted 1-30-94
- 5 Raspberries • .5 hectares planted 7-1-94
- 6 Asparagus • .7 hectares planted 4-2-94
- 7 Asparagus • .5 hectares planted 3-28-94
- 8 Asparagus • .5 hectares planted 3-28-94
- 9 Artichokes • 2 hectares planted 10-16-93
- 10 Tomatoes • .8 hectares planted 6-9-94
- 11 Tomatoes • .3 hectares planted 8-24-94
- 12 Melons • .7 hectares planted 7-15-94
- 13 Watermelons • .1 hectares planted 6-15-94
- 14 Strelitzia • .5 hectares planted 11-10-93
- 15 Melaleuca • 1 hectare planted 2-15-94



NURSERIES & BUILDINGS

- 16 Speedling overflow - transplant hardening (tomatoes/melons) • .2 hectares
- 17 Speedling overflow - transplant hardening • .15 hectares
- Artichoke propagation • .05 hectares
- 18 Office, Storage, Preparation Area for Speedling Nursery
- 19 Boiler (heating) and enclosure - completed 7-15-94
- 20 Speedling Nursery 3000 square meters - completed 6-12-94
- 21 Potted-Plant Nursery
- 22 Nursery for speedling overflow
- 23 Hardening/propagation nursery — speedlings

- H House for Resident Technician
- R Residence

⊗ Irrigation Pump



MELONS



ARTICHOKES



TOMATOES



ASPARAGUS



WATERMELON



POTTED PLANTS



SPEEDLINGS



STRELITZIA



MELALEUCA



RASPBERRIES



The Technical Committee and other visitors met in a tent for discussions after touring the project site, June 24, 1994.

Demonstration and Outreach

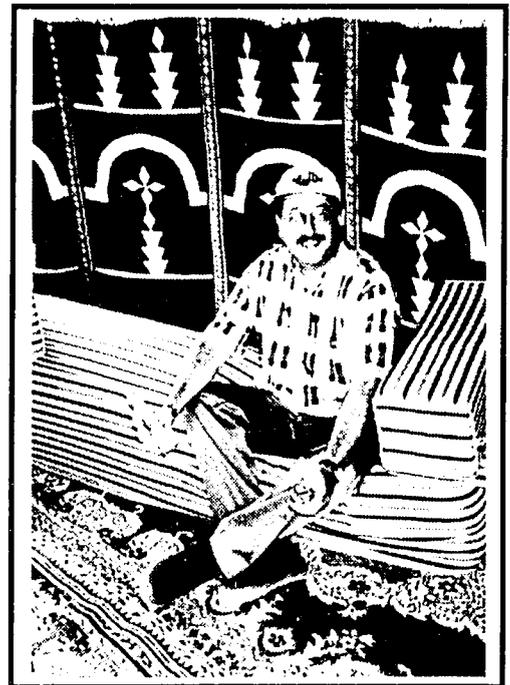
Bringing New Technologies into the Field

Part of the project's development program concentrates on speeding technologies. AMARIS has advanced the technologies to practical implementation. Under the direction of Mr. Itzhak Ayalon the new technologies have been refined to insure that they become practice in the field. A key element has been outreach efforts. Mr. Ayalon has focused upon strengthening communication with local farmers and ultimately has provided followup services to farmers contracting for Amaris speedlings. Farmers are being given timely, on-site practical advice on plant establishment and agro-management practices to insure healthy, productive crops for the farmers. The response has been most encouraging with repeat contracts for additional Amaris speedlings from most of the farmers and new customers as farmers communicate their satisfaction with neighboring farmers. The effectiveness of this program will be closely monitored, as it represents effective long term measures to improve the transition of the projects' development activities to the growers field.

Demonstration Day Well Received

Local farmers were invited to Amaris nurseries on June 7, 1994, for a demonstration of the new technologies and plants. Numerous enthusiastic farmers attended this event. Speedling nursery activities, irrigation and agro-management practices and new varieties of tomatoes grown under low tunnels were demonstrated. Samples of speedlings were given to farmers.

Daily visits by local farmers are made to the project site in addition to the planned demonstration days. The project's activities already have captured considerable interest by farmers in the region. Demonstrations become increasingly important as production expands and new technologies are established. The number of daily visits by local farmers has increased dramatically over the past year as more and more farmers learn about the project. It is expected that this trend will continue.



Other views inside the visitor's tent at Amaris Nurseries. Top: Dr. Irit Rylski, Israeli Technical Committee member and Dr. Dov Pasternak, Chairman, Technical Committee. Middle: Mr. Allal Chibane and Mr. Hammoutou El-Mekki, Moroccan Technical Committee members. Bottom: Mr. Jeffrey H. Allen, Project Officer, USAID, Rabat.

POUR LES LECTEURS FRANÇAIS **du bureau de l'éditeur.....**

Le nouveau nom de ce journal est "Amaris Pépinière." Ce nom représente les trois pays, Amérique, Maroc et Israël, qui collaborent pour atteindre le but du projet. Dans ce petit journal il y a quelques articles et photos qui présentent les nouvelles actuelles des activités du projet.

Le Projet de Coopération pour le Développement Agricole Marocain est fondé par le Bureau de Développement International aux États Unis (USAID). L'Université de l'État de San Diego, l'Université Ben-Gourion en Israël et la Société Maghreb Agriculture au Maroc travaillent et collaborent pour accomplir le but du projet.

Le but du projet est de promouvoir la paix mondiale par la coopération des trois pays dans les activités agricoles. L'objectif est de contribuer à l'amélioration du secteur agricole au Maroc par l'introduction de nouvelles technologies et en démontrant les bénéfices de ces innovations aux fermiers de la localité. On espère que le projet pourra démontrer l'efficacité économique de cette entreprise ainsi que ses bénéfices.

L'article, "Rencontre des Experts Techniciens au Maroc" résume la dernière réunion du comité à Casablanca le 26 juin 1994, dénotant les recommandations offertes par le comité pour le travail du projet. Il y a aussi quelques articles qui expliquent les activités du projet: production, formation et démonstration. Il y a également un article qui donne des informations sur les activités de recherche qui sont conduites en Israël et qui font parties du grand plan de travail pour ce projet.

Au cas où vous désiriez de plus amples renseignements sur ce projet, veuillez vous mettre en contact avec, Dr. Bonnie Stewart, à l'adresse de l'expéditeur sur ce petit journal.

Two Moroccans Complete Training in Israel

Two Moroccan agricultural engineers spent seven months in Israel at Ben Gurion University of the Negev. Mr. Moulay Sadiq Zoubir received training in agri-management practices. Mr. Zoubir returned to Amaris Nurseries in Morocco in August 1994, and is now in charge of the speedling nursery.

Ms. Fatima Agdid completed seven months of training in tissue culture propagation and is now completing an additional three months training in potted plants propagation. She will return to Morocco in November 1994 to work at Amaris in the potted plant nursery.

The project will send two additional trainees to Israel in October 1994.

Israel Sponsors Training Course for Moroccan Experts

In Israel the Division of International Relations of the Ministry of Agriculture will sponsor a two month short course on modern irrigation methods and techniques. The course is being organized at this time. Up to twenty Moroccan experts will attend the course. Dr. Itzhak Abt is the Director for this program.

This is a U.S. Agency for International Development Project.
Comments or questions may be forwarded to:

Dr. Bonnie Stewart
U.S. Director, Morocco Project
Phone (619) 594-5644 Fax (619) 583-5734

Innovative Studies Show Promise for the Region

Israeli researchers are conducting several studies on tomatoes, truffles, verticordia and ornamental eucalyptus in Israel. Products are tested in Israel and in Morocco for their adaptability to local conditions. The results of these studies will benefit both countries.

Verticordia is being studied for its potential for decorative uses. The branches have a good vase life. The species has not yet been introduced in Europe and therefore represents a good potential for export. The varieties being tested are indigenous to Australia. Eleven species have been collected and are being tested in Israel. Three varieties have been established at the project site in Azemour. It takes up to two years to germinate verticordia, so the progress to date has been impressive.

Native Moroccan truffles are being studied to determine if they can be grown commercially. Samples are being collected from different locations in Morocco. Eight fruiting bodies have been secured so far.

Tomatoes are being studied in Israel to determine whether aged transplants will provide greater flexibility in planting schedules while reducing water consumption and pest problems. The study

has successfully applied treatments and demonstrated responses. After further testing in Israel, the techniques will be tested at the project's Amaris Nurseries in Morocco.

In another study, researchers are trying to produce high quality nematode resistant tomatoes for cultivation in open-fields. Hybrid tomatoes are being developed with these resistant qualities. Amaris nurseries is testing a wide range of existing cultivars with nematode resistance and fusarium resistance for adaptation to Moroccan conditions.

A study of eucalyptus was initiated. The purpose of the study is to develop techniques for efficient tissue culture propagation of this plant. Approximately sixty shoot cultures have been established.

Amaris Promotional Brochure

The first Amaris Nurseries promotional brochure was prepared in French. The brochure explains the benefit and advantages of plant materials secured through Amaris. The information has been distributed to farmers in the Azemour region and also in Agadir.

*Moroccan Cooperative Agricultural
Development Program*
San Diego State University Foundation
6330 Alvarado Court, Suite #220
San Diego, California 92120 U.S.A.

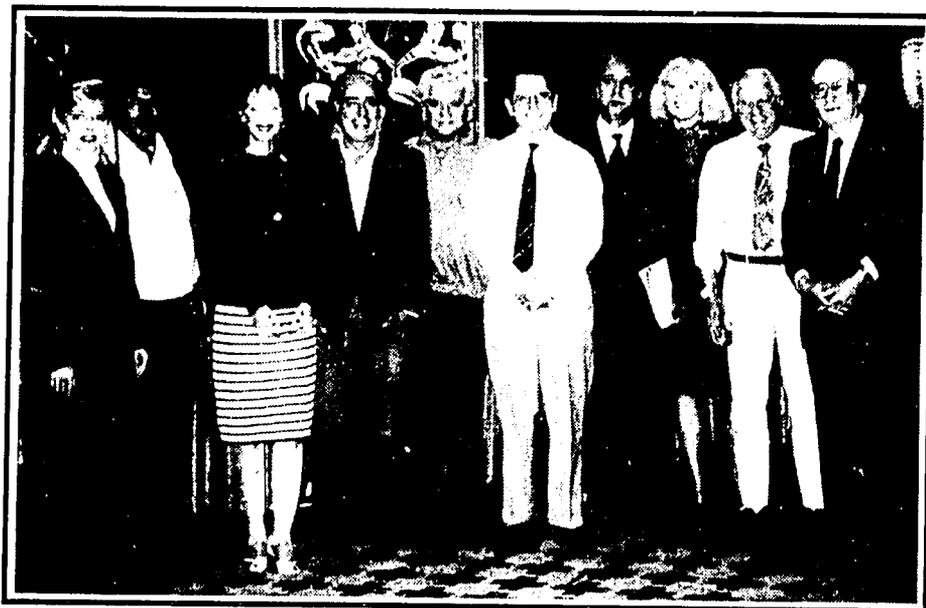
TO:

MOROCCO REPORT



NEWSLETTER

SPRING 1994



Steering Committee meeting in Casablanca, October 26, 1993. Left to Right: Ms. Stephanie Barnett, Director of Public and Community Relations, San Diego State University Foundation (SDSUF); Mr. Itzhak Ayalon, Israeli Technical Advisor; Dr. Bonnie Stewart, U.S. Project Director; Mr. Driss Lahlou, Morocco Project Coordinator; Dr. Dov Pasternak, Chair of the Technical Committee and Head, Institute for Agriculture & Applied Biology, Ben Gurion University; Professor Lehaim Naggan, Vice-President and Dean of Research and Development, Ben Gurion University; Mr. Hassan Alami, Steering Committee member and President, Manay Maroc; Ms. Frea Sladek, Associate General Manager for Sponsored Research & Educational Programs, SDSUF; Mr. Harry Albers, Executive Director and General Manager, SDSUF; Professor Samuel Pohoryles, Israeli Project Coordinator.

The Moroccan Cooperative Development Project is funded by the Agency for International Development Bureau for Near East Regional Cooperation Programs. The project is being accomplished by participants from the Kingdom of Morocco, the State of Israel and the United States of America.

The goal of the Morocco Project is to increase the ability of Morocco's agricultural sector to meet internal demands for agribusiness products. Export capabilities for both Morocco and Israel will be strengthened through project activities. The project constitutes a new stage in the Middle East Regional Cooperation Programs, introducing a new partner with Israel and the United States.

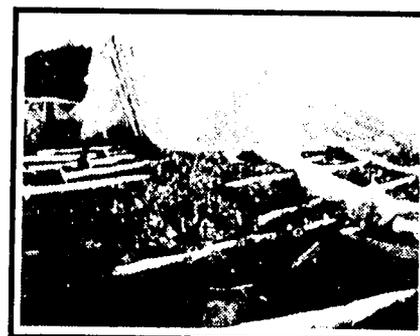
SPECIAL REPORT

Storms Damage Project

Two exceptionally severe storms caused an estimated damage of \$138,000 at the project site in Morocco. Three green houses were destroyed by strong winds and heavy rains that occurred in November 1993 and January 1994.

The first storm occurred on November 2. Winds up to 120 km/hour were followed by heavy rains causing green houses #2 and #3 to collapse (see Amaris Nursery plan in the center section of the Newsletter for exact location). Losses included the materials for the green houses, labor and production costs.

The second storm occurred on January 5. Green house #1 was completely destroyed in addition to the melon crop within the green house. Winds up to 110 km/hour with



Tomato green house #3 destroyed by a storm on November 5, 1993.

The Moroccan Cooperative Agricultural Development Project
Funded by the Agency for International Development/Bureau for the Near East
Administered by San Diego State University Foundation, SD, California 92182

heavy rains caused the damage. In the region surrounding the farm there were over 100 hectares affected by this storm activity.

The destruction caused by the storms has seriously impacted the project in terms of lost investment, lost time as well as lost revenue. It still needs to be determined if the plan of work for the project will need to be modified due to these losses. Some activities may need to be delayed.

AMARIS Nursery

A New Name for the Project Site

Amaris stands for America, Morocco (Maroc in French) and Israel, the three cooperating partners in the Morocco project. The name, *Amaris Nursery and Demonstration Farm*, was approved by the Steering Committee in October.

The purpose of the name is to promote product recognition in the marketplace. As the project continues to grow and production increases, it will be important to have name recognition with newly introduced varieties of plants and produce.

The nursery name will also help to give the project recognition as more and more demonstration and training opportunities at the farm are offered to local farmers.

NURSERIES BEGIN PRODUCTION

Construction of three nurseries at the project site in Azemour was completed by August 1993. Production activities began shortly after in two of the nurseries. Fortunately, none of the nurseries were damaged by the recent storms in the region (see "Special Report").

The "speedling" nursery was the first to begin production. Tomato and melon seedlings were grown. Local farmers purchased 150,000 melon seedlings. Tomato seedlings also were purchased by local farmers while the remainder were used on the farm for varietal testing. Peppers and cucumbers will be produced in the speedling nursery in the spring of 1994.

The storage and preparation area for the speedling nursery, and the germination chamber, were constructed last fall. The sowing and mixing machines that will be used to prepare the speedlings were installed in December 1993 and are now in operation.

The potted-plant nursery will generate rooted seedlings and finished pot-plants. By the end of 1993, the following

ornamentals had been purchased for the nursery: Ficus Benjaminia, Ficus Goldenking, Schefflera, Croton Goldstar, Croton Red and Amaranthus. A shading net was installed in the nursery.

The hardening nursery for the production of tissue culture seedling has been constructed but is not yet in production. The hardening nursery will be expanded to include a tissue culture laboratory. These activities will occur later in the project.

VEGETABLES GROWN IN OPEN FIELDS & GREEN HOUSES

Melons, tomatoes, peppers, artichokes, cucumbers squash, eggplants and green beans were produced in the fall 1993 on the farm in open fields, green houses and low tunnels (see farm plan for location of crops). In addition, Strelizia was planted in open fields in November after the storm.

The purpose for the production activities was to evaluate different varieties of vegetables under different growing conditions, evaluate different agri-management techniques, varietal resistance, cost benefit analysis and the commercial production capabilities of selected crops. In addition, comparisons of different plastics, heating systems and the design of protected structures was made using local and imported materials.

Some of the produce was sold in the local markets. Unfortunately, three green houses were destroyed by storms causing substantial losses to the project (see "Special Report").



Onions grown at the project site in Morocco.

MOROCCANS TRAIN IN ISRAEL

Two Moroccan engineers traveled to Israel in December 1993 for training. Ms. Fatima Agdid and Mr. Moulay Sadiq went to Ben Gurion University of the Negev where they will receive seven months of training in agri-management practices and tissue culture propagation. After their return to Morocco they will work on the farm while receiving additional hands-on training.

Training and Demonstration in Morocco

Seven Moroccan students are receiving training at the project farm in Azemour. Their training began in November 1993 and will continue for six months. They are learning about new agri-management techniques, new varieties of vegetables and new production methods.

Demonstrations are held weekly on the farm. More than 100 farmers participated in demonstrations offered during the recent months of December and January. Topics addressed included nursery production, new varieties of crops, management techniques and new technologies being introduced such as improved plastics for the green houses.

Local farmers continue to show a great interest in the demonstrations at the farm.

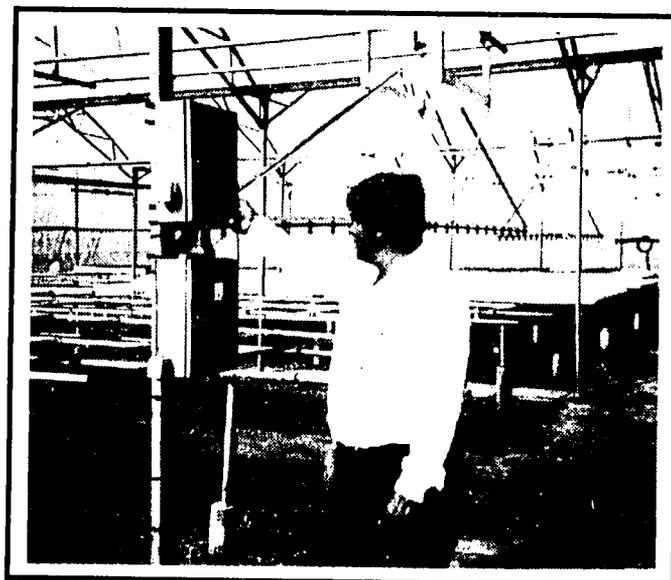
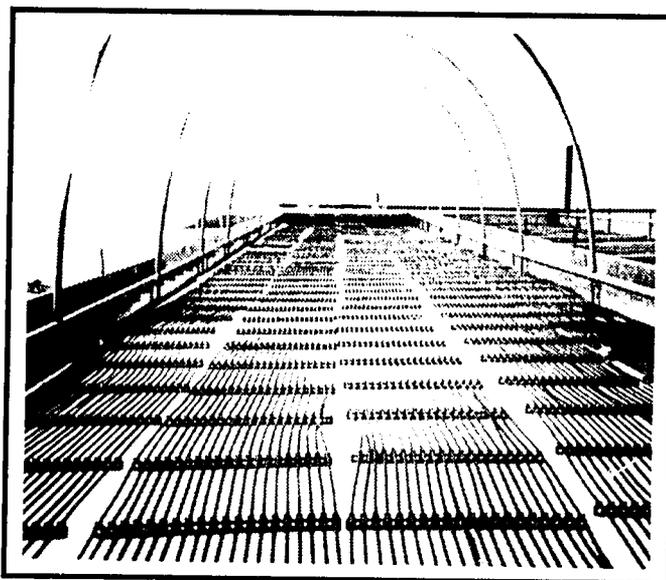
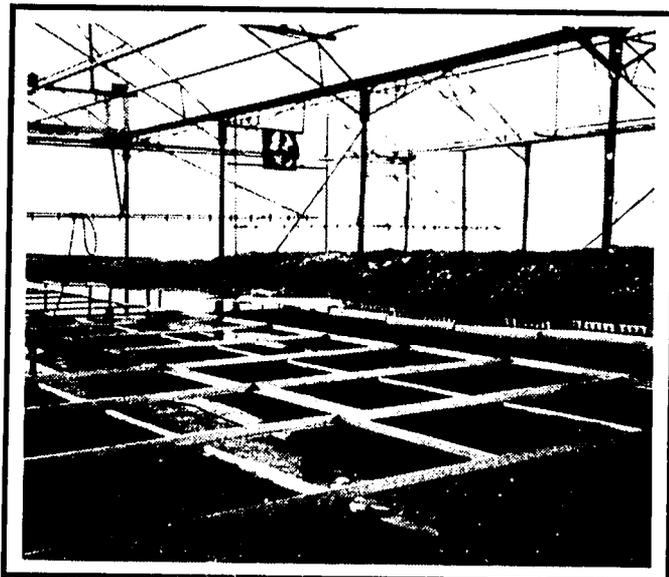
SCIENTISTS VISIT MOROCCO

Israeli and American scientists have made several technical visits to the project site in Morocco in support of the production activities in Morocco and the research activities in Israel.

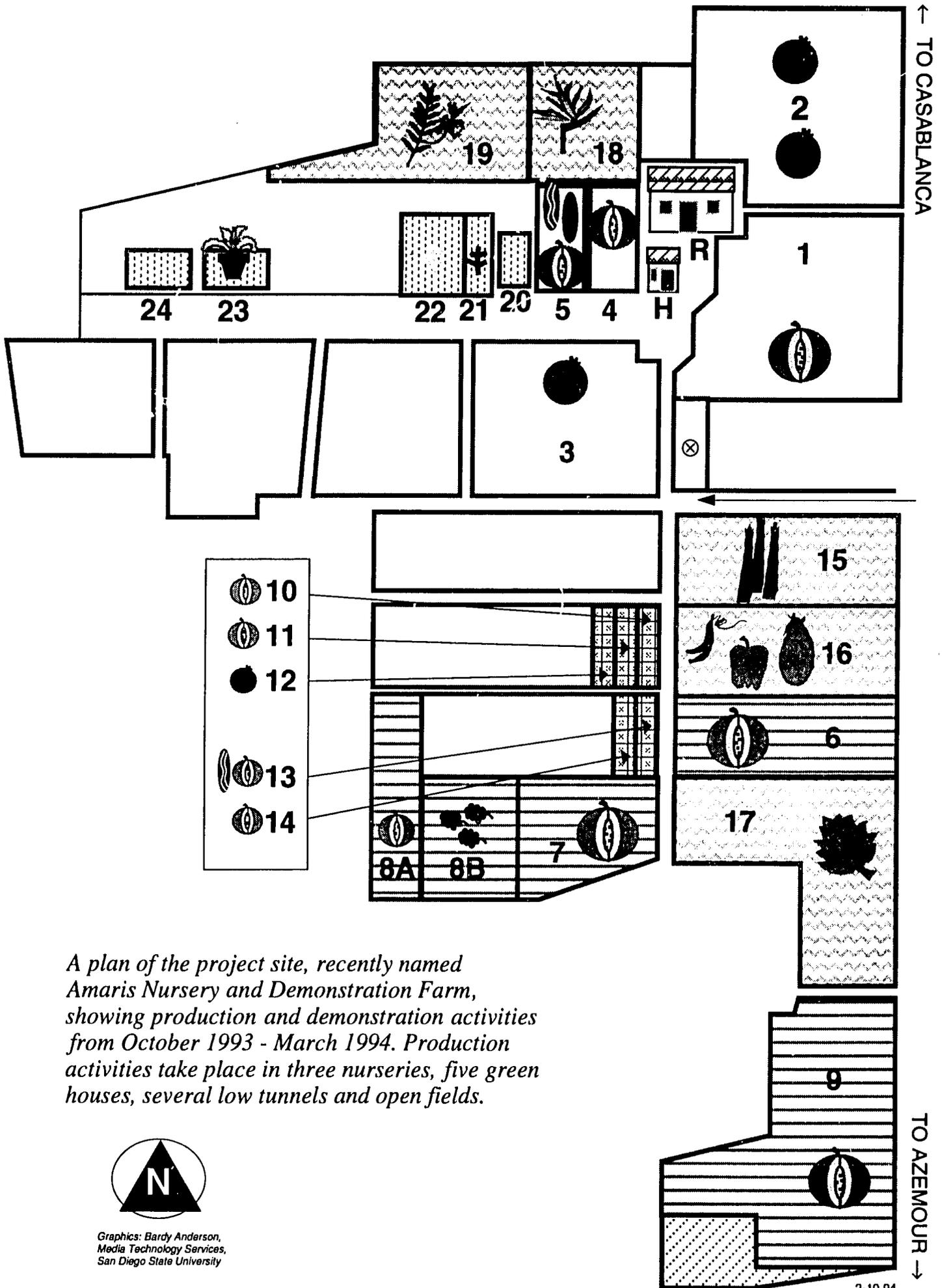
Dr. Irit Rylski, from the Volcani Institute in Israel and Technical Committee member, and Mr. Moshe Bar, from the Volcani Institute, traveled to Morocco in December 1993 to provide consultation on tomato and vegetable research and production activities. Two consultants from Shorashim Nurseries in Israel traveled in December to help install the mixing and sowing machines for the speedling nursery and to provide guidance in the operation of the equipment.

Dr. Richard Jones from the University of California, Davis, and Technical Committee member, visited the project in January 1994 to evaluate the vegetable production activities and to provide consultation on raspberry and asparagus agri-management techniques.

Ms. Varda Tsur from the Ben Gurion University of the Negev in Israel will visit Morocco in March to collect local varieties of truffles as part of her research study on the development of commercial truffles.



Views of the Speedling Nursery at the project site in Azemour. Top: irrigation system, tables and speedlings. Middle: heating systems. Lower: Mr. Itzhak Ayalon, Israeli Technical Advisor adjusts the environmental control system.



A plan of the project site, recently named Amaris Nursery and Demonstration Farm, showing production and demonstration activities from October 1993 - March 1994. Production activities take place in three nurseries, five green houses, several low tunnels and open fields.

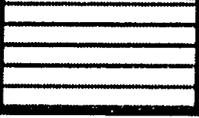
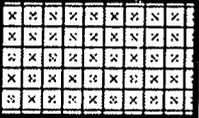
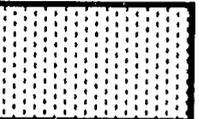


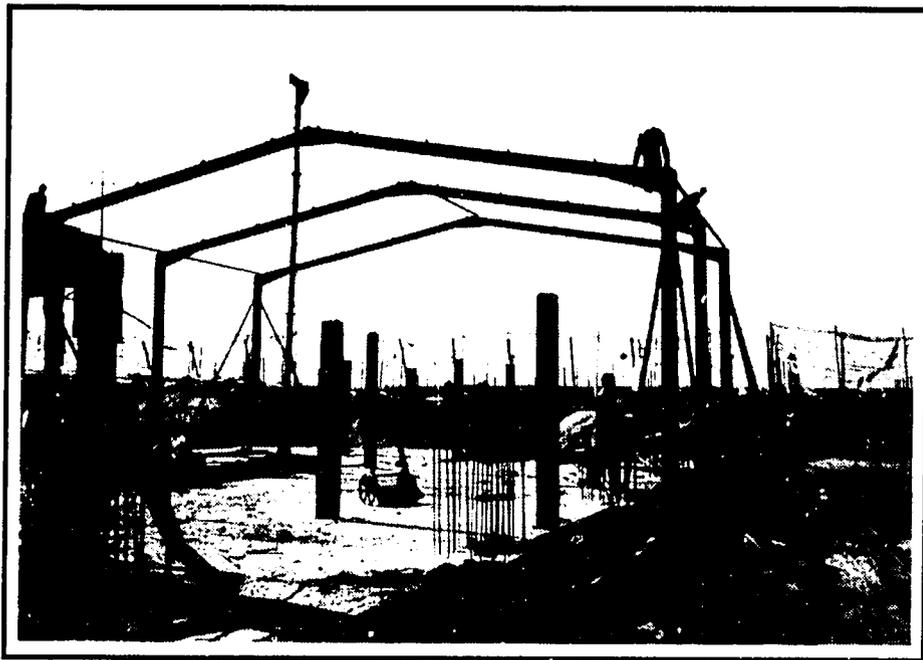
Graphics: Bardy Anderson,
Media Technology Services,
San Diego State University

AMARIS Nursery and Demonstration Farm

of the Moroccan Cooperative Agricultural Development Project

KEY:

 <p>GREEN HOUSES</p>	<p>1 Melons • 1.7 hectares planted 12-7-93 -<i>Destroyed 1-5-94</i> 2 Tomatoes • 1.8 hectares planted 9-16-93 -<i>Damaged 11-5-93</i> 3 Tomatoes • 1.1 hectares planted 9-16-93 <i>Destroyed 11-5-93</i> 4 Melons • .2 hectares planted 12-1-93 5 Cucumbers, Squash & Melons • .2 hectares planted 12-7-93</p>			
 <p>LOW TUNNELS</p>	<p>6 Melons • .5 hectares planted 11-24-93 7 Melons • .5 hectares planted 1-20-94 8A Melons • 1.8 hectares planted 2-7-94 8B Raspberries • 1.7 hectares planted 1-30-94 9 Melons • 1.5 hectares planted 2-3-94</p>			
 <p>WALK THROUGH TUNNELS</p>	<p>10 Melons • planted 11-24-93 11 Melons • planted 11-24-93 12 Tomatoes • planted 12-5-93 13 Melons & Squash • planted 11-24-93 14 Melons • planted 12-1-93</p>			
 <p>OPEN FIELD PRODUCTION</p>	<p>15 Asparagus • .7 hectares planted 4-2-94 16 Green Beans, Eggplant & Peppers • .5 hectares planted 1-30-94 17 Artichokes • 2 hectares planted 10-16-93 18 Strelitzia • .5 hectares planted 11-10-93 19 Melaleuca • 1 hectare planted 2-15-94</p>			
 <p>NURSERIES & BUILDINGS</p>	<p>20 Office, Storage, Preparation Area for Speedling Nursery 21 Speedling Nursery 22 Speedling Nursery expansion of 2000 sq. ² proposed 1994 23 Potted-Plant Nursery 24 Hardening Nursery H House for Resident Technician R Residence</p>			
 <p>MELONS</p>	 <p>ARTICHOKES</p>	 <p>TOMATOES</p>	 <p>ASPARAGUS</p>	 <p>GREEN BEANS</p>
 <p>PEPPERS</p>	 <p>CUCUMBERS</p>	 <p>SQUASH</p>	 <p>RASPBERRIES</p>	 <p>EGGPLANT</p>
 <p>POTTED PLANTS</p>	 <p>SPEEDLINGS</p>	 <p>STRELITZIA</p>	 <p>MELALEUCA</p>	 <p>IRRIGATION PUMP</p>



Construction of the office, storage and preparation areas adjacent to the speeding nursery. Photo was taken in October 1993. Construction was completed in November.

Steering Committee Meets

Casablanca

The Steering Committee met on October 26, 1993, in Casablanca, Morocco. Mr. Harry Albers, General Manager, San Diego State University Foundation, welcomed members to the second meeting of the Steering Committee. His remarks were followed by comments from Mr. Driss Lahlou of Morocco and Professor Samuel Pohoryles of Israel.

The speakers acknowledged the impressive accomplishments made by Moroccan, Israeli and American participants to date. They expressed a desire for the project to serve as a model for Morocco and for the region in promoting future cooperative programs.

The next Steering Committee meeting was scheduled for October 1994.

Azemour

A visit to the project site was made prior to the Steering Committee meeting. Mr. Lahlou, Morocco Project Coordinator, and Mr. Ayalon, Israeli Technical Advisor, gave an informative tour of the project site. All members expressed deep appreciation for the hard work and technical progress made over the past year.

Winrock Official Visits Morocco

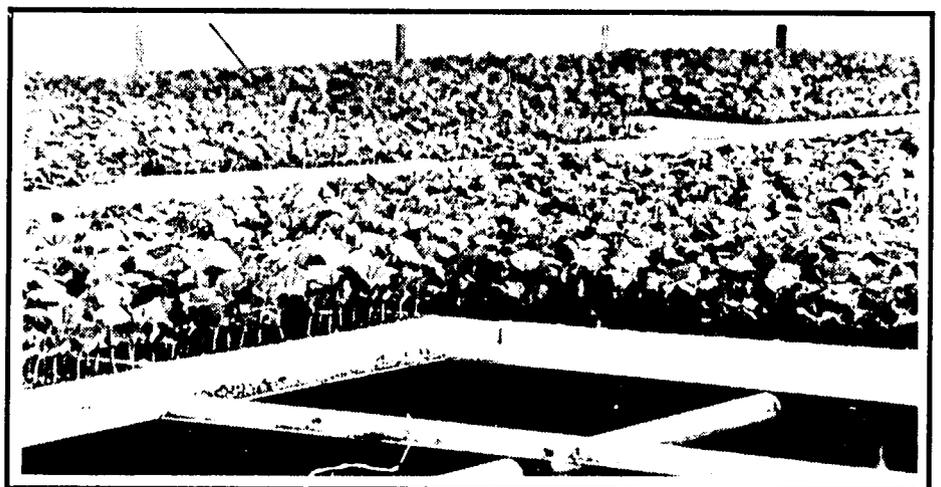
Dr. Edward Rice, Middle East Specialist with Winrock International, visited the project site of the Moroccan Cooperative Agricultural Development program in Morocco in January 1994. Dr. Rice observed current on-going work including production, marketing and training activities accomplished to date. This was Dr. Rice's first visit to Morocco.

After visiting Morocco, Dr. Rice continued to Israel where he met with Dr. Dov Pasternak, Chairman of the Technical Committee and Head, Institute for Agriculture and Applied Biology, Ben Gurion University of the Negev. Morocco project research and training activities in Israel were reviewed and other program details discussed.

Winrock International, based in Arlington, Virginia, is under contract with the United States Agency for International Development to review all of the regional cooperation programs sponsored through the Bureau for the Near East. Annual site visits are made to each project by staff specialists.

Technical Committee Meeting

The Technical Committee is scheduled to meet March 16-17, 1994 in Casablanca. A review of work plans for this year will be made. Plans for 1994-1995 will be discussed and an implementation schedule proposed. The damages caused by the recent storms in Morocco will be evaluated and work plan adjustments will be determined as necessary (see "Special Report").



Arava melon speedlings produced at Amaris Nursery and Demonstration Farm in Morocco. The speedlings were sold in the local markets in December 1993.

POUR LES LECTEURS FRANÇAIS **du bureau de l'éditeur.....**

Le Projet de Coopération pour le Développement Agricole Marocain est fondé par le Bureau de Développement International aux États Unis (USAID). L'Université de l'État de San Diego, l'Université Ben-Gourion en Israël et la Société Maghreb Agriculture au Maroc travaillent et collaborent pour accomplir le but du projet.

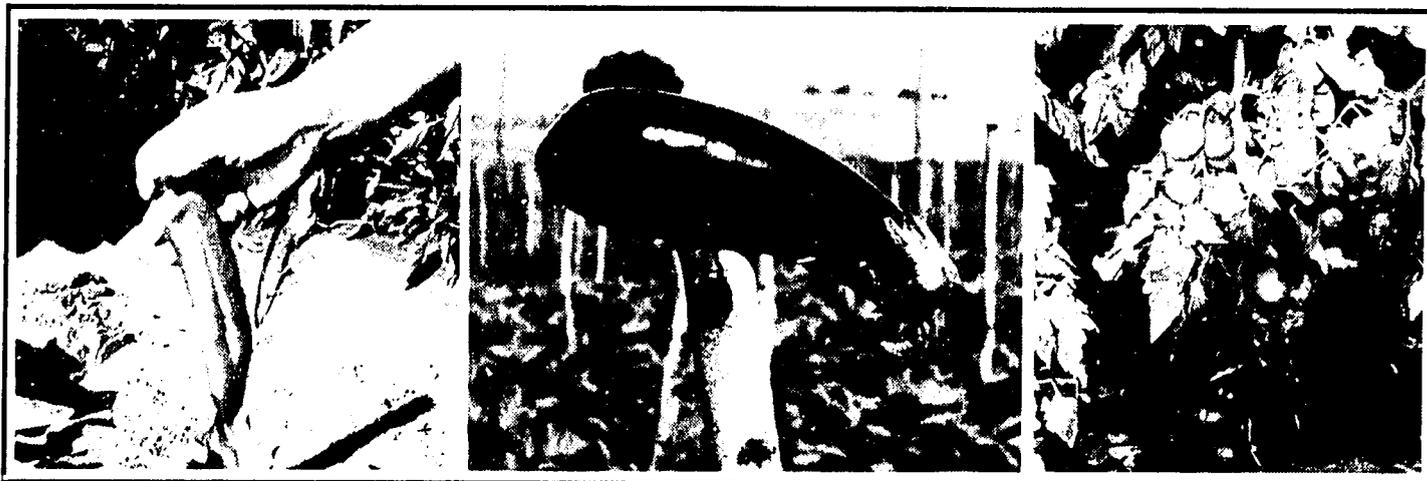
Le but technique du projet est de contribuer à l'amélioration du secteur agricole du Maroc par l'introduction de nouvelles technologies et en démontrant les bénéfices de ces innovations aux

fermiers de la localité. On espère que le projet pourra démontrer l'efficacité économique de cette entreprise ainsi que les bénéfices techniques.

Dans ce petit journal il y a quelques articles qui présentent les nouvelles activités du projet. "Le Rapport Special" décrit la destruction récente des serres de la ferme à cause des tempêtes en Novembre 1993 et en Janvier 1994. L'article, "Amaris Pépinière..." présente le nouveau nom attribué au projet marocain. Ce nom spécial est très important pour l'identification

du travail dans la région et des produits du projet vendus sur le marché local et international. Il y a aussi quelques articles qui expliquent les activités du projet: production, formation et démonstration. Il y a également des articles qui offrent des informations sur les visites scientifiques et les réunions en relation avec le projet.

Au cas où vous désiriez de plus amples informations sur ce projet, veuillez vous mettre en contact avec, Dr. Bonnie Stewart, à l'adresse de l'expéditeur sur ce petit journal.



Vegetables produced at Amaris Nursery and Demonstration Farm in Azemour, Morocco. Left to Right: peppers, eggplants, tomatoes.

This is a U.S. Agency for International Development Project.
Comments or questions may be forwarded to:

Dr. Bonnie Stewart
U.S. Director, Morocco Project
Phone (619) 594-5644 Fax (619) 583-5734



San Diego State University Foundation and USAID, Washington, D.C. officials visit the project site in September 1993. Left to Right: Mr. Herb Blank, Grant Officer, USAID; Mr. Driss Lahlou, President of Maghreb Agriculture and Morocco Project Coordinator; Mr. Frank DiSanto, Director of Grants and Contracts Administration, SDSUF; Mr. Robert Benshoff, Associate General Manager for Financial Management, SDSUF; and Mr. Itzhak Ayalon, Israeli Technical Advisor.

SDSUF Managers & USAID Grant Officer Visit Morocco

Mr. Robert Benshoff, Associate General Manager for Financial Management for San Diego State University Foundation (SDSUF), Mr. Frank DiSanto, Director of Grants and Contract Administration, SDSUF, and Dr. Bonnie Stewart, U.S. Project Director, visited the project site in Morocco in September 1993. Mr. Herb Blank, Grant Officer from the Near East Bureau of the United States Agency for International Development in Washington, D.C., joined the San Diego team on their visit to the project site in Azemour.

In addition to the site visit, the San Diego team reviewed the business, accounting and banking practices of Maghreb Agriculture; reviewed compliance with the Cooperative Agreement requirements; and provided guidance in finalizing the business plan for use of revenue generated through project activities.

The trip was successful. Most important, these efforts continue to demonstrate cooperation among all participants in pursuing the goals of this regional cooperation program.

**Cooperative Agricultural Research Program
San Diego State University Foundation
6330 Alvarado Court, Suite #220
San Diego, California 92120 U.S.A.**

TO:



AMARIS NEWS

Bulletin N° 1

Juin 1994

LE PROJET DE COOPERATION POUR LE DEVELOPPEMENT AGRICOLE AU MAROC

Financé par le l'agence Américaine de Développement International (USAID), avec la coopération de l'universite d'état de San Diego, l'université de Ben Gourion Be'er-sheva et la société Maghreb Agriculture. Ces institutions collaborent ensomble pour réaliser de ce projet qui vise l'introduction au Maroc de nouvelles technologies dans le domaine de l'agriculture.

A. Cultures maraicheres

Trois principaux axes de recherche sont prévus dans le projet à savoir:

1. La production à grand échelle de plants maraicheres de haute qualité.
2. La recherche des variétés maraicheres tolérantes à la salinité d'une part et résistantes aux nématodes et aux maladies vasculaires d'autre part.
3. La promotion des exportations par l'introduction des variétés nobles, notamment de tomate et de melon et l'experimentation des espèces nouvelles telles que l'artichaut, l'asperge et framboisier.

B. Plantes Ornementales

Le but recherché par cette activité vise essentiellement la production d'un grand nombre de plants d'ornement destines pour l'approvisionnement du marché local et l'exportation. En outre plusieurs expérimentations relatives aux techniques de multiplication et d'adaptation seront effectuées par la pépinière AMARIS. Les meilleurs résultats obtenus seront diffusés au profit des producteurs et pépiniéristes à a travers tout le Maroc.

C. Perspectives d'avenir

Les percipals préoccupations de la pépinière AMARIS sont : l'utilisation rationnelle de facteurs

de production et la valorisation de la production et ce afin d'assurer un meilleure optimisation de la rentabilité des investsments.

LE SECTEUR DES PRIMEURS JOUE UN ROLE SOCIO-ECONOMIQUE IMPORTANT :

Les cultures primeurs sont pratiquees principalement en vue de l'exportation. Elles couvrent une superficie moyenne de 20.000 Ha et assurent une production de l'ordre de 500.000 T dont 45 à 50% sont exportees.

Les principales cultures sont la tomate qui couvre une superficie de 6.000 Ha soit 30% la pomme de terre occupe 10.000 Ha soit 50% et les légumes divers 4.000 Ha soit 20% des superficies totales.

La zone primeuriste s'étend le long de la zone littorale atlantique allant de LARACHE - KENITRA a SAFI en passant par CASABLANCA et EL-JADIDA et a AGADIR-TAROUDANT.

Le secteur des primeurs joue un rôle socio-economique important:

* Il concerne 8 à 10.000 producteurs et crée plus de 12 Millions de journées de travail par les activites qu'il engendre au niveau de la production, du conditionnement et de la commercialisation.

* Il contribue largement à la modernisation du secteur agricole par l'introduction des techniques nouvelles telles que la culture protégée, la fertigation...

* Il participe au développement du secteur industriel notamment en matière de façonnage d'abris-serre, films plastiques, matériel d'irrigation et fournitures d'aemballage.

* Il constitue enfin une source appréciable de devises pour le pays (883 Millions de DH en 1992).

AMARIS NURSERIES

AMARIS pépinière présente le nouveau nom attribué au projet marocain. ce nom spécial

est très important pour l'identification du travail dans la région et des produits du projet vendus sur le marché local et international.

A une structure d'obtenir des plants dans les bonnes conditions, homogènes, faciles à manipuler, précoces, sains et très bons marchés. Il utilise les meilleurs substrats par le mélange de la tourbe et de la vermiculite. Le rôle de la tourbe de céder facilement les éléments fertilisants (éléments majeurs et oligo-éléments).

Alors que le rôle de la vermiculite; c'est de maintenir une humidité permanente, sans être dure comme la terre. De cette façon la germination est obtenue à des pourcentages très élevés. Avec l'humidité permanente et la chaleur, les plants germés seront homogènes.

LA SITUATION DES BANANERAIES SOUS- SERRE AU MAROC EN 1994 (Dr. Mohamed Ndir)

Les serres anciennes

Malgré la faiblesse des prix de vente de banane, les serres anciennes, amorties de plus de trois années et donnant des rendements supérieurs à 25 tonnes/ha/an, sont rentables.

Dans beaucoup des cas, à cause de l'hétérogénéité des plants, due à la mauvaise luminosité, les serres anciennes doivent être replantées avec des vitro-plants. Il faudrait respecter scrupuleusement les dates de plantation :

Par la protection sous serre avec plastique infra-rouge, les plants germés seront précoces. Les plants germés seront indemnes de maladies, puisque le matériel est désinfecté, et les filets anti-trips protègent les plants germés de maladies virales.

À ne pas oublier que toutes les phases de la germination par AMARIS, se font automatiquement par des appareils sophistiqués, sans interventions manuelles pour éviter toutes les infections.

Le point essentiel c'est le gain réalisé par les agriculteurs qui commandent les plants à AMARIS pour des raisons suivantes :

- le pourcentage élève des plants germés .
 - les plants disponibles selon le calendrier établi par l'agriculteur donc gain appréciable du temps.
 - économies réalisées en comparaison avec des plants obtenus dans la ferme.
-
-

1 ères dates: de la première semaine de janvier jusqu' au première semaine de février

2 es dates: de mi-août au mi-septembre. Il est impératif de laisser dans une plantation en ligne jumelée, un grand rang à un minimum de 4,00 mètres (Voir la note: Choix de la densité de plantation de bananier sous-serre).

Le coût de plantation d'un hectare de serre en bois avec 2000 vitro-plants s'élève à 206.000,00 DH.

Le coût de replantation d'un hectare de serre métallique de 2000 pieds avec des vitro-plants s'élève à 160.000,00 DH

Les nouvelles serres

1er cas: Pour monter des nouvelles serres de banane, si on dispose d'un sol non-sablonneux (avec des teneurs de sables inférieures à 40%), et d'une eau égale au inférieure à un gramme de sels par litre. En peut envisager de planter de 1800 à 2000 vitro-plants par hectare à des dates précitées.

En outre il faudrait installer double système d'irrigation : une irrigation par les circo-jets, surélever à une hauteur de 30 à 40 cm , mouillant toute la surface des lignes plantées. Ce système remplacera la brumisation qui provoque très souvent la maladie de bout de cigare. Deuxieme système d'irrigation par goutte à goutte avec un débit de 4L/H , et deux goutteurs par pied. Ce systeme servira pour la fertigation. En peut y injecter des oligo-éléments, des produits phytosanitaires et des acides pour rendre assimilable des oligo-éléments et les phosphates.

2e cas: Si on a seulement un terrain sablonneux (avec des teneurs de sables > ou= 80%), mais on dispose d'une eau inférieure au égale à un gramme de sels par litre. Dans ces conditions on peut envisager de planter de 1800 à 2000 vitro-plants par hectare. Mais les frais de cultures seront très élevés.

1) Il faudrait apporter avant la plantation de 150 à 200 tonnes de fumier, pour éviter les pertes des éléments fertilisants par lessivage. En outre la matière organique de fumier augmentera la Capacité de Rétention du sol vis à vis des eaux d'irrigation .

2) Après épandage de fumier, il faudrait désinfecter le sol avec le bromure de méthyle.

3) Il faudrait, envisager d'apporter tous les trimestres de nématocide, et alternés deux nématicides, convenant pour les sols basiques.

4) Double système d'irrigation: circo-jets et goutte à goutte comme le 1er cas.

Dans les conditions de plantation citées plus haut, la bananeraie nouvellement créée, peut être rentable. Les nouvelles plantations de bananier ne répondant pas aux conditions précitées ne seront pas rentables dans les conditions actuelles au Maroc.

Il ne faut pas oublier, pendant les périodes chaudes de l'année d'aérer la serre par des ouvertures aux côtés et au plafond, pour créer des cheminées d'évacuation de l'air chaude.

En pouvait éventuellement chaulé le plastique pendant la période chaude de l'année.

Au cas ou vous désirez de plus amples informations , veuillez vous mettre en contact avec,
Mr. AYALON Isaac, à l'adresse de l'expéditeur : MAGHREB AGRICULTURE
Ulja de Chtouka, Azecmour. Tel.03.35.75.05 ou fax 02.27.63.77



AMARIS Nurseries - Pépinière

Funded by : THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

Pourquoi Les Plants Maraichers de la Pépinière AMARIS

*Haute Qualité !
Sécurité !*

Plants Sains

Les plants produits par la pépinière AMARIS sont
issus de semences de haute qualité

Conditions de production maîtrisées

- Structure des serres adaptée.
- Atmosphère contrôlée.
- Substrat adéquat et sain

Homogénéité et Facilité de Manipulation

Les plants Maraichers d'AMARIS sont Homogènes et
Faciles à manipuler au transport et à la plantation.

Precocité

Une reprise RAPIDE et PARFAITE des plants d'AMARIS
permet une bonne precocité.

Affaire Economique

Gain de 25% par rapport aux plants produits par l'agriculteur lui - même.

Gain de temps : Plants disponibles selon le calendrier de plantation.

Gain d'espace et d'investissement.

Gain sur les intrants.

La pepinière AMARIS assure la production des plants, si l'agriculteur apporte ses propres semences.

Production des plants de toutes les espèces et variétés maraichères.

La pepinière AMARIS produit les plants de toutes les espèces et variétés maraichères. Les variétés sont de hautes performances agronomiques et commerciales, destinées à l'exportation et au marché local.

Haute Technicité

La qualité des plants est assurée par une haute gamme d'ingénieurs et techniciens, dont dispose la pepinière AMARIS.

Assistance Technique

La pepinières AMARIS garantie l'assistance technique après vente.

PROBLEMS

Problems and Actions Taken to Address Them

Natural Disaster

The project suffered a set-back during this reporting period. Two exceptionally severe storms caused an estimated damage of \$138,000 at the project site in Morocco. Three green houses were destroyed by strong winds and heavy rains that occurred in November 1993 and January 1994.

The destruction caused by the storms seriously impacted the project in terms of lost investment, lost time as well as lost revenue. As a result of the financial losses, the micro propagation laboratory needed to be delayed. Also, green house production and open-field production was scaled down in order to concentrate effort and resources on the speedling and ornamental nurseries.

Micro propagation Laboratory

Construction of the micro propagation laboratory was delayed in part due to the financial constraints resulting from the storm losses (as noted above). In addition, there was concern that private sector activities had increased and the demand for more micro propagation capabilities in Morocco had decreased.

After review and analysis by both the Technical Committee, the Steering Committee and supplementary research and review by the Moroccan Technical Committee members and the Moroccan Project Coordinator, it was determined that the need for additional micro propagation capabilities still existed.

Regarding the financial constraints, the strategy proposed by the committees was to make the speedling nursery self-sufficient, and ultimately to generate more revenue. Then, by delaying construction of the laboratory until the spring of 1995, sufficient resources would be available between this year's budget and next years installment of funds to cover the construction and start-up costs.

Onion Study in Israel

The research study is being conducted in Israel and has been directed mostly for processing onions. Onion trials have been conducted in Morocco. However, the project is shifting priorities toward production of fresh onion products where market potential exist rather than for processing market whose future is less certain and less likely to reach fruition in the context of this grant period. The Technical Committee recommended completing the onion project early and redirect the research funds to those studies that given the experiences gained in the project indicate a higher potential for impact and success in Morocco.

Initial inquiries were made by the Technical Committee Chairman to researchers at Hassan II Institute in Agadir. The preliminary results were positive and the study are identified was with the product argon.

The proposal needs to be reviewed by Steering Committee members and formally submitted to USAID for approval.

Financial Management

The project is complex and requires management of many financial details. In order to give the Moroccan partner adequate time to devote to technical objectives and farm work, we re-structured the financial reporting system.

Manay Maroc, a Moroccan CPA firm, is now providing this service to the project. They are serving as a fiduciary agent for Maghreb Agriculture and provide the financial reporting to San Diego State University Foundation. Farm records are maintained at the project site in Azemour.

Mixing and Sowing Machines

After the initial installation of the machines, there was a problem in the size of seeds used. Melon seeds were handled satisfactorily by the sowing machine but other seeds such as tomatoes were too small.

In order to resolve the problem, a new barrel was purchased in Israel that was able to handle smaller sized seeds. Some additional adjustments are needed to make is completely efficient. These adjustments are being made.

Open-field Ornamentals

Purchase of additional ornamentals for the open-field production was delayed due to a problem of weeds. Additional efforts are now being directly at weed control. When this is resolved, then more varieties of ornamentals will be purchased.

ACCOMPLISHMENTS IN REGIONAL COOPERATION

There has been impressive cooperation among the participating countries as reported.

In support of the production activities at the project site in Morocco and the research activities in Israel, twelve technical visits were made during the last quarter of 1993 through September 30, 1994: eight visits were made by Israeli scientists, two visits by a Moroccan and two visits by a U.S. scientist. In addition, meetings of the project Steering Committee and Technical Committee were held in Morocco.

Training and outreach activities have demonstrated accomplishments in regional cooperation. Two Moroccan trainees spent seven months in Israel at Ben-Gurion University of the Negev for intensive work in agro-management and tissue culture production technology. One of these trainees is scheduled to spend an additional three months in Israel for training in pot-plant production technology. Seven Moroccan technicians received six months training at the project site in Azemour.

Demonstrations were held in December 1993, January and June 1994. Daily outreach activities are being accomplished as farmers visit the project to gather information on project activities and to purchase seedlings. Promotional visits have been accomplished in Agadir for demonstrating seedling technology.

Every effort has been made to interface with USAID staff in Washington, D.C., Morocco and Israel by project members.

ATTACHMENT A

Project Review

Prepared by

Dr. Richard Jones
Department of Vegetable Crops, University of California, Davis
Member of the Technical Committee

Project Implementation Goals/Activities Accomplishments at Azemour R D Site

Objective	Immediate	Activities	Achieved					Scheduled	Morocco	Israel	U.S.A.	Current*	Comments
			yes	no	source								
												*June thru September, 1994	
1. Develop a commercial speedling transplant nursery	1 Building of Infrastructure	a. Allocation of physical space	x										
		b. Utilities to site	x										
		c. Building construction for offices, speedling prep. & storage	x		Mar-94								
		Addtl storage space	x				X				Sep-94	32 m2- pesticides, organics	
		d. Secure materials & construct GH (Phase I)- 1000 m2 Arava type	x		Jun-93				X				
		(Phase II)- 2000 m2 Arava annex	x						X		Jun-94		
		(Phase III)- 7000 m2 Local		x				X			Jan-95	Local annex (Deferred TCmeeting 6/94)	
		e. Extension - Lecture room							X		Sep-94	48 m2- demonstration/meeting room	
		2 Capital equipment in place	a. Complete structural modifications					Nov93					House & seeding facilities functional
	b. Purchase equipment & Install seed driller, flat mixer/filler		x				Sep93					need refined improvements.	
	heater/ germination room		x						X	Jun-94	Heater installed & heat-tubes to germ. room		
	c. Fabricate benches for GH		x				Sep93		X			Need to install automated control systems	
	install fans, heat tubes		x						X				
	watering booms & controls		x						X				
	d. Enclose heater/boiler								X		Jul-94	Cinderblock enclosure to protect boilerplant	
	3 Technical personnel	a. Screening & selection		x									
	in-house training			x									Technical training is on-going
	manager trainee			x	x								High priority for nursery f(x); continuing
	4 Commercial transplant production	a. Secure seeds of CVs		x					X	X			
	b. Initiate pilot speedling production			x			6-7,93						GH delays; setup by in-house personnel.
	c. Evaluate varietal responses			x									
	d. Evaluate media mixes			x									Expts to improve O2 in media
	e. Modify cultural practices			x									On-going; growth regulator/hardening expts
	f. Target yearly production of												
	800,000 transplants (Phase I)			x			Jan-94						
	2,000,000 transplants (Phase II)			x							Sep-94		
	8,000,000 transplants (Phase III)				x								Continuing to market speedlings
g. Contract transplant sales			x			Dec93						Expanding activity (melons,toms,pepper,chokes)	
5 Extension & Outreach	a. Transfer tech. to local growers		x									On-going, numerous visitors have toured facilities	
b. Informational bulletin developed			x							Jul-94		Distributed to growers in Azemour/Agadir areas	
c. Fertigation guideline-handbook			x							Sep-94		Distributed to PC growers in Azemour area	

Project Implementation Goals/Activities Accomplishments at Azemour R D Site

Objective	Immediate	Activities	Achieved			Scheduled	Source			Current	Comments
			yes	no			Morocco	Israel	U.S.A.		
2. Establish Seedling & Pot- Plant Nursery	1 Building of Infrastructure	a. Procure construction materials	x		Aug-93			X			
		b. Utilities to site	x								
		c. Construct state-of-art nursery	x								1000 m2 nursery
	2 Capital Equipment in place	a. Misting tables fabricated	x								
		b. Retractable shade cloth installed	x		Nov93						500 m2
		c. Cement walkways, H2O lines in	x								
	3 Technical Personnel	a. Selection & technical training	x								Ongoing
		b. Refine practical experience	x								Foster dependability & independence
	4 Propagation unit	a. Fabricate rooting tables	x								Rooting expts with cuttings underway
		b. Install misting system	x								Refining humidity/temp interactions
	5 Commercial pot plant production	a. Market analysis		x	1994						Initiated but not developed
		b. Stock selection: & procurement	x		Oct93						Mother plant production (to date)
		Aglaonema maria	x								
		Bouganvilla	x					X	Aug-94		
		Canna lily	x					X	Sep-94		
		Chamedora (wild palm & cv. elegans))	x				X	X			937
		Croton (Codiaeum variegatum)	x				X				395
		Cycus	x					X			2
		Dieffenbachia (dumbcane)	x				X				48
		Dracena	x				X				492
		Ficus benjamina (weeping fig)	x				X				50
		Hybiscus					X		Sep-94		
		Lantana montevidensis	x				X				
		Maranta leuconeura (prayer plant)	x				X				87
		Melaleuca	x					X			
		Potus (ivy)	x				X				
		Schefflera (umbrella tree)	x				X				150
		Syngonium	x				X				43
		c. Mother plant production (sum to date)	x		Oct.93						2204
		d. Tailor environ./management to improve quality&cost-effectiveness	x								Ongoing effort; propagation quality improved under shading. Dwarfing agents initiated
	6 Marketing analysis	a. Economics of production- assess		x	Sum94						Marketing assessment underway
	7 Extension & Outreach	a. Market products	x	x	Sum.94				Sep-94		1st contract with local nurseryman made
		b. Transfer technology to local nursery	x	x	Sum.94						A number of interested clients have toured facility
		c. Demonstration for potential clients	x						Sep-94		Product samples distributed to local nurseries

Project Implementation Goals/Activities Accomplishments at Azemour R D Site

Objective	Immediate	Activities	Achieved			Scheduled	source			Current	Comments	
			yes	no			Morocco	Israel	U.S.A.			
3. Establish Micro-Propagation Lab. & Hardening Nursery	1 Building of Infrastructure	a. Tissue culture laboratory: design facility	x								Deferred construction (TC jun94)	
		secure materials & construct		x	6./93			x				
		b. Hardening nursery: purchase materials	x					x				
		construct greenhouse	x		8./93					1000 m2 house		
		2 Capital Equipment in place	a. Tissue culture laboratory: establish equipment list	x								Plans for the tissue culture facility have been deferred due to cost, longer term budget impact & private sector capabilities.
		secure bids		x								
	order & install equipment		x	12./93			x					
	3 Technical Personnel	a. Select trainees	x								Two trainees completed extended tissue culture study in Israel	
		practical training in Israel	x		12./93				Jul-94	Ongoing activity		
	4 Commercial micro-propagation production		a. Identify plant materials	x								
			b. Order propagules: Ornaments & pot plants			spring94						
			Carnation	x	x							
			Banana		x					Jun-94	Activities deferred by TC	
			Raspberry	x						Jul-94	Hardening studies underway	
			Strawberry		x					Sep-94	Currently being developed	
			c. Initiate disease-free micropropag.		x	5./94						
			d. Refine production efficiencies		x	Fall94					Hardening initiated	
			5 Extension & Outreach	a. Technology transfer		x						Must await development of appropriate, tested technologies

Project Implementation Goals/Activities Accomplishments at Azemour R D Site

Objective	Immediate	Activities	Achieved		Scheduled	Morocco	Israel	U.S.A.	Current	Comments	
			yes	no							
	Task										
4. Ornamental Production (Open-field)	1 Site preparation	a. Site allocated	x								
		b. Field prepared- fumigated	x								
		c. Beds made & drip lines installed	x								
	2 Technical Personnel	a. Utilize existing personnel	x								
		b. In-house training	x							On-going	
	3 Commercial open-field Ornamental production	a. Identify stocks to exploit foreign & domestic markets	Survey local ornamentals	x							
			b. Order propagules:								
		strelitzia	x					x			
		melaleuca spp.	x					x			
		eucalyptus spp.		x				x			Introduction await ongoing research in IS
		leptospermum spp.		x				x			and development of successful weed
		leucodendron spp.		x				x			control at field site
		verticordia		x				x			
		wax flower						x			
		c. Stand establishment (openfield):									
		Strelitzia stocks established	x		Oct-93				Jun-94		0.5 ha- refine weed and insect control
	Melaleuca stocks established		x	Feb-94						1 ha- 4 cvs. eval potential as cut branches	
	d. Improve cultural practices	Install shade cloth	x	x							On-going activity
			x								500 m2
		e. Improve post-harvest handling		x							Must await adequate production and tailor to diversity of stocks under production.
4 Marketing	a. Economics & marketing assessments				1994				Sep-94	Market analysis for cut flowers/ornamentals currently being developed	
5 Extension & Outreach	a. Technology transfer								Sep-94	First full field production is underway	

Project Implementation Goals/Activities Accomplishments at Azemour R D Site

Objective	Immediate	Activities	Achieved		Scheduled	Morocco	Israel	U.S.A.	Current	Comments		
			yes	no								
	Task											
5. Vegetable Production (Open & GH)	1 Site preparation	a. Site allocated	x									
		b. Field prepared- beds made	x									
		c. Drip lines installed-plastic mulch	x									
	2 Technical Personnel	a. Utilize existing personnel	x									
		b. In-house training	x								On going activity	
	3 Commercial open-field Vegetable production	a. Identify stocks/cultivars to exploit foreign & domestic markets		x								
		b. Purchase seeds		x								
		b. Sow seedlings, harden & transpl	melons	x					x	Jun-94	0.7 ha	
			tomatoes	x					x	Jun-94	0.8 ha- Varietal eval. disease rxn & fruit qual	
									Aug-94	0.3 ha- nematode resistance, hort.evaluation		
			artichokes	x				x	Oct-93	2 ha- 3cvs- refine cultural practices/market		
			asparagus	x					Mar-94	1.7 ha- 4cvs for evaluation-fresh&processed		
			raspberries	x					Feb-94	2.6 ha- 12cvs for evaluation-fresh&processed		
		watermelon						Jun-94	0.1 ha- cultural practices			
	4 Commercial Greenhouse Vegetable Production	a. Stand establishment :	melons	x					Aug-94	2.9 ha- plastic mulches, fusarium control		
			tomatoes	x						none		
		d. Improve cultural practices						Sep-94	On-going effort-Expts with melon plt shaping & IR plastic are encouraging			
		e. Improve post-harvest handling							Continuing evaluation & improvements			
5 Marketing	a. Assessment of local & export markets							Sep-94	Market assessments being developed			
6 Extension & Outreach	a. Demonstrations							Sep-94	Low tillage system and fusarium control in melons			
								Sep-94	New large-fruited tomatoes for open-field production			
								Sep-94	Ir/black plastic mulches for open-field establishment in tomatoes			

Project Implementation Goals/Activities Accomplishments at Azemour R D Site

Objective	Immediate	Activities	Achieved		Scheduled	Morocco	Israel	U.S.A.	Current	Comments	
			yes	no							
											source
6. Training & Extension	1 Training activities at Azemour Project Site	a. Technical short courses :		x					Sep-94	Potential topics formed - course content, timing, duration, & participants are being developed by the technical committee	
		Farm management									
		Irrigation & chemigation systems									
		Marketing strategies									
		Pest & disease control									
		Plant propagation									
		Plasticulture technologies									
			Post-Harvest Handling								
		b. In-house training of technical staff weekly planning sessions		x						Five trainees have received in-depth training to assume greater project responsibility	
			x						Seven trainees from Moroccan Agr. Inst. spent 6mos, on-site training in Agro-manag		
		2 Extension Programs	a. Technology transfer to local growers	x							Daily visits by numerous potential clients & interested parties tour the projects activities
			b. Demonstration projects on-site:								
			Plant protection	x	x					Sep-94	Low tillage system and fusarium control in melons; nematode resistance in tomatoes
			Vegetable production	x	x					Sep-94	New large-fruited tomatoes for open-field production
										Sep-94	Ir/black plastic mulches for open-field
	Ornamental production		x	x					Aug-94	Demonstration of potted plant products and rooting technologies	
	c. Develop informational bulletins		x						Jul-94	Amaris-speedling informational leaflet printed and distributed to potential clients	
	Distribution (formal & informal)	x	x					Sep-94	Fertigation PC guidelines distributed to growers in Azemour		
		d. Dissemination of information to Moroccan farms	x	x					Outreach programs will be developed as the project gains a greater technology base to share.		
			x					Aug-94	Follow-up/on-site advice provided to speedling clients		

Summary Worksheet for Ornamental Activities at the Project Site (1994-95)

Ornamental Species	Commercial Production	Mother plant	Propagules (rooted)	Month											
				Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
	Target	established	stock	fresh cuttings made											
Aglaonema maria		#	#	#	(by month)										
Canna lily															
Red	500														
Orange	500														
Yellow- spotted orange throat)	500	6													
-orange throat	500	6													
Chamedora															
wild palm	1000	206													
cv. Elegans	1000	731													
Croton (Codiaeum variegatum)															
cv # 1 Goldstar	500	94													
cv # 2 Aucubaefolium	500	194													
cv # 3 Excellent	500	70			25										
cv # 4 Goldfinger	500	13			7										
cv # 5 Pictum	500	24													
Dieffenbachia (dumbcane)															
cv # 1 Camila	500	24	31												
cv # 2 Tropic snow	500	24	43		46										
Dracena															
cv # 1 Boringuensis	500	202			101										
cv #2 Frajgrans	500	99			150										
cv # 3 Marginata tricolor	500	44	64												
cv #4 Colorama	500	47													
cv #5 Drememsiswarniki	500	100	35												
Ficus benjamina (weeping fig)															
cv # 1 ?Starlight	800	24	677												
cv # 2 Golden princess	800	26	465												

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Summary of Speedling Production Activities Related to Selected Cropping Establishment Cycles

Speedling Nursery Production		Jun-94	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
		Phase I	Phase II			Phase III											
Perennials																	
Artichokes																	
(stumps) Units to date	0	10															
Current period				10	40.6												
(seeds) Units to date	0	16															
Current period			10	6													
Field establishment:																	
Azemour pc	NA																
Azemour of				XXXX	XXXX	XXXX											
Asparagus																	
(crowns) To date	0	none															
Current period					30												
(seeds) To date	0	18															
Current period																	
Field establishment:																	
Azemour pc	NA																
Azemour of					XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX				
Raspberries																	
Units to date	none	none															
Current period																	
Field establishment:																	
Azemour pc	NA																
Azemour of					XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX				
Annuals																	
Broccoli (Cauliflower)																	
Units to date	none	none															
Current period																	
Field establishment:																	
Azemour pc	NA																
Azemour of					XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX				

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Summary of Speedling Production Activities Related to Selected Cropping Establishment Cycles

Nursery production(contd)		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Melons	Phase I		Phase II			Phase III															
	Units to date	565	124																		
	Current period		64	60	?120																
	Field establishment:																				
	Azemour pe																				
	Azemour of		XXXX	XXXX	XX		XXXX	XXXX	XXXX												
Peppers	Phase I		Phase II			Phase III															
	Units to date	17.1	55																		
	Current period		5	50																	
	Field establishment:																				
	Azemour pe	XXXX	XXXX	XX																	
	Azemour of																				
Tomatoes	Phase I		Phase II			Phase III															
	Units to date	114.8	1305																		
	Current period		105	1200	230																
	Field establishment:																				
	Azemour pe		XXXX	XXXX	XXXX	XX															
	Azemour of																				
Watermelon	Phase I		Phase II			Phase III															
	Units to date		6																		
	Current period																				
	Field establishment:																				
	Azemour pe	NA																			
	Azemour of																				
Zucchini	Phase I		Phase II			Phase III															
	Units to date	1.1																			
	Current period		none																		
	Field establishment:																				
	Azemour pe																				
	Azemour of																				
Cucumbers	Phase I		Phase II			Phase III															
	Units to date	1.4	none																		
	Current period																				
	Field establishment:																				
	Azemour pe																				
	Azemour of																				

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Cooperative Agricultural Research Program



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MEMORANDUM

DATE: November 16, 1994
TO: Distribution (listed below)
FROM: Dr. Bonnie Stewart *BJS*
U.S. Project Director
Morocco Project
San Diego State University Foundation
RE: 1994 Annual Technical Report

In support of our contract with the Agency for International Development to operate the Moroccan Cooperative Agriculture Development Project (Grant Number: 0158-F-00-2075-00), I am pleased to enclose the 1994 Annual Technical Report covering the period October 1, 1993 - September 30, 1994.

Please let me know if you have any questions regarding this Regional Cooperation Program.

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