MINISTRY OF MAHAWELI DEVELOPMENT

MAHAWELI AUTHORITY OF SRI LANKA

CANTALOUPE MELON ASSESSMENT FOR MAHAWELI SYSTEM B

by

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(Report No. 218)

Mahaweli Economic Agency

Mahaweli Engineering and Construction Agency

MARD PROJECT

Pimburattewa
via Polonnaruwa

Development Alternatives, Inc.
Colorado State University
Oregon State University
FINTRAC, Inc.
Post - harvest Institute
for Perishables

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List of Annexure.

Annexure 1	General Layout of Mahaweli System B.
Annexure 2	Climatic Data for Mahaweli System B.
Annexure 3	Cantaloupe Growing Recommendations 1992.

Abbreviations.

USAID	United States Agency for International Development.
MEA	Mahaweli Economic Agency.
MARD	Mahaweli Agricultural and Rural Development Project.
RARC	Regional Agricultural Research Center.
DOA	Department of Agriculture.
OFC	Other Field Crop.
PMU	Planning and Monitoring Unit for the Mahaweli.
AO	Agricultural Officer for the Mahaweli.

CONTENTS

		Page
1.0	BACKGROUND	01
2.0	INTRODUCTION	03
3.0	TRIAL 1. MEA SEED FARM YALA 1990	04
	3.1 Conclusions	05
4.0	TRIAL 2. MEA SEED FARM YALA 1991	06
	4.1 Conclusions	08
5.0	TRIAL 3. CANTALOUPE PRODUCTION TRIAL MAHA 1991/2	09
	5.1 Conclusions	11
6.0	TRIAL 4. CANTALOUPE MELON TRIAL YALA 1992	12
	6.1 Grapes	13
	6.2 Conclusions	17
7.0	TRIAL 5. CANTALOUPE/ROCKMELON TRIAL 1992/3	18
	7.1 Conclusions	20
8.0	TRIAL 6. MUSKMELON TRIAL YALA 1993	21
	8.1 Conclusions	28
9.0	CANTALOUPE GROSS MARGIN 1993	29
10.0	HORTICULTURAL CONCLUSIONS AND RECOMMENDATIONS	32
11.0	GENERAL COMMENT	34
12.0	ANNEXURES	36

BACKGROUND

The Mahaweli Agricultural and Rural Development (MARD), funded by USAID and managed by Development Alternatives Inc (DAI), commenced activities in 1988, with the main aim of improving farmer incomes through crop diversification, specifically to a region known as Mahaweli System B. (see annexure 1)

Mahaweli System B basically denotes an area of irrigation which was and still is being developed for paddy production. However, the income derived from paddy by a settler with the present land policy is not enough to sustain his average needs. (see report from Mahaweli PMU).

Crop diversification is seen as a way of improving the settlers income from the allocated hectare of irrigated land.

It must be noted that many of the settlers in System B are not experienced farmers and are therefore, wisely, very cautious of trying something new. Consequently on arrival in System B, it was necessary to look at traditional crops and markets for this increase of income, such as Greengram, Blackgram, Cowpea, Chilli, B Onion, Brinjal etc. It became evident very early in the life of the project that System B was greatly disadvantaged with regards these crops. Firstly, a conservative local market had traditional sources of supply for these conventional crops, which were closer to population centers and more reliable. And secondly the returns from these types of crops, although giving a better income than paddy, did not seem to tempt the settlers to diversify. The lack of interest might also have been a historical understanding of the difficulties of marketing these crops, especially as the water issue system often limited planting times and created gluts of these crops in the market.
It was apparent that if incomes were to be increased for a large number of farmers/settlers a new marketing strategy had to be found. If this new strategy was not found the settlers would be condemned to small volume production for the local shops and market days, thereby benefiting only a few farmers.

There were two approaches taken. The import substitution role, where contacts were made directly with parastateal organizations so that prices and delivery could be arranged through farmer organizations or marketing cooperatives. Again, however, it soon became clear that the returns to the farmer, at the strict specification required by the parastatals, was difficult to manage and the contracts were often unreliable. The pricing from these parastatals was dependant on the timings of their importations or other political factors. Nevertheless, two commodities, B. onion and green/dry chili production showed promise and work to promote these crops continues.

The second approach was to look at the potential export markets for

commodities that were likely to be adapted to the environment of Mahaweli System B. It was understood, when the selection for an export commodity was made, that it would leave a natural percentage of the commodity for local sales. If the type of fruit or vegetable selected for export was not already commercially grown in the country, the local market would need to be developed and could initially be very lucrative.

The MARD export marketing and horticultural components short listed cantaloupe and honeydew melons as having potential in various regional export markets. It was also noted that these melons were being imported into the local market from Australia at very high prices.

Therefore, it was decided that it was possible that both an export market and local market might exist for these melons.

INTRODUCTION.

Mahaweli System B is situated in the Dry Zone of Sri Lanka. The climatic data (Annexure 2) indicated that this area might be well adapted to the growing of cucurbits. In 1989 the Gherkin production businesses were already being developed by various commercial companies in many of the Mahaweli Systems including System B. Other members of the cucurbit family such as Snakegourd and Bittergourd had been grown for many years in the area. It was very possible that both Honeydew and Cantaloupe melons would produce good yields in the area. It was therefore a little surprising that the Dept of Agriculture (DOA) had no identifiable data on these crops. Some data and research was found on watermelon production, but little of this data was transferable, when designing cultural practices for Honeydew and Musk melon (Cantaloupe) production.

The lack of experience in Sweet melon production in Sri Lanka prompted the MARD project to site the initial trials at the MEA Seedfarm, unlike other crops such as Okra, Babycorn and Zucchini, which had been put out to settler farmers very promptly for 'on farm' trialing. Honeydew and Cantaloupe production trials were initially limited to the MEA Seed farm, as it was possible to provide close supervision by the MARD staff.

Melon trials were started in Yala 1990 and continued in Yala 1991 These trials have already been reported in, 'Mahaweli Seed Farm Trial' Yala 1990 and 1991. However a precis of the results is included in this report to give the reader an overall view of the development of this crop.

Initially in early 1990, it was the view of the MARD marketing component that Honeydew melon production for sea freight shipment to Europe might be the best market for Mahaweli System B farmers to exploit. Therefore, in Yala 1990 an initial trial (Trial 1) was carried out with the only available variety at the time, this being provided by the Senior Agronomist from MEA.

TRIAL 1. MEA SEED FARM YALA 1990.

Objectives:

1. To confirm adaptability of a Honeydew melon variety.

2. To assess new cultural techniques.

Cultural Techniques Used:

Melon type:	Honeydew.
Planting Date:	04.6.90.
Soil Type:	NCB
Land preparation:	Raised Beds.
Spacings:	Width 250 meters. Between planting stations 60 cm
Seeding:	Three seeds per station.
Basal Fertilizing:	Urea. 200 Kg/hectare. TSP. 200 Kg/hectare. MOP. 150 Kg/hectare.
1st Top Dressing:	Urea. 10 gms/station. Potash. 10 gms/station.
2nd Top Dressing:	Urea. 10 gms/station. Potash. 10 gms/station.
Yield from 776 sqm	257.5 Kg 3,318 kg/Hectare.

CONCLUSION TO TRIAL 1.

This trial's objective was to assess the adaptability of this honeydew melon variety. It was felt that a combination of a poor soil type and misjudged cultural techniques were to blame for the inferior yield performance of this variety. The potential of most honeydew varieties is at least ten times higher than that achieved by this trial.

Various indicators from this trial, were noted, which could help improve the cultural recommendations for melon growing and therefore the development of the crop.

1. It appeared that in some parts of the fields, where the soils were heavier and organic matter content high, the plant growth was much improved and yield/plant higher.

2. Preemergence seed removal by rats, weevils and birds were a major cause of a poor stand and methods of seed protection prior to germination had to be designed. It was noted that on post emergence these pests were not a problem.

3. System B has for a large part of the Yala (Dry) season prevalent winds that average in the region of 10 mph. The planting stations position on the soil beds have to bear this in mind. The bed should, if possible be at right angles to the wind direction and planting stations should be on the windward side of the bed.

4. Large physical damage was sustained by the young plants and was attributed to "Cucumber" weevil (orange winged insect). This pest arrived regularly in large numbers. A second soil larva was also identified as a major pest. This larva bored into the roots of the young plants. It was decided that a soil applied insecticide such as carbofuran would be necessary until the life cycles of these pests could be observed, and other methods perhaps designed.

5. It was also noted that the plant cover could be increased therefore an increased plant population would be used in further plantings.

In general it was still felt that melons were adapted to System B Yala climate and further trials were considered.

TRIAL 2 MEA SEEDFARM YALA 1991.

The marketing component of MARD by 1991 had identified a regional market for 'Musk melons'. It was felt that the regional market opportunities outweighed the lower priced and distant European market for Honeydew. Therefore, the horticultural component was asked to evaluate seven 'musk melon' varieties. These varieties included four 'Cantaloupe types' defined as orange fleshed, round in shape, and netted in appearance.

Objective:

1. To trial different plant spacing and positioning on a standard bed.

2. To assess the yield potential (adaptability) of seven 'musk melon' varieties with a standard growing technique, improved from the experiences of the 1990 Yala trial.

TRIAL DATA.

Varieties Used:
- Christmas
- Palestro
- Saporoso
- Tasty Sweet
- Mission
- Fiesta
- Ole'

1. Various plant spacing and seed positionings were tried.(Seed Farm Adaptability Trials) and from these trials the most adaptable spacing was used in a future farmer handout.

2. The following Cultural Techniques were used to assess the yield potential of the various varieties.

Planting Date.....11th June 1991

Seed Rate for the ground plantings.....1.4 kilos/hec

Germination.....75% at 5 days
Seed Treatment Actellic Dust
Thiram Dressed

Back up Transplants for gapping up.

Basal Fertilizer and Agrochemical:
- Ammonium Sulphate..... 400 kg/hectare
- TSP.....400 kg/hectare
- MOP.....600 kg/hectare

Carbofuran 3%.....200 kg/hectare
1st Top Dressing (32 days) Urea 10grms/station
225 kg/hectare
2nd Top Dressing (50 days) Urea 10grms/station
225 kg/hectare
Agrochemical Post Basal:
Lebycid
Actellic
Ambush.

Yield Data.

VARIETY	EXPORT FRUIT in KGs	LOCAL/PROC'S in KGs	YIELD FROM TRIAL AREA	TOTAL YIELD per Hec
Christmas	9.25	43.00	52.25	12,440.5
Palestro	894.75	363.00	1,257.75	32,584.2
Saporoso	120.00	436.75	556.75	18,017.8
Tasty Sweet	**818.45**	**131.70**	**950.15**	**36,827.5**
Mission	550.70	109.00	659.70	28,435.4
Fiesta	500.60	160.50	661.10	28,012.4
Ole'	7,406.80	1,510.45	8,917.25	20,584.6

N.B. It was noted after planting that the 'Christmas' melon variety, had mixed seeds and was therefore not a pure variety.

AVERAGE BRIX VALUES PICKED AT FULL SLIP.

1. Christmas	6.0%
2. Palestro	10.0%
3.* Saporoso	**14.0%**
4. Tasty Sweet	11.0%
5. Mission	8.0%
6.* Fiesta	13.0%
7.* Ole'	13.0%

* These varieties had green fresh and had lightly netted exteriors. They are musk melons but not Cantaloupes.

N.B. All varieties trialed were hybrids with the exemption of Christmas.

CONCLUSIONS FOR TRIAL 2

Following the improved cultural practices of this trial, it was clear that musk melons were adapted to the growing conditions prevailing during Yala in System B. (See Annexure of Climatic Data)
It was noted that the yields obtained were close to the possible field potentials of these varieties anywhere in the world.

The marketing component confirmed that the regional export market targeted had a preference for orange fleshed varieties (cantaloupes). Therefore three varieties were singled out for closer scrutiny, Palestro, Tasty Sweet, and Mission. It was not hard to see that Tasty Sweet (Sunseeds) was the first variety to continue and expand. Palestro however, although high yielding in total, had too many poor quality fruits to be suitably used as an export variety, therefore Mission was selected as the other variety with which to continue experimentation.
It was clear from the trial that the green fleshed musk melon varieties had better brix values, under the same climatic conditions, than the orange flesh type. Therefore, if the preference for orange flesh was not a determining factor in the market and increased sweetness a strong factor, I would recommend a continued look at the green flesh musk melons.

Following this trial the marketing component identified a buyer in Singapore. The buyer saw the two varieties, Tasty Sweet and Mission and confirmed that these varieties if shipped to Singapore during August and September would have a good market. It was therefore decided that if (a) a contract was signed and (b) post harvest facilities were in place, the System B settler farmers would have a good opportunity to get into export horticulture in Yala 1992.

MAHA 1991/2 CANTALOUPE PRODUCTION TRIAL. NO 3

Justification.

Following the success of the Yala 1991 Trial, the marketing component suggested that there was an opportunity to sell melons in February and March, but only if the quality of melons in the late part of the Maha season in System B was similar to the Yala production. The opportunity was a perceived opening in the Middle East market during Ramadan (MARCH). This market is traditionally supplied through the port of Dubai by Australia and high cost melon production from Jordan. The normal Middle East melon suppliers of Iran and Egypt are not in production at this time.

It was decided to try and grow for that market and the following trial commenced in January 1992. It was understood that this period would not be ideally suited to quality production. (See Annexure on Climatic Data)

Objective.

1. To determine export quality yield potential of cantaloupe melons yielding in the month of March in System B.

Trial Techniques and Data.

A. Location..... Free draining soils at Dharmasenna Farm.

B. Objectives:

1.To trial the possibility of growing export quality cantaloupes during late Maha season.

2.To test market production to specified market.

C. New Cultural Techniques (specific to this season).

1. Seeding melons into pots in mid December under artificial protection.

2. Transplanting melons into the field in early January.

3. The use of a trellis system onto which the melon vines could be trained off the ground.

4. The increased use of specific fungicides as protective sprays.

5. The practice of flower removal from the trellised plants. Removal of all flowers upto 20 cm from the base of the plant.

All other cultural techniques were the same as practiced during the Yala trial of 1991 detailed in Annexure No 3

D. Varieties Used:

Tasty Sweet.
Gold Mark.
Top Star.

E. Area Planted

1. Tasty Sweet ..... 4,934 sqm

2. Gold Mark..... 1,428 sqm

3. Top Star..... 1,110 sqm

F. Transplanting Date: 27.12.91 - 31.12.93.

G. Seed Rate used in transplanting:

1. Tasty Sweet..... 500 grms.

2. Gold Mark..... 250 grms.

3. Top Star..... 250 grms

H. Transplanting Technique:

Two seed per pot were seeded. It was noted that 98% germination occurred at 7 days after seeding. The potted plants were transplanted at 8 days after seeding. The cotyledon stage was used as an indicator to transplanting time, as reduction in survival rates would occur if transplanting was delayed to the first true leaf stage.

I. Harvesting Data:

All varieties commenced harvest 60 days after seeding. 23.2.92.

1. Fruit Data.

VARIETY	No of VINES	No of Fruits	Average Fruits/plant
Tasty Sweet	7,476	21,570	2.89
Gold Mark	2,116	5,060	2.39
Top Star	2,150	4,579	2.13

2. Yield Data:

VARIETY	Marketable yield kg	Reject yield kg	Av Fruit weight kg	Area grown sq	Yield per hectare
Tasty Sweet	10,128	490.0	0.49	4,934	21,520
Gold Mark	3,972	246.0	0.83	1,428	29,538
Top Star	3,487	887.5	0.96	1,110	39,410

CONCLUSIONS FOR TRIAL 3

At first appearance this trial seemed to indicate that cantaloupe melons, especially the variety Top Star, would be adapted for production in late Maha. It would therefore be possible to produce quality melons for export during this period using the revised growing instructions.

Unfortunately, although the general appearance of the melons was acceptable the eating quality in general was not acceptable. The average brix values were perceived to be much lower than in Yala season growing. This, however cannot be quantified as no brix testing was done in this trial.

The general view was, as the sunlight hours are lower during this period and as rainfall occurred during the last two weeks before harvest, that these factors could have contributed to the lower brix values.

A second opinion offered, suggested that premature fruit drop was caused by the late rains that the crop received, which in turn reduced the brix values.

A third opinion offered suggested that increased disease pressure in the form of Alternaria Blight caused premature fruit drop, which again reduced brix values.

This trial was therefore inconclusive, and indicated that to provide product for the export market at this time of year would require more work.

CANTALOUPE MELON TRIAL YALA 1992. NO 4

Justification

By Yala 1992, following the results of the 1991 Yala trial, a buying contract for cantaloupe was signed and packhouse facilities constructed. Commercial melon production started in Kalukelle and Mahadammina.

It was noted and understood that for export shipments of any kind that the timing of the production was vital. Sea shipments of 10 to 20 tonnes of the commodity would require large numbers of farmers planting in blocks. In this way shipping schedules could be accommodated. It would therefore be helpful to understand the yield distribution of the varieties being used in the ongoing commercial production. This would give the contractor more confidence when timing his production.

Objective.

To determine a general pattern of yield distribution of three commercial varieties.

TRIAL DATA.

Location: Regional Research Station Aralaganwila.

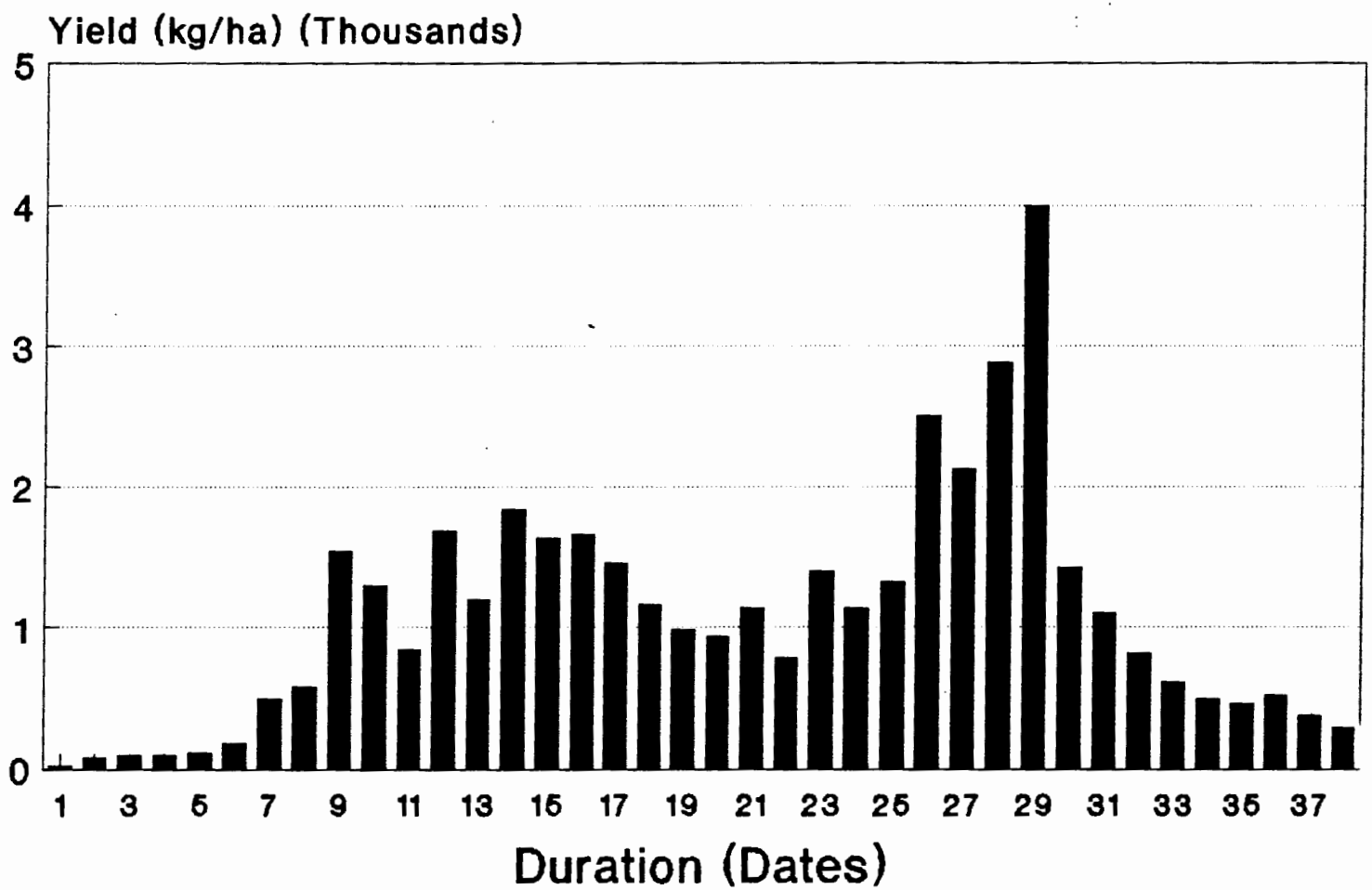
VARIETY	No of fruit per hectare	Average fruit size	Area Grown	Yield per hectare
1. Mission	42,480	0.56 kg	391 sqm	23,887 kg
2. Tasty Sweet	48,833	0.84 kg	343 sqm	41,112 kg
3. Gold Mark	20,736	1.06 kg	489 sqm	21,942 kg
4. Tamdew	15,912	1.05 kg	482 sqm	16,660 kg

* Tamdew a honeydew type melon.

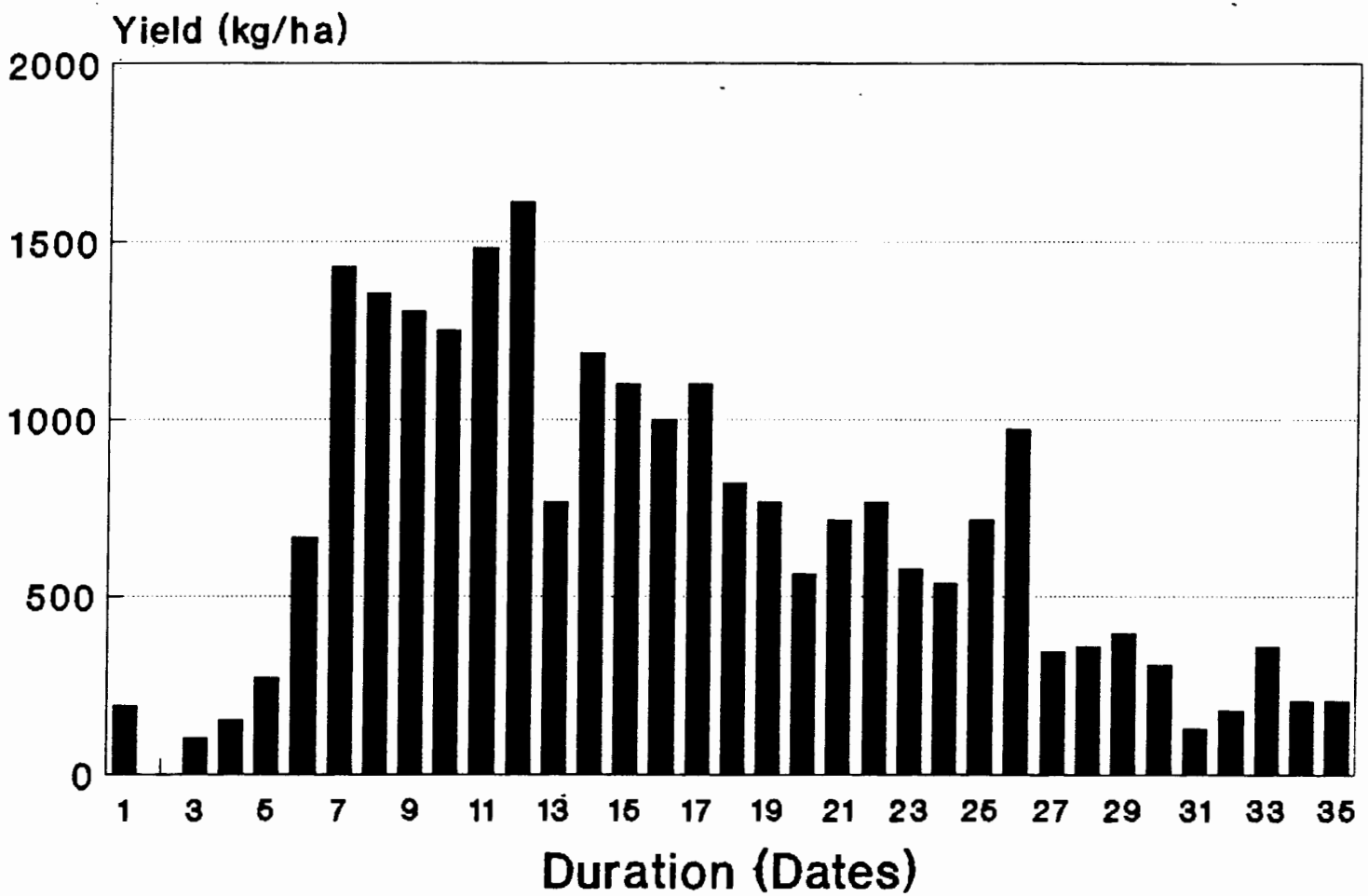
The cultural techniques were obtained from the MARD project growing handout which had been given to the commercial farmers in System B. (See Annexure 3)

Shown on the next page are graphic illustrations of the yield distributions of the varieties tested.

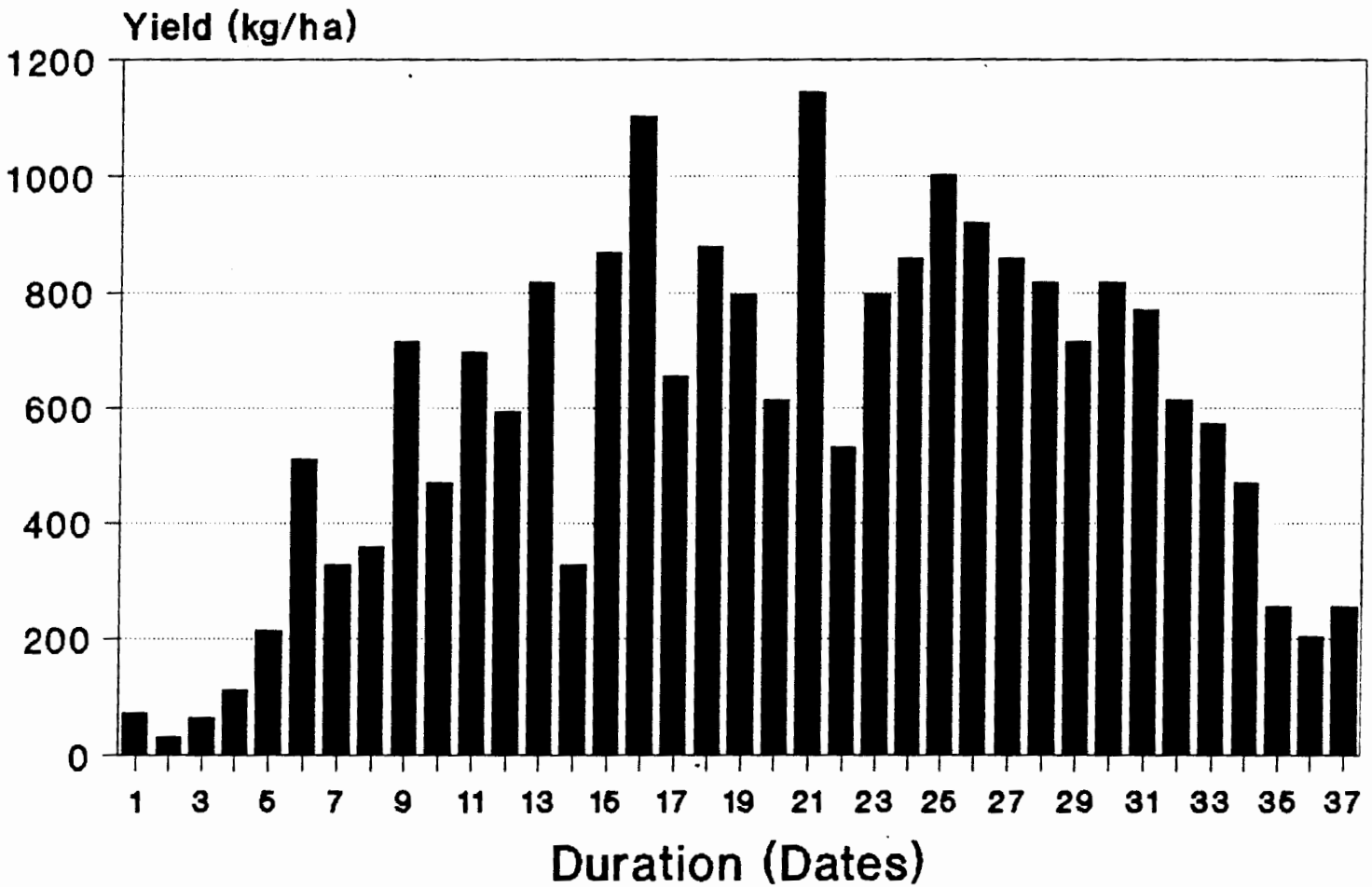
Yield Distribution of C'melon (T'sweet) Marketable at Field Level Graded



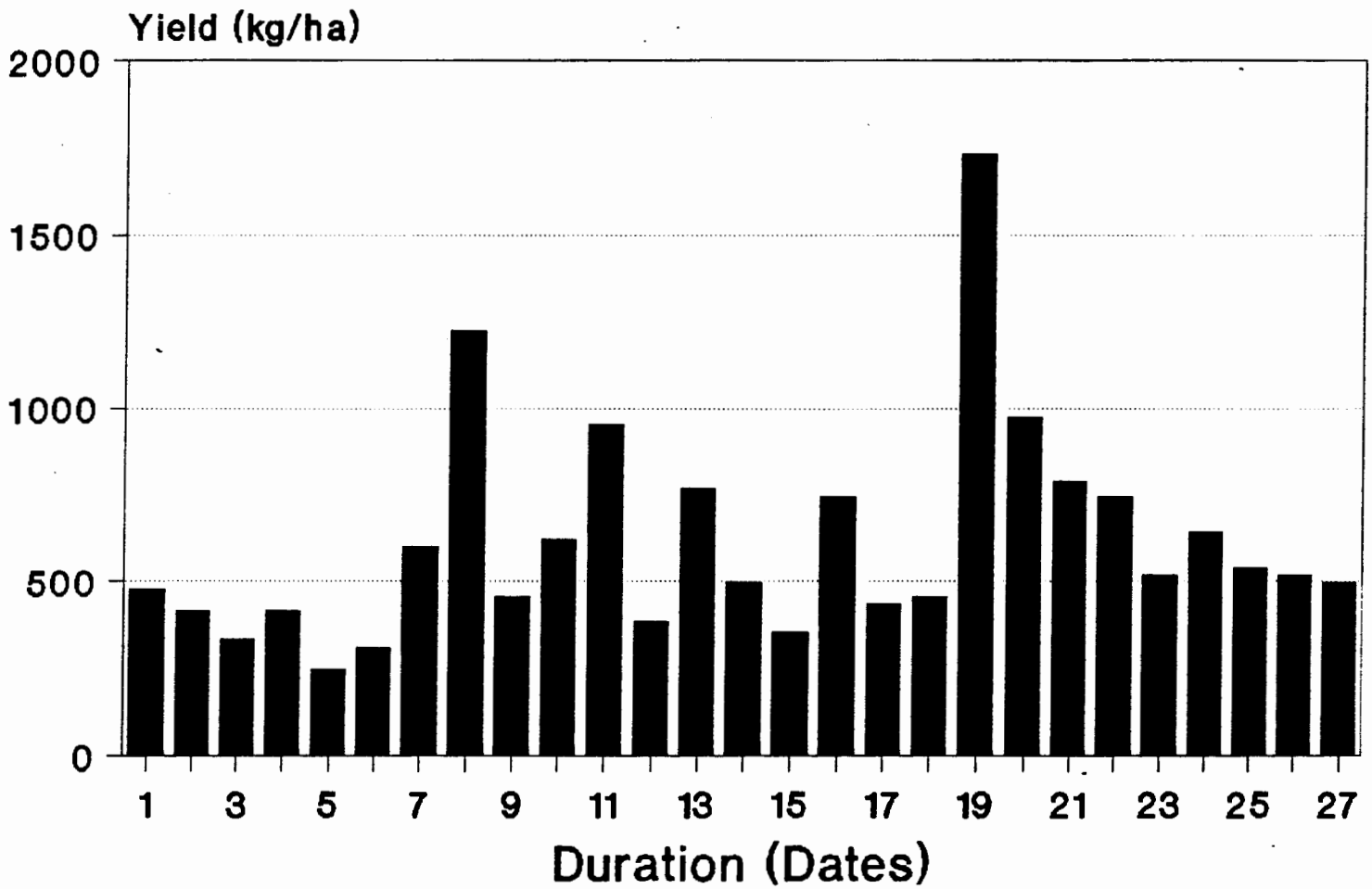
Yield Distribution of C'melon (Mission) Marketable at Field Level Graded



Yield Distribution of C'melon (G'mark) Marketable at Field Level Graded



Yield Distribution of C'melon (T'dew) Marketable at Field Level Graded



CONCLUSIONS TO TRIAL 4.

This trial demonstrates that within a similar overall harvesting period of 32 to 37 days that there is some variation between the daily yielding patterns that appear to be related to the variety cultivated.

This information is very important to companies purchasing melons for sale in a market that requires uniformity of supply.

The company/farmer who is trying to program his production, would therefore greatly benefit from reliable information of the likely daily supply of this product from the field. However, various factors other than variety can be used to program his production. The use of the following techniques with cantaloupe melons can also help.

1. The varying of the picking stage, for example, picking a percentage of the crop at full slip followed by picking the crop at half or three quarter slip can vary daily production.

2. The use of post harvest technology to increase the shelf life of the commodity.

3. The use of many varied planting times within the monthly production to balance any potential variation in daily production.

Although these techniques can be used to help counteract irregular production, reliable knowledge of the pattern of production of a particular variety compliments the other factors of producing regular supplies for a precise market place.

It must be noted that in this trial the fruit was picked at full slip and each variety was treated with similar cultural practices. However, one experiment cannot determine whether in different climatic conditions the varieties would react in a similar pattern.

It is therefore necessary to continue this work to determine if a regular pattern can be established for each variety.

PLEASE NOTE THAT COMMERCIAL PRODUCTION OF CANTALOUPE MELONS COMMENCED AND WAS SUCCESSFULLY COMPLETED DURING YALA 1992. THIS PRODUCTION PROGRAM WAS REPORTED BY THE PLANNING AND MONITORING UNIT OF THE MAHAWELI BY MR. TITTAGALA, IN EARLY 1993. FOR A COPY, PLEASE WRITE TO THE DIRECTOR P.M.U. MAHAWELI

CANTALOUPE/ROCKMELON TRIAL MAHA 1992/3 TRIAL 5

Justification:

It was deemed necessary that following the trials in Maha 1991/2., it was essential to continue work on various varieties that might be more adapted to the production of a quality product in the more humid conditions prevailing at this time of year.

Objective:

To test the yield potential and quality of various Rock melon varieties and existing Cantaloupe varieties planted in late Maha.

TRIAL DATA.

1. Location: Farmers fields in Kalukelle.

2. Varieties Tested: Eastern Star.
   Eldorado.
   Green Delica.

   Control Varieties: Tasty Sweet.
   Mission.
   Gold Mark.

3. Area and Yield results. SEE NEXT PAGE.

4. Cultural practices as previous Maha trial.

5. Dates of planting from 19.1.93 to 24.1.93

Yield information obtained

FARMER	VARIETIES	F.C.	AREA	QUALITY 1st	QUALITY 2nd	QUALITY REJECT
W.A.LAL	GOLD MARK ELDORADO	30	500	280.0	50.0	250.0
JAYA-SEKARA	TASTY SWEET EASTERN ST	20	1,000	49.9	92.9	118.5
LAXMAN GAMINI	GOLD MARK ELDORADO	31	500	10.4	66.7	128.9
MATHUPAL	TASTY SWEET EASTERN ST	20	500	50.4	150.0	100.0
BASIL EL'SINGE	GOLD MARK ELDORADO	48	500	---	14.7	81.4
K.D.M. M'BANDA	GOLD MARK ELDORADO	48	500	---	---	---
SAMAN KUMARU	GOLD MARK G'DELICA	--	500	11.6	63.6	44.4
ROHINI PIERIS	TASTY SWEET EASTERN ST	35	1,000	6.75	---	---
W.A.PRE' CHANDRA	TASTY SWEET EASTERN ST.	37	1,000	29.6	212.5	501.5
S.G.GUN' TTILAKE	TASTY SWEET EASTERN ST.	38	500	71.0	260.5	217.5
D.R.SEN' ARATNE	TASTY SWEET EASTERN ST.	41	1,000	43.8	186.0	337.35
PREMA' SIRI	GOLD MARK G' DELICA	42	500	1.0	94.0	83.0
NANAYA' KARE	GOLD MARK G' DELICA	42	500	14.1	80.6	154.9
H.A.POD' MENIKE	TASTY SWEET G' DELICA	--	500	49.1	209.35	169.2
H.A.ABE' THILAKE	MISSION ELDORADO	--	500	8.5	50.3	139.6
BUDDA' DASA	GOLDMARK ELDORADO	--	500	13.1	27.7	77.7

YIELD DATA OBTAINED FROM 'GOODS RECEIVED NOTES' FROM TESS CO.

CONCLUSIONS TO TRIAL 5

This trial ran satisfactorily until the harvest period, the design could have given us some interesting information on the performance of the tested varieties grown in late Maha. However, at harvest the farmers did not keep to their side of the bargain, which was to sell all the production to the project. It is estimated that 90% of the 1st grade fruit was sold to outside traders and another 75% of the 2nd grade fruit went the same way. We did, however, get all the reject fruit as there had been an agreement to pay for all the fruit at a fixed price.

The design for data collection had been that the quantity and quality of each variety from each farmer would be noted at the field by the extensionists. This was partially completed, however the same information on yield and quality was then to be collected when the fruit arrived at Tess Co. as a second check. Even with the double checking a large amount of the crop was not accounted for as farmers would harvest when the extensionists were not present and sell to other traders.

Therefore, the tables of yield do not have any value, in our opinion, as true indicators of variety performance.

The trial did show that farmers' fields are not the place to do any form of detailed trialing, especially when the commodity that is being trialed has a ready local market. Yield data collection becomes very difficult when the farmers harvest the production at night to avoid detection.

It was agreed that future trials of this sort should return to a controlled environment where the project did the growing itself in areas such as the MEA Seed farm, the RARC, or rented land on commercial farms.

MUSK MELON (CANTALOUPE/ROCKMELON) TRIAL 6 YALA 1993.

Justification.

Following market investigation in Singapore and Hongkong, it was established that the main competitor in these markets was the Australian 'Rock melon'. It was therefore suggested that these varieties be sourced, so that they could be tested against the existing varieties. At the same time, it was thought necessary to test a group of new varieties of cantaloupe, green fleshed musk melon, and honeydew, perhaps adding to the range of adaptable varieties.

Objectives.

1. Assess total yield and marketable yield at certain specifications of the varieties trialed.

2. To confirm the average brix values of the varieties tested.

3. Make a general assessment of the varietal resistance to the prevailing pests and diseases.

TRIAL DATA.

1. Location: MEA Seed Farm Aralaganwila.

2. Date of seedings: Varieties 1 to 8..... 21.5.93.
   9 to 13.....26.5.93.

3. Numbers of seeds sown/station.....

4. Seeding Position.....30cm from the windward side of the bed.

5. Spacing Used for all varieties..... 100cm x 60 cm

6. Plants retained/station..... 2 plants/vines

7. Basal Dressing used and application method.

   Ammonium Sulphate.....285 kg/hectare.
   Triple Super Phosphate.....285 kg/hectare.
   Muriate of potash.....430 kg/hectare.
   Carbofuran 2.5%.....60 kg/hectare.

The basal dressing was mixed and incorporated at 7.5 to 10 cm depth in a strip of 60 cm on the seeded side of the bed, two days prior to seeding.

8. Varieties, Type, and Trial Area.

VARIETY TESTED	TYPE	AREA sqm
1. Dubloon.	F1 Hybrid Rock Melon	300
2. Hotshot.	F1 Hybrid Rock Melon	300
3. Malibu.	Unknown Hybrid Rock Melon	300
4. Planters Jumbo.	Open polinated Rock Melon	300
5. Sunex 7002.	Hybrid Cantaloupe	300
6. Gold Mark.	Hybrid Cantaloupe	300
7. Mission.	Hybrid Cantaloupe	300
8. Tasty Sweet.	Hybrid Cantaloupe	300
9. Sun-7002.	Hybrid Cantaloupe	550
10. Picasso	F1 Hybrid Musk Melon	405
11. R.F. Honeydew.	F1 Hybrid Honeydew Melon	90
12. R.F. Honerum Star	F1 Hybrid Honeydew Melon	90
13. Dream Melon.	F1 Hybrid Musk Melon.	75.

9. Trial Setup:

a) Varieties numbered one to eight were planted in a randomized system.

There were three areas, the varieties were planted in 100 sqm plots in each section in a random fashion.

b) Varieties numbered 9 to 13 were placed in one area and were not randomized.

10. Top Dressing Fertilizer.

This fertilizer was incorporated at each station and followed by a LIGHT irrigation.

1st application 14 days after seedling 225kg/hectare of Urea (10gms/station)

2nd application 28 days after seedling 225kg/hectare of Urea (10gms/station)

11. Pests and Diseases identified or best guess.

a) Rats

Major losses of seed can occur prior to germination from rats who

dig the seed up and eat it. Control methods, such as the use of highly smelling pesticide drenches in the seeding stations, can help in small areas. The physical covering of the seed by coconut shell can be very effective. However, in this case the use of an **active** night watcher, for three days following seeding, controlled the pest.

b) Damping Off

All seed was thiram treated, however a soil borne disease effected all varieties to a greater or lesser degree one week after germination. A spray of thiram (Phormasol Forte) at this stage, seemed to control the disease.

c) Virus.

Assumed Cucumber Mosaic virus was seen on a few of the varieties from the sixth week. Dubloon and Planters Jumbo seemed very susceptible. Heavily infected plants were removed.

d) Alternaria leaf Blight.

This disease was identified during the eighth week of the crop. The infection seemed to be controlled by the use of mancozeb at the recommended rate.

e) Fusarium Species.

These were found on all varieties, Topsin was used for its control.

f) An unidentified insect.

This pest appeared throughout the growing season of the crop, feeding on both leaf and boring into fruit. This insect was controlled by both Selicrone and Endosulphan.

12. Yield Data.

1. POTENTIAL MARKETABLE YIELD DATA.

Variety	Block 1.	Block 1.	Block 2.	Bloc 2.	Block 3.	Block 3.	TOT	ALS
------	Kilos	NOS	Kilos	NOS	Kilos	NOS	KG	NOS
Dubloon	172.0	126	270.5	187	292.0	226	734.5	539
Hotshot	232.5	182	316.0	210	241.5	202	789.5	594
Malibu	291.5	215	421.5	333	307.5	234	1020.5	782
Planter Jumbo.	156.0	114	144.5	108	278.5	221	579.0	443
Sunex 7002	251.5	154	423.5	257	428.0	285	1103.0	696
Gold Mark	406.0	262	292.0	213	259.0	189	957.0	664
Mission	190.0	198	295.0	286	266.5	244	751.5	728
Tasty Sweet	235.0	204	241.0	215	265.5	253	742.5	672

2. REJECT YIELD DATA.

Variety	Block 1.	Block 1.	Block 2.	Bloc 2.	Block 3.	Block 3.	TOT	ALS
-------	Kilos	NOS	Kilos	NOS	Kilos	NOS	Kilos	NOS
Dubloon	163.5	101	98.0	96	103.0	94	364.5	291
Hotshot	73.0	78	118.5	93	128.5	137	320.0	308
Malibu	167.0	130	25.5	28	97.5	89	290.0	247
Planter Jumbo.	173.0	134	162.0	126	75.5	57	583.5	317
Sunex 7002	102.0	70	126.0	83	80.5	50	308.5	203
Gold Mark	107.5	68	141.0	99	83.0	63	331.5	230
Mission	84.0	96	68.5	69	62.5	68	215.0	233
Tasty Sweet	62.0	58	111.5	115	42.5	52	215.5	225

YIELD SUMMARY OF TRIAL 6.

VARIETY	Av Markable Yield kg/hec	Av Reject Yield kg/hec	Total Yield Kg/hec	Av fruit weight (kg)
Dubloon	24,483	12,150	36,633	1.33
HotShot	26,317	10,667	36,984	1.23
Malibu	**34,017**	**9,658**	**43,675**	**1.27**
Planter Jumbo	19,300	19,450	38,750	1.55
Sunex 7002	**36,767**	**10,283**	**47,050**	**1.57**
Gold Mark	31,900	11,050	42,950	1.44
Mission	25,050	7,167	32,217	0.98
Tasty Sweet	24,750	7,183	31,993	1.06
Sun7002	17,100	13,930	31,030	1.47
Picasso	3,827	12,827	16,654	0.93
R.F. Hon'dew	6,223	11,777	18,000	1.23
Honerum Star	7,215	12,063	19,278	1.51
Dream Melon	8,334	23,066	31,400	0.85

Other fruit factors

AVERAGE BRIX % VALUE AND AVERAGE MARKETABLE YIELD PERCENTAGE.

VARIETY	Av BRIX%	% MARKETABLE YIELD	GENERAL APPEARANCE
1. Dubloon	6.6	66.8%	Unnetted, oval Sectioned
2. Hotshot	9.7	71.2%	Well netted Round
3. Malibu	8.0	77.9%	Slightly netted Oval, Sectioned
4. Planters Jumbo	7.6	49.8%	Netted, Round, Sectioned.
5. Sunex 7002	8.9	**78.1%**	Slightly netted Round,Sectioned
6. Gold Mark	8.9	74.3%	Well netted, Round.
7. Mission	9.7	77.8%	Well netted, Round.
8. Tasty Sweet	**10.9**	70.1%	Well netted, Round.
9. Sun 7002	8.0	60.6%	Netted, Round Sectioned.
10. Picasso	6.2	23.0%	Unnetted, light green color.
11. R.F. Honeydew	9.2	12.0%	Rough skin,pale yellow.
12. Honerum Star	9.4	37.5%	White, Unnetted.
13. Dream Melon	7.6	26.5%	Unnetted, light green color.

**********Definition of Marketable in this Trial**********

This was a simply defined as a whole unblemished fruit.

****

The following specification criteria are often used by buyers to determine marketability. Different markets have different preferences or specification, it is necessary to pick the required variety to suit.

1. Size Range.
2. Skin Appearance.
3. % Brix value range.
4. Flesh color.
5. Particular physical features to which the market is accustomed.

CONCLUSIONS TO MUSK MELON TRIAL 6 YALA 1993

This was a successfully conducted trial which gives a large amount of useful information.

1. It is clear that certain Rockmelon varieties are adapted to the Yala climate of System B, with one very large proviso, the rock melon crop in general was not as well netted as the cantaloupe types, the shape was oval and there were clear ridgings on the surface of the majority of the varieties. It must be assumed that this general 'poorer' appearance is accepted by the markets, which prefer Rockmelons for their darker red flesh color and more juicer consistency and forgo the fine and better netted appearance of the Cantaloupe. If this is a correct assumption and the market is prepared to substitute for the existing Australian supplies then Hotshot and Malibu could be used in Yala 1994 for farmer testing with a great deal of confidence.

2. Sunex 7002 cantaloupe should be recommended and has good potential for a market specification which covers weights from 1.0 kg/ fruit to 2.0 kg/fruit. The present specification of 0.9 kilos to 1.5 kilos would not suit this variety.

3. The three 'old faithfuls', Gold Mark, Tasty Sweet and Mission have again shown that at the present market specification they are well adapted to System B.

4. The Japanese variety, 'Dream melon' might be followed, subject to checks on such factors as seed cost and market opportunities. It must be noted that at present there is no possibility of exporting melons from Sri Lanka to Japan due to the quarantine restrictions, but perhaps a market might exist in Hongkong, although it is likely that this type of musk melon can be produced in China which would be a closer source.

5. The reduction of the overall basal dressing levels in the 1993 Yala trial do not seem to have had an effect on the yield levels of the standard varieties, however this was not a fertilizer trial therefore this is only a speculation. Unlike some lower valued crops small fertilizer reductions do not have significant effects on profitability.

6. The one open pollinated variety, Planters Jumbo, although yielding well as expected, had less disease resistance and a low fruit quality. Seed costs of around 30 dollars/kg can be an expected price when buying open pollinated melon seed. This compares with 350 dollars/kg. for the average hybrid. Horses for courses!

7. As in previous trials, the Honeydew types did not perform well, perhaps the crop growing recommendations for Musk melons do not suit this type of melon, but why they do not, is not understood.

YALA 1993 CANTALOUPE GROSS MARGIN.

Present Commercial Yields

a) Grade 1 Present Commercial Specification

Size:	0.9 kilos to 1.5 kilos
Brix:	Above 7.0%
Skin:	Fully netted without blemishes.
Picked:	Full slip. Delivered same day
Price:	12 Rupees.
Yield	12 tonnes/hectare.

Gross Return from grade 1..... 144,000

b) Grade 2.

Size:	0.75 kilos to 0.90 kilos Above 1.5 kilos
Brix:	Above 7.0%
Skin:	90% Netted without major blemishes
Picked:	Full slip Delivered same day
Av Price:	5.00 Rupees.
Yield:	6 tonnes/hectare.

Gross Return from Grade 2 30,000

c) The Rest:

Possible Price: 2.00 Rupees.

Yield: 6 tonnes/hectare.

Gross Return from the rest..... 12,000

Total Gross Return 186,000

These are conservative 'Best Guess' commercial yields estimated from a Farm Organizations returns to a processor and an estimation of outside sales. Farmers often sell to outside traders by the melon rather than the weight and to compound the problem are often very unwilling to give extensionists access to accurate figures.

An historical survey of farmer yields in the 1993 Yala commercial cantaloupe production might be useful, however, it must be assumed that the results might have a high variability, due to a large number of factors, which might include dishonesty.

12 RS TOTAL GROSS RETURN.....	186,000.
12 RS TOTAL GROSS RETURN (with no second grade sales).	144,000.
8 RS TOTAL GROSS RETURN (with no second grade sales).	96,000.

Costs of Production. (excluding labour)

1. STARTER PACK.

Seeds (Thiram dressed) ..2 seeds/station Plus transplants for gapping	16,000.	
Basal Dressing (Special Mixture).....	9,330.	
Carbofuran 3% 60 kilos.....	4,200	
Post seeding Chemicals		
Thiram 200 grms.....	1,300	
Benlate 50 grms.....	1,300	
SUB TOTAL.....		32,130

2. PEST AND DISEASE PACK REQUIRED 14 DAYS AFTER SEEDING.

First Top Dressing.

UREA 225 kilos.....	2,369	
Chemicals.		
Ridomil 300 grms.....	3,900	
Manozeb 100 grms.....	488	
Topsin 250 grms.....	2,750	
Benlate 50 grms.....	1,300	
Copper. 200 grms.....	980	
Selicron 100 mls.....	1,220	
Endosulphan 100 mls.....	600	
Lanate 100 mls.....	950	
SUB TOTAL.....		12,188

3. 2nd PEST AND DISEASE PACK REQUIRED 35 DAYS AFTER SEEDING.

Second Top Dressing.

UREA 225 kilos.....	2,369
Chemicals.	
Ridomil 100 grms.....	1,300

Mancozeb	100 grms.....	488	
Tribon	100 grms.....	1,080	
Atabron	100 grms.....	1,550	
SUB TOTAL.....			6,787.
TOTAL INPUT COST.....			51,105
AVERAGE INTEREST ON WORKING CAPITAL FOR FOUR MONTHS			
24%/annum	4 months.....		3,066
GRAND TOTAL.....			**54,171**
POTENTIAL GROSS MARGIN/HECTARE (excluding labour):			**131,829**

Notes:

a) It is possible to get upto 12% discount on all chemicals if the order is purchased through a farmer organization, which has a relationship with a dealer/agent.

b) It is important to note that some of the agrochemicals recommended and costed might NOT be necessary if the climate is not favorable to fungal build up. Again if the insects that have been identified in the past, as pests, are not present, there could be a reduction in the insecticide necessary.

Conclusion:

What is the labour input? This is the obvious question. However, I think it is perhaps better to look at the number of farm operations involved in this crop compared to other cash crops and then look at gross margins of the crops in question (excluding labour). This system might give a better indication of profitability. The actual labour hours within a group of farmers, it is believed, will have very large variation, due to the differing backgrounds, trainings and experiences of the System B. farmers.

Cantaloupe melon production is very similar to many high value horticultural crops. It, however, has one major labour advantage. When harvesting, one fruit is normally approximately one kilo. If 'turning of fruit' as an operation is added as an additional task for the last three weeks before harvest, this advantage is some what reduced.

The final litmus test of a crop, is the farmers willingness to grow at a price. To date the supply of farmers wishing to grow has out weighed the buying contracts available.

HORTICULTURAL CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE ACTION.

From a horticultural production point of view, the introduction of this new crop type to Sri Lanka has been very successful. The Reddish Brown, free draining soil types under irrigation in System B, with the climatic conditions prevailing especially in Yala, are very conducive to a high quality and high yielding musk melon. (Cantaloupe and Rockmelon).

It is believed that musk melons should be developed in the following ways, so that the farmers can continue to obtain good returns from the crop.

This research could and perhaps should be taken over by the Dept of Agriculture now, but could also be continued by MARD until 1995 and reviewed then by the Dept of Agriculture.

1. A study is necessary to determine the best cultural methods that improve the sugar contents of these melons. The relationship between shelf life and sugar contents must be assessed to improve both marketability and general consumer acceptance. The market requirement for brix percentages must be determined before the trial proceeds, so that staged harvesting targets for the trial can be determined. The advantages of being able to pick at an earlier stage (three quarter slip) without affecting sugar acceptability should not be underestimated.
The possibility of getting two or three days longer shelflife might mean the difference between a small or very large market.

2. The trialing of open pollinated varieties for the perceived low cost/low quality local production is necessary. There might be a need for a second string set of recommendations, which will substitute for the high input/high output if the export markets were to disappear. The high yield/high input production is only suited to the top farmer groups and will be determined by economic climates, therefore the growing of specialized varieties tend to fluctuate in and out of favor. It must be noted that the development of open pollinated recommendations might have a detrimental effect on the export market opportunities for the following reasons. Firstly, the producers of this lower quality melon might try to export them, giving Sri Lanka a poor quality name, and secondly and perhaps, more damaging, is the likely scenario, where the open pollinated muskmelon is grown for the local market,creating a glut of second grade fruit in this market. This glut will affect both local producers and the export producers alike.
Although, there are possible negative effects in a second line of recommendations for low cost production, it is believed that the sustainability of some muskmelon production is assured in some form, if the recommendations exist.

3. A detailed look at the agrochemical practices presently being recommended would be economically and ecologically sound. This would include the determining of threshold levels for the various perceived pest and disease problems. At present, a paranoid set of agrochemical recommendations are used. It is to no ones benefit to have crop failures when developing a crop. However, as the crop develops further, a detailed look at agrochemical practices could perhaps lead to reductions in input costs for the growing of this crop.

4. Trialing of new varieties should be continued. The development for disease resistance and improved storage life in other countries continues. The varieties adapted for similar climatic conditions should be sourced and trialed. This will require a continued close relationship with all the seed importing companies. For this minor crop, it is not sensible for any company in Sri Lanka to start breeding programs.

5. It is suggested that a seed company and a farmer organization could involved itself in a transplant business in conjunction with a produce exporter, so that the work of extending production periods, improving the timing of production and the reduction of seed loss in the field could be developed. This could start with the help of MARD, so that any teething problems could be solved, and a profitable enterprise could continue after the end of the project. The importance of providing crops to market demand cannot be underestimated, crop production timing is vital to the economics of both processed production and fresh sales. This basic fact is true for many perishable crops.

6. The research into an improved method of pollination of the existing female flowers and their set should be started. Once the best method is established, research into the use of various chemical treatments to increase the number of female flowers could be useful.

GENERAL COMMENT.

The production period of Musk melon in Mahaweli System B can be assumed to be late February to early October. At present, however, the realistic periods of production are late March to Mid April, and mid June to mid September.

The market necessity to have continuity from late February to early October is assumed as a benefit to the exporter and therefore farmer, however at present the following constraints exist to limit the period.

Firstly, there are no transplant/module producers in the System, this limits the start time of seeding to early January. Secondly, the water issue arrangements are yet to be streamlined so that water can be issued through April. Thirdly and perhaps most important, there is a 'New Year Mentality' that exist with many, which assumes no work for a two week period from 10th April to 24th April. It is hoped that the economic attraction of this crop, might overcome this problem.

It must be noted that it is the not thought possible to supply from mid October to mid February without a large and perhaps uneconomic investment in greenhouses (plastic or glass) to protect from the rainfall.

It is envisaged in the future a graded or two price production periods for musk melon will develop.

1. High Prices for production for late February, March, April, May early June and perhaps from mid September to mid October.

2. Lower prices for production for mid June, July, August and early September.

Returns to the Sri Lankan buyer seem at present to be following the usual trend. The upmarket local trade of the hotels and restaurants showing the best returns, followed by middle class local trade and the exported quantities showing only marginal returns.

It must be understood and has been repeated by the project on many occasions, the export (world) market is very competitive and requires good management of all sectors of the business, from production through to shipment and marketing. This export market creates the volume of sales that is necessary to allow investment in the technologies that are vital to production of a quality item for the up market local trade. If the local market is supplied with low tech and poor quality commodity, the targeted upmarket trade and middle class sales become the target of other exporting countries.

The market effort should be addressed so that volume export markets are found, once this has been done, the company must then focus on the local market, so that the technology required to export is identified in the local market as a benefit to the local consumer and wholesaler. The technology should be a benefit to the wholesale market, as it might improve their ability to sell within a given period of time or reduce wastage percentages that are usually associated with the crop. The technology should be identified to the local consumer as a health improver, or a fresher better tasting commodity.

Cantaloupe/Rockmelons are very much liked by Sri Lankans in general, since their introduction in 1990, there has been a keen local interest when production is underway. It must also be noted the farmgate price of the second grade production is often less than the per kilo price of existing fruits marketed, such as papaya and even pineapple. The export quality, Colombo delivered price, is also in a class of its own compared with the existing fruits that are on sale. The Sri Lankan local marketing system is very slow to change and often the buyers for hotels and supermarket are extremely conservative in their attitude to new commodities. The project must expect the development of the local market to be depressingly slow, but it must continue to help its development.

The export market, although not conservative in its outlook is very competitive and will not give up an existing supplier, unless it sees continuity of a better quality commodity than its existing supplier can arrange or the same quality at a better price. All this development takes time especially as on farm production techniques have to be learnt by farmers, post harvest systems have to learnt by the exporter, and linkages to the market made reliable.

The Mahaweli melon exports of first grade fruit and development of a first grade local market have come a long way in three years considering that this crop had not previously been grown commercially in Sri Lanka. However, more effort is still required on both the first grade export market development and the first grade local market development.

At this stage a detailed look at one or two processed melon product could be considered. It is suggested that mass local market processed sales should be looked at first, such as juices and jams.

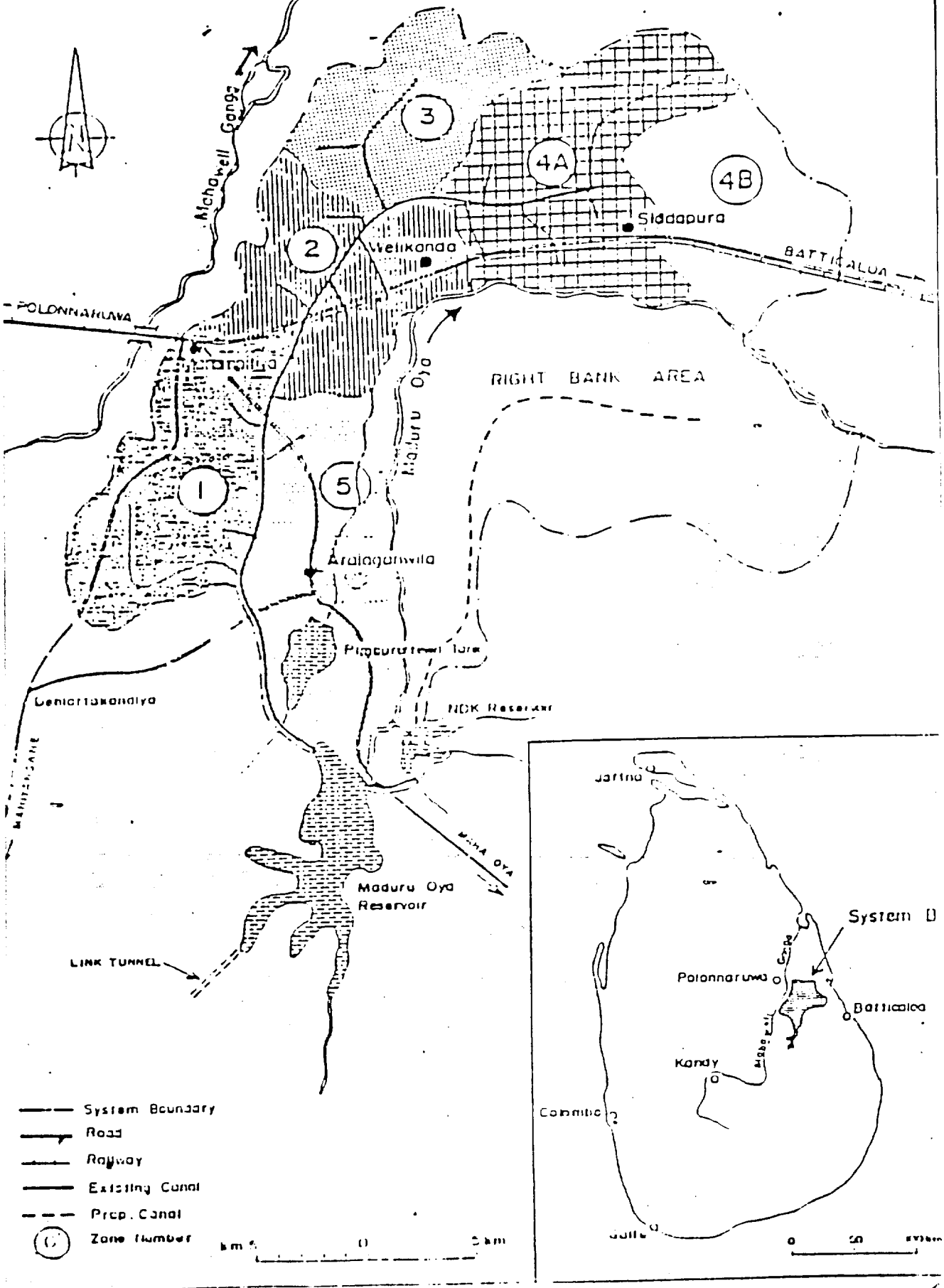
Finally, It is very necessary for the System B exporters to create a clear brand name for their commodity, so that the very probable competition for the high class local market is minimized in the long run. This low cost competitor will produce an inferior melon closer to Colombo and undercut the better quality System B melon, if they succeed the profitability of the overall melon growing package will be reduced. This will mean that less farmers will benefit from the crop in System B.

It also must be noted that the volume of local sales is assumed to be elastic, therefore if pricing in Colombo for the quality melon is set at a level which limits the sales to certain outlets and income levels, the possibility of other melon growers capturing a mass local market is likely. This may be acceptable to the System B processor, but will limit the benefits of this crop to the distant System B farmer.

ANNEX - I

GENERAL LAYOUT

SYSTEM B



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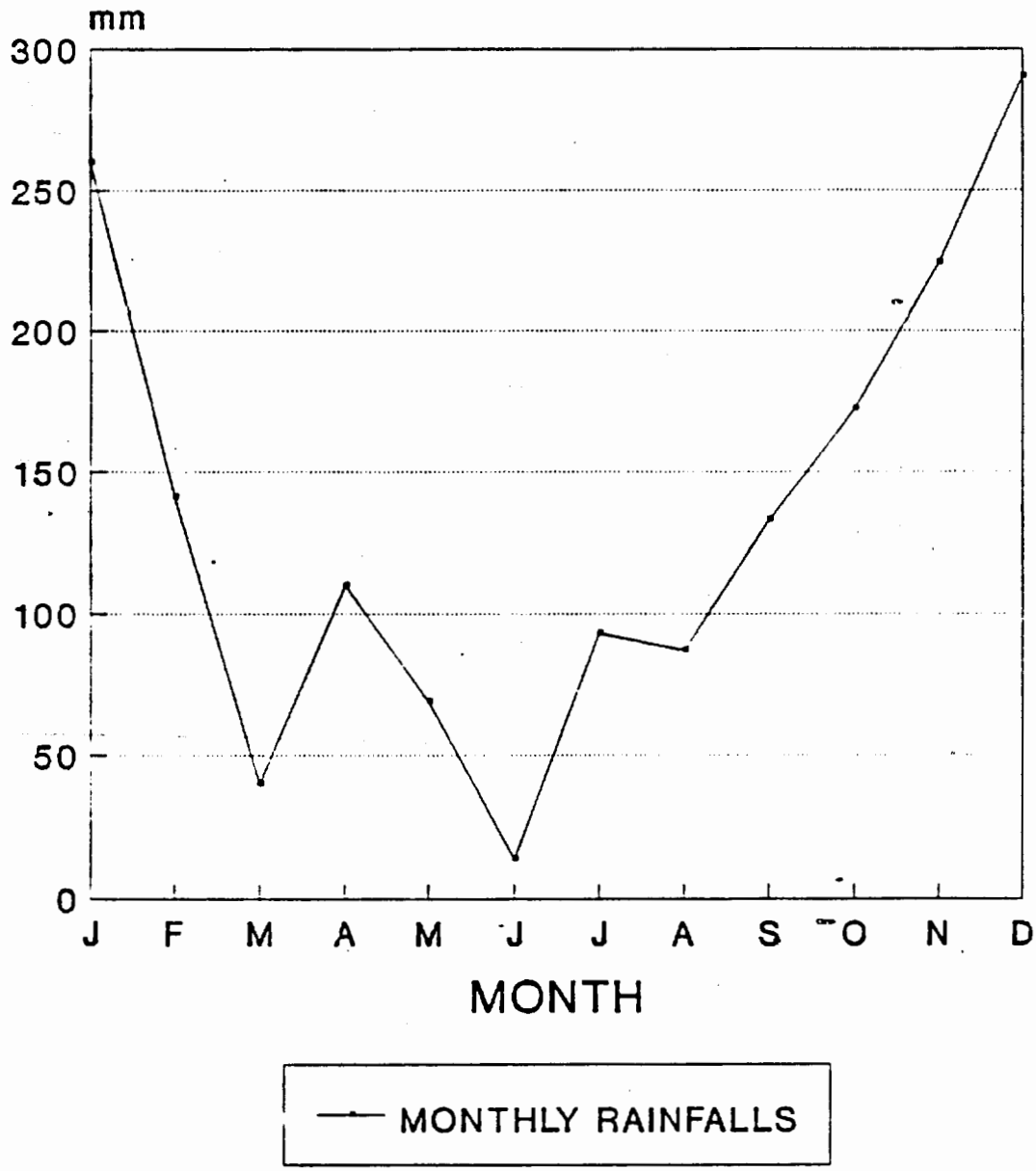
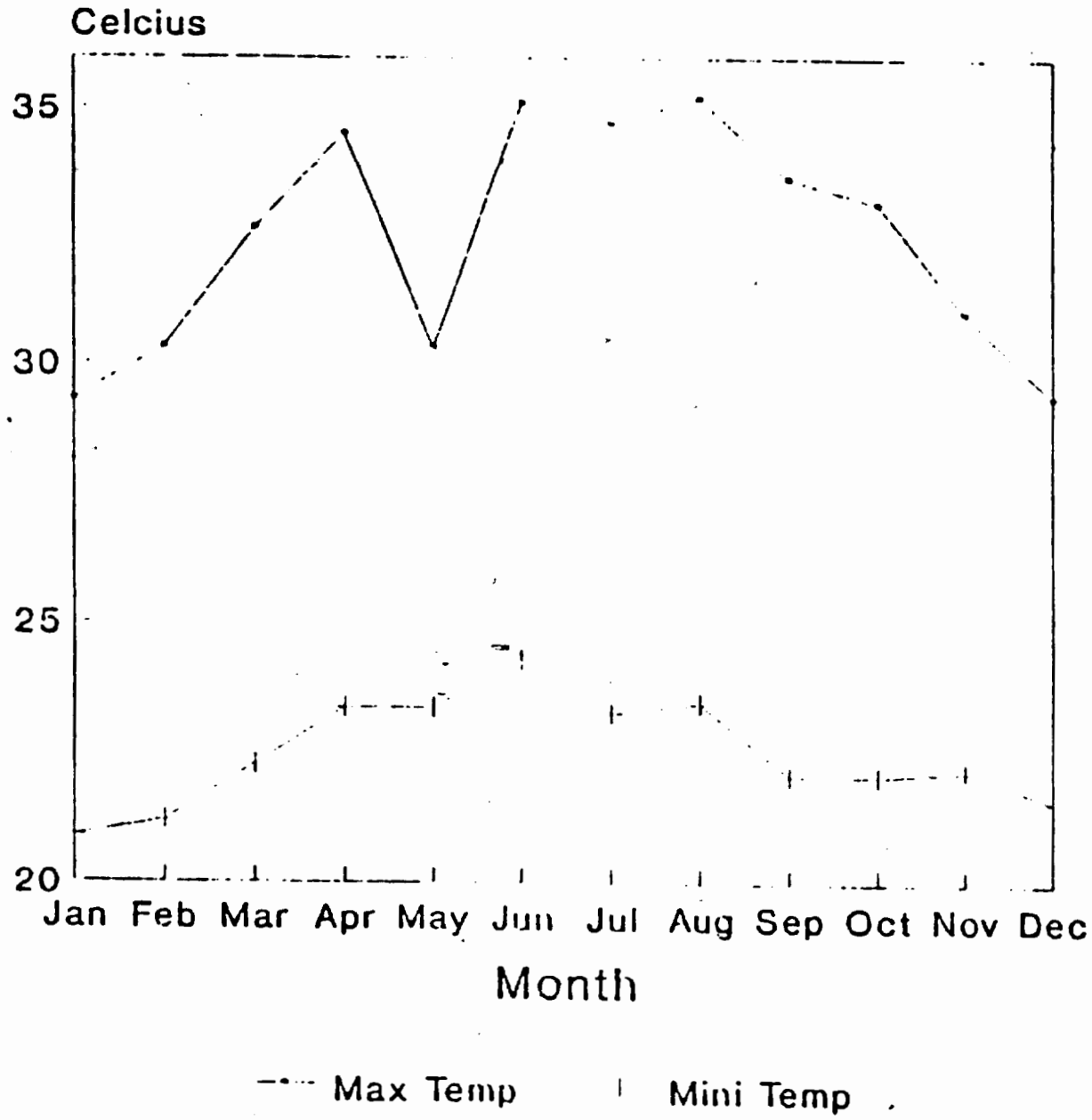
METEOROLOGICAL DATA
7 YEAR AVERAGES



Mean Monthly Temperature

RARC / Aralaganwila.

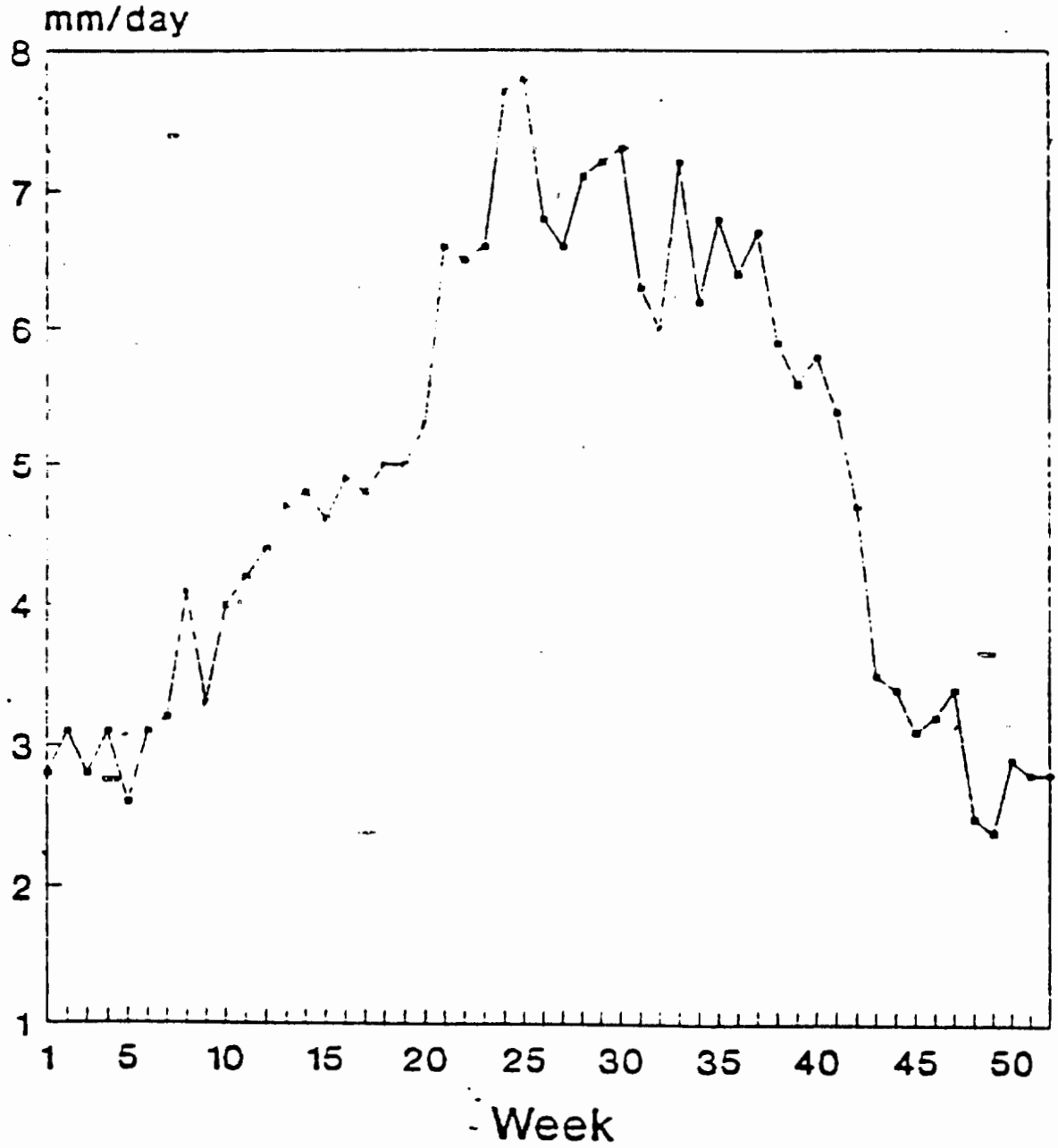
(1984 - 1990)



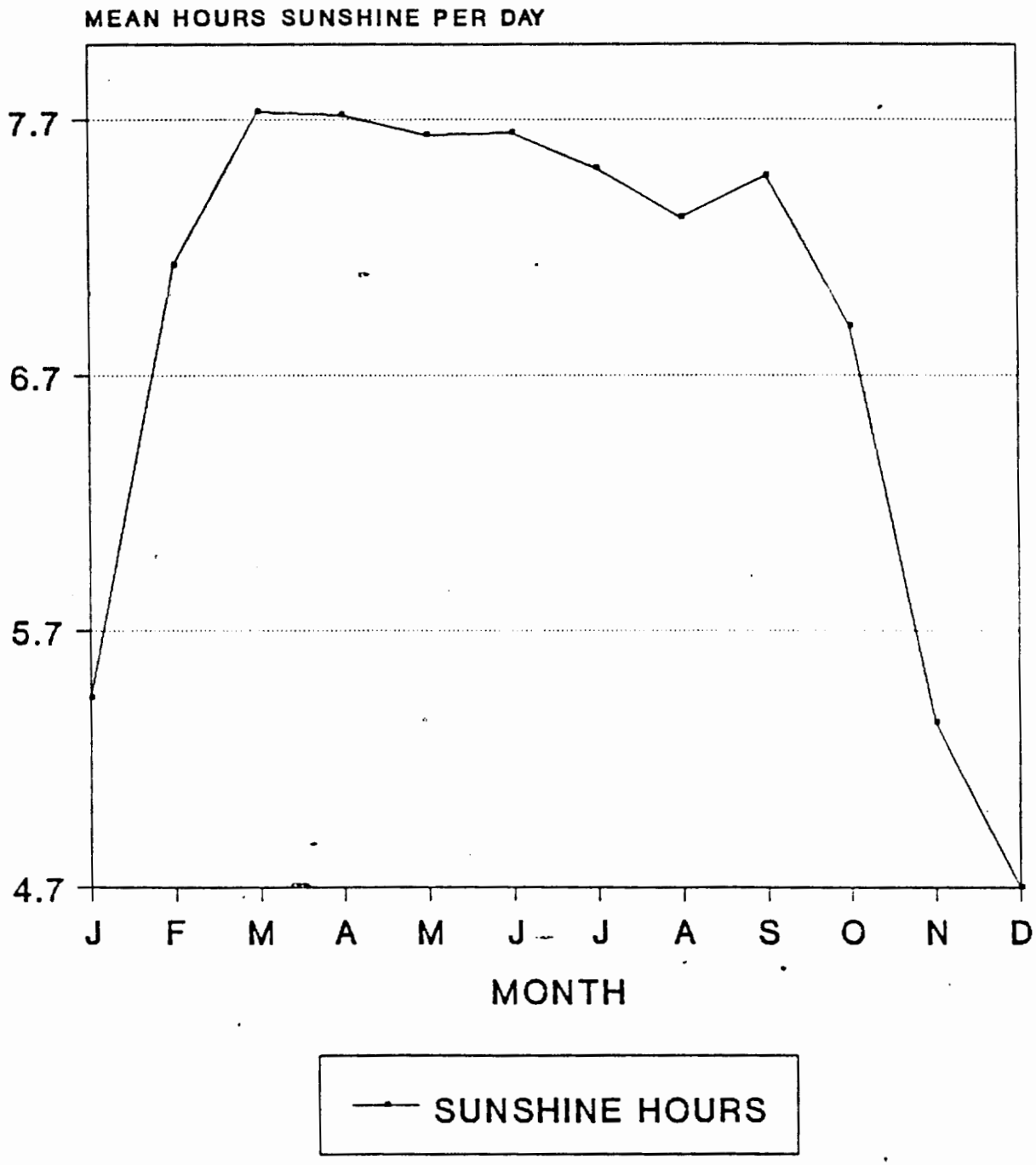
Mean Evaporation Rate

RARC / Aralaganwila.

(1984 - 1990)



METEOROLOGICAL DATA
7 YEAR AVERAGES



ANNEX 3

CULTURAL RECOMMENDATIONS

a) You will note that the individual yield data for the different training a plant spacing is not shown. The reason for its absence is that it was confused in the middle of the harvest and therefore could not be quoted reliably. However the general view was that the trellis system did improve fruit quality however yield was not affected dramatically by the system. It was felt that because of the improved disease control potential of the trellis, it would be necessary cultural technique in more hostile environments or seasons. The offset planting on the bed was seen to be the most advantageous at this time of year, this system reduced the labour of making the trellis. However the trellis labour is again balanced by the necessity to turn every developed fruit daily to avoid basal rots. The planting requires extreme skill in water management. THE COMPROMISE THEREFORE, AT THIS PLANTING DATE, IS TO USE THE 60 CM SPACING OFFSET ON THE STANDARD 1 METER RAISED BED.

b) **Irrigation;** The following practices were followed which were seen to be correct.

Preirrigation by flood the morning before planting.
From seeding to germination watering by hand.
From germination to flowering flood irrigation once per week
From flowering to the start of harvest flood every 10 days.
From harvest every 14 days.

It must be noted that when irrigation is taking place, the farmer must be present all the time. Flood irrigation MUST NEVER TOP THE BEDS. The infiltration must be even and when field capacity reached the water removed. If the farmer is asked to be present during the whole cycle, it is believed that over irrigation is less likely to take place.

c) **Pest Control;** Pest control has to continue during the harvest period. This creates a post harvest interval (PHI) problem. Chemicals with short PHIs are limited in Sri Lanka. It is therefore recommended that pressure be put on the Dept of Agriculture to allow the uses of a limited number of pyrethroid pesticides and perhaps the clearance of such chemicals as Phosdrin. If these chemical are not cleared for use in Sri Lanka, there will be a temptation to use chemical which will leave harmful residues in the crop.