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SPECIAL PROJECT FUNDS ACTIVITIES: COMPLETION REPORTS

By

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UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

DEVELOPMENT ALTERNATIVES INC.

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P R E F A C E

The Diversified Agriculture Research Project (DARP) was implemented under an agreement between the Department of Agriculture (DOA) and the Agency for International Development (USAID). Development Alternatives, Inc. (DAI), under contract number 383-0058-C-00-5023, provides technical and managerial assistance to the Project.

Funds were provided through DARP to facilitate project activities in areas where DOA operational budgets were inadequate. Utilization of these resources was limited during the original phase of the project (1985-90) to workshops, grants for socio-economic research, and installation of the Seed Development Unit. In 1992, over $500,000 were added to the DAI contract to be managed on behalf of the project. Special Project Funds (SPF) were utilized to support a wide range of activities, including:

- Printing Crop Recommendations Technoguide
- Mass media campaigns--radio, television, and publications
- Installation of farm broadcasting recording studio
- Importation of germplasm
- Field demonstration programs
- Research grants program
- Workshop on biotechnology
- National Horticultural Exhibition
- Special studies
- Farm manager, farmer, and nurserymen/women training
- Seed enterprise manager
- Installation of seed cleaning equipment
- Management training workshops
- Training in software applications

The multitude of topics reflected the basic elements of the project and were linked to each other through the underlying theme of crop diversification and horticultural development.

Although the mechanisms for disbursement and DAI staff to manage the funds were put in place only in early 1992, all of the funds allocated were fully utilized.

This document covers all activities listed above. Note also that a separate report containing abstracts of the research grant papers was distributed earlier by DARP. Whereas this report describes the 16 research grant activities, the abstracts provide insights as to the results obtained and plans for their application.

This report presents brief descriptions of the activities with some indications pertaining to the outcomes. No attempt is made here to evaluate performance, results or impact of any technologies transferred. The undertaking of such studies should however be considered by DOA. The reader may also refer to the Final Report on the DARP project for an assessment of the impacts of the Project in general.

1. "TECHNOGUIDE"

The "Technoguide" is a handbook of about 200 pages embodying the production recommendations developed during DARP Phase I by the DOA for 35 subsidiary field crops. Also given as annexes to the guide are a) 32 intercropping models, b) techniques for managing water in Reddish Brown Earths, the soil most common in the areas where these crops grown, and b) recommendations on the use of chemicals for control of weeds and pests in these crops.

500 copies of the English edition were produced in 1990 under DARP Phase I. The Sinhala (800 copies) and Tamil (200 copies) versions were produced in 1992 under the present phase at a cost of US$37,513 (Rs.1,762,500).

The flyleaf and the list of contents of the "Technoguide" are shown as Annex 1 of this report. The flyleaf carries on its reverse the following note: *"Whenever amendments to crop recommendations are made, they wil be mailed to you. Please notify any change of address immediately to Deputy Director (Technology Transfer) P.O. Box 18, Department of Agriculture, Peradeniya, Sri Lanka".* As evident from this statement, the distribution of the "Technoguide" and maintenance of the mailing list for supply of amendments to it is being handled by the TT Division.

The "Technoguide" is issued free to selected government institutions and officials (at present almost exclusively from the DOA), but sold to other users at a subsidised price of about $10 (Rs.500) each. The total disposed of accordingly as at 30 June 1993 was: Sinhala 307, Tamil 86 and English 474. A list of those who have received the "Technoguide" was provided by DD/TT on a *pro-forma* is given below as Annex 1.

Annex 1

DISTRIBUTION OF "TECHNOGUIDE"

		Number of Copies Issued		
		Sinhala	Tamil	English
Ministry of Agriculture	:	02	01	03
USAID	:	00	00	06
FAO	:	00	00	01
CARP	:	00	00	01
Department of Agriculture				
01. Director	:	00	00	01
02. DD/Research	:	39	08	09
03. DD/TT	:	00	00	57
04. DD/S&PM	:	20	00	56
05. DD/SC&PP	:	02	00	04
06. DD/Gardens	:	00	00	01
07. DD/Econ	:	00	01	04
08. Central Library	:	02	01	04
09. RAR Centres	:	00	00	25
10. PGRC	:	01	00	00
11. Asst Directors(Extn)	:	25	06	00
12. Asst Directors (IP)	:	00	00	06
13. Schools of Agric	:	09	02	09
14. DOA Farms	:	00	00	05
15. DARP	:	02	01	01
Dept of Export Agriculture	:	02	02	06
Agric Devt Authority	:	00	00	01
NADSA	:	00	00	01
Sugar Cane Res Institute	:	00	00	01
Sri Lanka Sugar Corpn	:	00	00	01
Land Devt Dept	:	00	00	01
Provincial Sec (Medirigiriya)	:	00	00	01
Provincial Dirs (Agric)	:	102	21	68
Divisional Sec (Matale)	:	01	00	01
Land Use Commission	:	00	00	01
Chairman (Mahaweli Authority)	:	00	00	01
Mahaweli Economic Agency	:	00	00	11
MARD Project (MASL)	:	00	00	02
Faculties of Agriculture	:	03	03	08
PGIA	:	02	02	04
IFS	:	00	00	02
Affiliated Universities	:	02	00	03

Number of Copies Issued

		Sinhala	Tamil	English
Techl/Training Colleges	:	00	00	01
Aquinas Agric Institute	:	00	00	01
Schools and Colleges	:	02	00	00
Dist Training Centres	:	01	01	00
TRI/RRI/CRI	:	00	00	05
Chamber of Commerce	:	00	00	01
Agribusiness Companies	:	00	00	07
Dept of Industries	:	00	00	01
Dept of AP&H, Sippikulama	:	00	00	01
Commissioner/Janasaviya	:	00	00	01
Non Governmental Orgs	:	00	00	35
Private individuals	:	90	37	115
TOTAL PRINTED	:	800	200	500
TOTAL ISSUED (as at 30/6/93)	:	307	86	474
BALANCE ON HAND	:	493	114	26

2. MULTI MEDIA CAMPAIGNS

Introduction

As a result of the withdrawal of the KVSN cadre, a gap was created in the DOA mechanism for technology transfer at grass root level. It was in this context that media campaigns were identified by the TT Division of DOA as being an appropriate alternative method of rapidly bringing vital agricultural development issues and technological advances to the attention of the farming community. SPF was therefore made available under the current phase of DARP for production of print media (newspaper supplements, fliers, advisory booklets), visual media (banners, posters) and broadcast media (radio and TV spots) for campaigns in respect of the following: crop diversification in paddy lands, improvement of horticulture, using quality seed and planting material, and pesticide safety.

The newspaper supplement, brought out in October 1991, is described in greater detail in Report No.3, and so this report deals only with the other media.

Banners

One element of the visual media campaign consisted of 5 banners (3'x 2', cotton poplin, screen printed in 4 colours) in Sinhala and Tamil carrying the slogans shown below:

	SLOGAN	*Sinhala*	*Tamil*
1.	*"Pesticides are dangerous!" "Take care when using"*	*200*	*40*
2.	*"Careless use of pesticides can invite death"*	*200*	*50*
3.	*"Let's grow OFC" "Great profits!"*	*204*	*50*
4.	*"For bigger yields use certified seed"*	*400*	*100*
5.	*"Seed certified by DOA are more reliable"*	*400*	*100*

Besides the 5 main banners mentioned above, there also was a smaller banner (20 numbers only) specifically promoting crop diversification in the Meda through sowing of green gram into the stubble from the Maha harvest; these were used only in Kurunegala and Mahiyangana. The main banners on pesticide safety and OFC in paddy lands were used during Maha 1992/93 and in Meda 1993 respectively. Their distribution is shown Table 1.

Posters

The other visual medium used in these campaigns was the poster. Only one was used in the pesticide safety campaign, while six were used in the case of the OFC campaign.

The pesticide poster was a large (22.5" x 35") pictorial one and carried the slogan: *"Keep the killer under lock and key and save lives"*. 10000 copies of it were printed (8000 in Sinhala and 2000 in Tamil) and strategically displayed in schools, government offices, post offices, railway stations etc as well as in agriculture extension centres.

The six posters used in the OFC campaign were smaller in size and simpler in presentation. Two of these (15000 copies of each) were produced at TT Division Headquarters, with one carrying the message: *"To get lots of money into hand, get OFC produced on your land!"* and the other saying: *"Get bigger profits from your land by growing such OFC as chilli, big onion, red onion, green gram; depending on the crop the profit can range from Rs.15,000-60000"*. The distribution of these two posters between extension divisions is shown in Table 1.

The four remaining OFC posters (1000 copies each) were district specific, and used with slight modification of addresses at Kurunegala, Mahiyangana, System B, System H, Polonnaruwa and Anuradhapura. In general they stressed the advantages of crop &diversification.

Fliers (Folders)

An A4 size flier was used in the pesticide safety campaign to highlight the danger to children from carelessly disposed empty pesticide containers. The distribution of the 30000 copies printed (25000 Sinhala; 5000 Tamil) is shown in Table 1.

Technical Bulletins

Nine technical bulletins were produced at a cost of $ 28572 (Rs.1,428,472) as part of the print media used in the campaigns. The titles and numbers printed are shown below:

Title	**Copies Printed**		**Cost**	
	Sinhala	*Tamil*	*$*	*Rs*
Big Onion Cultivation				
1st printing	1000	-	2577	121119
2nd printing	1000	-	1595	75000
Neem as an Insecticide	5000	2000	1637	78234
Pineapple Production	10000	3000	4635	221500
Quality Seed Paddy	20000	5000	4524	216250
Passion Fruit	5000	1000	2426	115950
Rambuttan	5000	1000	1985	94910
Mangosteen	2000	-	721	34480
Big Onion	10000	2000	4584	219120
Chilli	8000	2000	3888	185840

TABLE 1. DISTRIBUTION OF BANNERS, POSTERS AND FLIERS

	BANNERS		POSTERS		FLIERS
	Pesticide Safety	OFC in Paddy Fields	Pesticide Safety	OFC in Paddy Fields	Pesticide Safety
PROVINCES					
Western	40	-	300	-	1500
Sourthern	30	-	400	2000	2000
Uva	30	10	-	1000	-
Sabaragamuwa	30	10	400	1000	2000
North Western	40	20	300	3000	2000
Central	40	10	1000	1000	2000
North Central	30	15	200	2000	1000
North East	33	45	1000	1000	2400
INTER PROVINCIAL AREAS					
Polonnaruwa	22	20	200	2000	1000
Hambantota	-	-	200	-	500
Minipe	14	10	100	1000	500
Kirindioya	10	10	-	-	-
Anuradhapura	20	10	100	2000	500
Moneragala	10	10	100	2000	500
Ampara	28	25	400	2000	2000
Mahaweli H	20	15	200	2000	1000
Mahaweli C	20	15	200	2000	1000
Mahaweli B	14	15	200	2000	1000
Udawalawe	-	10	100	2000	1000

Radio Spots

Radio spots of 50 words and 30 or 60 seconds duration each were broadcast over the national services of SLBC at 0615 hrs (Sinhala) and 1819 hrs (Sinhala and Tamil), the prime times for agricultural listeners. The numbers produced on "Pesticide safety", "OFC in paddy lands" and "Use of quality seed" were 08, 02 and 03 respectively. The dates of broadcast are given below:

Pesticide safety

Maha 92/93: 8 spots in rotation on 43 consecutive days from 20 November 1992 to 01 January 1993.

Yala 1993 : 4 spots in rotation on 42 consecutive week days from 03 May 1993 to 29 June 1993.

OFC in paddy lands

Yala 1993 : 2 spots in rotation on 22 consecutive week days from 15 April 1993 to 14 May 1993.

Use of quality seed

Yala 1993 : 3 spots in rotation on 22 consecutive week days from 15 April 1993 to 14 May 1993.

TV Spots and video films

Three TV spots on the undermentioned topics were produced for the "Pesticide safety" campaign:

i) *Protective clothing:* duration 1 minute
ii) *Carelessness in use:* duration 30 seconds
iii) *Proper disposal of containers:* duration 30 seconds

The first two were telecast on Rupavahini during May/June 1993.

MULTI MEDIA CAMPAIGNS: EXPENDITURE SUMMARY

Banners	1694 nos.		Rs. 461400
Posters	35000 "		Rs. 121650
Folders	36000 "		Rs. 50800
Technical Bulletins	83500 "		Rs.1284403
Radio and TV productions			Rs. 65440
SLBC			Rs. 511400
Rupavahini			Rs. 306000
	Total	**$58356**	**Rs.2801093**

3. INSTALLATION OF FARM BROADCASTING STUDIO

The significance of farm broadcasting in Sri Lanka increased consequent to withdrawl of the village level extension service provided by DOA through village level extensionists *(Krushi Vyapta Sevakas)*. Agricultural programmes are currently produced by the Farm Broadcasting Unit of the DOA utilizing SLBC facilities as and when made available. This arrangement cannot cope adequately with the volume of material available with DOA for dissemination. Hence DARP funds were utilized to modify a DOA building in Colombo for use as a fully equipped professional recording studio and programme library. Designs and specifications for the proposed modifications were prepared.

4. NEWSPAPER SUPPLEMENTS

Considerable emphasis was given in DOA plans under the current phase of DARP to a) increasing farmer income through crop diversification in paddy lands, b) promotion of horticulture, c) the production and use of quality seed and planting material, and d) the safe handling and use of pesticides. The basic short term strategy devised to attain these objectives consisted in the launching by Technology Transfer Division of media campaigns and complementary field demonstrations utilizing DARP/SPF.

The media employed in the campaigns consisted of printed material (newspaper supplements, advisory booklets and fliers), visual aides (banners and posters) and broadcast material (radio and TV spots). This report concerns the newspaper supplement that was produced accordingly.

The newspaper supplement was designed to focus attention on the objectives mentioned above, and was issued monthly beginning October 1991. The first five supplements were half page ones, carried in the Sinhala daily, the *Dinamina*. From March 1992 the supplement was made a full page one, and published both in the *Dinamina* and in the other national Sinhala daily, the *Divaina*. A half page version of the supplement in Tamil was started in October 1992 in the *Thinakaran*. The final supplements will appear in August 1993. The total cost to DARP of these supplements was $25,312. (Rs.1,202,300).

The supplement carries feature articles (mostly contributed by the Technology Transfer Division), news items and announcements of topical interest from the DOA, a question and answer column, and a simple quiz. The contents of the supplements are given in the annexed lists. It is evident from these lists that the supplements have covered a wide range of topics pertinent to crop diversification, pesticide safety, horticulture and quality seed.

The Tamil supplement in general is a translation of the Sinhala one. But the two versions in a given month were not always identical; for the features translated could have been taken from any issue of the Sinhala supplement. Such contents specific to the Tamil supplement are indicated in the lists.

Annex 2

DARP TECHNICAL AREA 3 - ITEM 5: SPECIAL CAMPAIGNS
ACTIVITY 3.5.02

NEWSPAPER SUPPLEMENTS

Dinamina
Divaina
Thinakaran

CONTENTS

October 1991 - 1993 July

SUPPLEMENT 01 **25 OCTOBER 1991** *"Dinamina"*

Messages of Felicitation

1. Hon RM Dharmadasa Banda, Minister AD & R
2. Dr SPR Weerasinghe, Director of Agriculture

Feature Articles

1. Unmixed fertilizer - Profitable.
Dissanayake ST, AD/Agric, HQ (TT Division)
2. Selecting a variety of rice.
Emitiyagoda S, AD/Agric, HQ (TT Division)
3. Preparation of seed paddy.
Emitiyagoda S, AD/Agric, HQ (TT Division)

News Items

1. SFC cultivation in danger.
Jayasinghe A, AD/Agric, HQ (TT Division)
2. Cheap seed potatoes.
Bogahawatte SL, AD/Agric, HQ (TT Division)
3. Beware! (Gall midge warning).
Senerath HB, AD/Agric, (SC&PP Division)

Announcements

1. Seed Sales

Quiz Contest

What is the rate for urea in the new fertilizer recommendation for chilli cultivation?

Farmer Problems: (Questions & Answers)

SUPPLEMENT 02 **29 NOVEMBER 1991** *"Dinamina"*

Feature Articles

1. Water use in paddy cultivation.
Jayasinghe A, AD/Agric, HQ (TT Division)

2. *Tur dhal* - a profitable crop.
Bogahawatte D, AD/Agric, Ratnapura

3. Multi benefits from *Margosa* trees.
Wijeweera P, SMS, S/A, A'pelessa

4. Let's control *Salvinia*.
Rajapakse H, AO/Plant Protection

News Items

1. Seed Development Unit established.

Announcements

1. Bean seed: Price reduction.
2. Private seed dealers.

Quiz Contest
In which cultivation season can a ratoon crop of Turdhal be obtained?

Farmer Problems: (Questions & Answers)

SUPPLEMENT 03 **27 DECEMBER 1991** *"Dinamina"*

Feature Articles

1. *Big Onion* seed: Let's produce our own.
Ratnayake W, Addl DD/TT, HQ (TT Division)

2. An additional income for New Year!
Jayasinghe A, AD/Agric, HQ (TT Division)

3. Bee keepers! This is for you.
Lanerolle G, AD/Agric, HQ (TT Division)

4. Do you know about *Big Onion* seed production?
Atapattu H, AD/Agric, Matale

5. Wells for cultivation should be dug with care.
Ekanayake EMPB, AD/Agric, HQ (TT Division)

News Items
1. Store *green gram* seed.

Announcements

Agriculture TV Programme

Quiz Contest

How long after planting the mother bulb does flowering occur in Big Onion cultivated for seed?

Farmer Problems: (Questions & Answers)

SUPPLEMENT 04 **31 JANUARY 1992** *"Dinamina"*

Feature Articles

1. Let's produce dhal from grain legumes.
Bogahawatte D, AD/Agric, Ratnapura

2. Tasty, nutritious noodles from *green gram*.
Kadawatharatchchi D, RO/CARI

3. Sheath Blight.
Wickramasinghe D, RO/Bombuwela & Mitrasena J, RO/A'pelessa

News Items

1. Do you need cross-bred piglets?
2. Bee keeping (A correction).

Quiz Contest

How many kg of dried green gram do you need to make 1 kg of green gram dhal?

Farmer Problems: (Questions & Answers)

SUPPLEMENT 05 **28 FEBRUARY 1992** *"Dinamina"*

Feature Articles

1. High quality seed paddy from your own field.
Chandrasiri OPK, AD/Agric & Emitiyagoda S, AD/Agric

2. This is how *green gram* and *cowpea* are stored.
Dharmasena CMD, RO/Maha Illuppallama

News Items

1. Be careful of top dressing fertilizer mixtures: A message from the *Director, National Fertilizer Secretariat*.

Agriculture TV Programme

Quiz Contest

How is delayed harvesting harmful to seed paddy?

Farmer Problems: (Questions & Answers)

SUPPLEMENT 06 **27 MARCH 1992** *"Dinamina"*
"Divaina"

Feature Articles

1. Safeguard your nurseries.
Semasinghe S, Agric Officer/Polonnaruwa

2. Increased income from crops replacing paddy.
Jayasinghe A, AD/Agric, HQ (TT Division)

3. Virus in *gotukola* too!
Dassanayake Ms M, RO/Bombuwela & Perera G, EO/Bombuwela

4. Agriculture technology to Janasaviya recipients.
Navaratne GB, AD/Agric, HQ (TT Division)

5. Take your paddy home and the straw to the field.
Tennekoon TMA, Addl DD/TT, HQ (TT Division)

6. Why do immature *mango* fruits drop?
Heenkende HMS, RO/Bandarawela

7. Let's grow *green gram* in the stubble.
Wijeratne B, AD/Agric, Kandy

8. Bud grafting in *avocado*.
Jayatilleke KNK, Manager, Horticultural Farm, Horana

News Items

1. Agricultural activities in Ampara District.

Announcements
Agriculture TV Programme
Quiz Contest
Name the vector of the virus in gotukola.

Farmer Problems: (Questions & Answers)

SUPPLEMENT 07 **24 APRIL 1992** *"Dinamina"*
"Divaina"

Feature Articles

1. Prosperity for '92: Grow *Big Onion* in Yala.
Atapattu H, AD/Agric, Matale

2. A farmer's novel invention.
Hemmathagama PRAB, AD/Agric, Ampara

3. Let's control *maize* stem borer.
Dharmasena CMD, RO/Maha Illuppallama

4. Protect your *mango* trees from leaf hopper.
Wijesekera A, RO/CARI

5. Would you increase use of urea and thereby lessen yields?
Wijesundera C, RO/Bombuwela

6. Let's tame *vel anoda (Anona glabra)*.
Dassanayake Ms M, RO/Bombuwela, Tantirige Ms M, RO/Bombuwela and Perera G, EO/Bombuwela

Announcements

1. Examinations conducted by the Department of Agriculture.

Quiz Contest

How many kg of seed are required to raise a nursery to plant 1 acre of Big Onion?

SUPPLEMENT 08 **29 MAY 1992** *"Dinamina"*
"Divaina"

Feature Articles

1. Effective and economic pest control.
Jayatissa KL, Principal, School of Agriculture, Kundasale

2. *Lime* during off-season.
Dassanayake Ms M, RO/Bombuwela, Tantirige Ms M, RO/Bombuwela and Perera G, EO/Bombuwela

3. Aphid control in *chilli* crops.
Dharmasena CMD, RO/Maha Illuppallama

4. *Big Onion* bulb rot.
Wijetilleke LC, RO/Maha Illuppallama

5. Let's educate agricultural organizations.
Karunatilleke KE, AD Agric/Minipe

Quiz Contest

Why are some insects considered as "farmers' friends" in IPM?

Farmer Problems: (Questions & Answers)

SUPPLEMENT 09 **26 JUNE 1992** *"Dinamina"* *"Divaina"*

Feature Articles

1. Water supply for **Other Field Crops.**
Gamage H, Addl DD/TT, HQ (TT Division)

2. Bees Honey from "Fruit City".
Wickramatilleke KWS, AI/Urapola

3. Easy transportation of grafted plants.
Piyasena K, AD Agric, HQ (TT Division)

4. Here's an idea for self employment.
Ekanayake S, RO/CARI

5. Bulb rot in *Big Onion*: is it a problem?
Wijayatilleke LC, RO/Maha Illuppallama

News Items

1. New varieties of paddy.
2. See if it is tasty.

Quiz Contest

How would you find out whether a crop requires watering by examining the soil?

Farmer Problems: (Questions & Answers)

SUPPLEMENT 10 **31 JULY 1992** *"Dinamina", "Divaina"*

Feature Articles

1. Grow a garden of sweet *rambuttan*.
Somawardhana LM, Agric Officer/Gampaha

2. Increase bees honey production in the dry zone.
Manawasinha K, AI/Palugasdeniya

3. Kirindi Oya farmers not defeated by drought.
Jayasinha A, AD Agric, HQ (TT Division)

4. Why discard harvests?
Nanayakkara KPGA, RO/CARI & Jayasekera SBJA, RO/CARI

5. Control of *sweet potato* weevil.
Piyasena K, AD Agric, HQ (TT Division)

6. Subsidiary and export crop production in Mahaweli B Zone.
Wijeyasekera RS, AD Agric/ISTI, Aralaganwila

7. Enemies in *Big Onion* cultivation.
Dharmasena MD, RO/MahaIluppallama

News Items

1. A new variety of paddy: *BG-352*

Quiz Contest

Name 3 varieties of rambuttan recommended by the DOA.

Farmer Problems: (Questions & Answers)

SUPPLEMENT 11 **28 AUGUST 1992**
"Dinamina", "Divaina"

Feature Articles

1. Plant Protection Act.
Aponso L, Asst Registrar of Pesticides

2. Solutions to water storage problems in Lunugamwehera.
Ranjit WJKV, AD/Agric, Hambantota (IP)

3. Assistance for *rambuttan* cultivation.
Ranasinghe TT, PD/Agric, Western Province

4. Biggest problem in *chilli* cultivation.
Wijetilleke LC, RO, RARC/Maha Illuppallama

5. Do not be misled by *red rice*.
Abeysiriwardene S, RO, ARS/Ambalantota

6. Is training necessary for use of agricultural implements?
Somapala BW, AD/Agric, Ag Eng Tr Centre, A'pura

Announcements

1. Schools of Agriculture: Admissions for 1993/95 Academic Session: Entrance Examination.
2. National Farmers' Day: 20 October 1993.

Quiz Contest

What is the colour of the band used on pesticide labels to indicate a highly poisonous pesticide? How wide is this band?

Farmer Problems: (Questions & Answers)

SUPPLEMENT 12 **25 SEPTEMBER 1992** *"Dinamina", "Divaina"*

Feature Articles

1. Think before disposing your *Big Onion* harvest.
tapattu H, AD/Agric, Matale

2. Pack your agricultural produce prior to despatch.
Ekanayake S, RO, CARI/Gannoruwa

3. *Tur dhal*: The crop for you.
Fonseka H, RO, RARC/Maha Illuppallama

4. Is the *Jak* tree ill?
Wickramasinghe D, RO/Bombuwela & Mitrasena J, RO/Bombuwela

Announcements

1. Schools of Agriculture: Admissions for 1993/95 Academic Session: Entrance Examination.

2. National Farmers' Day: 20 October 1993.

Quiz Contest

How many weeks prior to Big Onion harvest should water supply be stopped?

Farmer Problems: (Questions & Answers)

SUPPLEMENT 13 **30 OCTOBER 1992** *"Dinamina", "Divaina" "Thinakaran"*

Feature Articles

1. A good crop for the dry zone.
Fonseka H, RO/Maha Illuppallama

2. Is post-harvest technology a headache?
Ranasinghe TT, PD/Agric, Western Province

3. Milk and honey from rubber trees.
Karunaratne BT, SMO/Bee Development, Ratnapura

4 Do not imitate others in landscaping.
Wijeysundera C, Curator, RBG, Peradeniya

5. *BW 453*: A new variety of paddy.
Pieris PE, RO (Rice Breeding), RARC/Bombuwela

6. *Tur dhal*: The crop for you. *(Thinkaran; from supp 12)*
Fonseka H, RO, RARC/Maha Illuppallama

News Items

1. Eat dhal!

Quiz Contest

Name the presently recommended variety of Tur dhal with a determinate growth habit.

Farmer Problems: (Questions & Answers)

SUPPLEMENT 14 **27 NOVEMBER 1992** *"Dinamina", "Divaina"*

"Thinakaran"

Feature Articles

1. Virus diseases of *banana.*
Udugama Ms S, RO, CARI/Gannoruwa

2. Pest control in *Tur dhal* cultivation. *(Thinakaran also)*
Dharmasena CMD, RO, RARC/Maha Illuppallama

3. Grow plants and decorate "Mother Lanka".
Rajapakse H, Superintendent, RBG, Peradeniya

4. Toffee from *divul.*
Jayasinghe Ramya Ms, AD/Agric HQ (TT Division)

Quiz Contest

Name the caterpillar considered as a serious problem in Tur dhal cultivation. State the ideal ecological conditions that help in its rapid multiplication.

Farmer Problems: (Questions & Answers)

SUPPLEMENT 15 **25 DECEMBER 1992** *"Dinamina", "Divaina"*

"Thinakaran"

Feature Articles

1. Cultivate during *meda* and reap big profits. *(in Tk also)*
Jayawardene SN, RO/Maha Illuppallama

2. High yields from fields with salinity problems.
Punyawardhana R, RO/Land Use Division

3. Secrets in grafting rambuttan.
Jayatilleke KNK, Manager, Horticultural Farm, Horana

4. *Cucumber* in Colombo homegardens.
Ranasinghe TT, PD/Agric, Western Province

5. A solution for *chilli leaf curl* problem.
Ranatunga N, AD/Agric, ISTI, Bombuwela

News Items

1. Do you produce your own *Big Onion* seed?
2. New variety of paddy: *BG-352 (Thinakaran; from supp 10)*

Quiz Contest

What is the seed requirement for meda season green gram cultivation in paddy fields?

Farmer Problems: (Questions & Answers)

SUPPLEMENT 16 **29 JANUARY 1993** *"Dinamina" "Divaina"*

"Thinakaran"

Feature Articles

1. Bee's honey season is nearing.
Chandrawathie NV Ms, AI, Peradeniya

2. Can post-harvest technology save fruit quality?
Heenkenda HMS, RO, RARC/Bandarawela

3. Biotechnology from a breeder's viewpoint (Part I).
Dhanapala MP, DD (Res), CRBS/Bathalagoda

4. Fruit crop cultivation *(Thinakaran)*
Anonymous

News Items

1. Cultivation in the stubble is easy and profitable.
2. A problem in paddy cultivation.
3. Scholarships to Schools of Agriculture.
4. How to avoid root damage *(Thinakaran)*
5. New varieties of *maize* *(Thinakaran)*

Quiz Contest
Mention two disadvantages in growing Willard and Karthacolomban mango in the Wet Zone.

SUPPLEMENT 17 **26 FEBRUARY 1993**
"Dinamina" "Divaina"

"Thinakaran"

Feature Articles

1. Biotechnology from a breeder's viewpoint. (Part II)

Dhanapala MP, DD/Res, CRBS/Bathalagoda

2. Are we nearing the end of *gourd* cultivation?
Udugama S Ms, RO, CARI/Gannoruwa

3. Do not let your paddy fields idle in Yala.
Jayawardene SN, RO, ARS/Maha Illuppallama

4. Do not damage roots when weeding.
Ranatunga N, AD/Agric, ISTI, Bindunuwewa

5. Straw as fertilizer *(Thinakaran from supp 6)*
Tennekoon TMA, Addl DD/TT, HQ (TT Division)

6. Rainfed cultivation during Yala *(Thinakaran)*
Anonymous

News Items

1. A fine opportunity for Mahaweli farmers: A course of training in the working and maintenance of 2-wheel tractors.

Quiz Contest

Name two varieties of green gram suitable for growing during Yala in paddy fields faced with water scarcity.

SUPPLEMENT 18 **26 MARCH 1993**

"Dinamina" "Divaina"

"Thinakaran"

Feature Articles

1. Biotechnology from a breeder's viewpoint. (Part III)
Dhanapala MP, DD/Res, CRBS, Bathalagoda

2. Know the soils before fertilizing them.
Kadadaragama KMA, RO, RARC, Maha Illuppallama

3. Off-season *Big Onions!* From Lunugamvehera?
Ranjith WJKV, AD/Agric (IP), Hambantota

4. Bigger harvests from saline paddy lands.
Senanayake N, DD/Res, RARC, Angunakolapelessa

Quiz Contest

What is the fee to be paid for the analysis of a soil sample in the laboratory?

SUPPLEMENT 19 **30 APRIL 1993**

"Dinamina" "Divaina"

"Thinakaran"

Feature Articles

1. Your requirements of seed paddy from your own fields.

Anonymous

2. Diseases affecting *gotukola*.
de Soysa IJ Ms, Pathologist, CARI/Gannoruwa

3. This is how we get rain.
Punyawardhana BVR, RO, Land & Water Use Division

4. Increased income from fallow paddy fields.
de Silva WP, SMO, ADA Office, Labuduwa, Galle

5. Protect your *Big Onion* nurseries.
Wijeratne B, DD/Agric, Central Province

News Items

1. Soil Testing Service.
2. Do not hesitate! Hurry up!

(Income from other crops grown in paddy lands in Yala)

Quiz Contest

What percent of grains in an earhead should be golden yellow in colour at optimum time of harvesting?

SUPPLEMENT 20 **28 MAY 1993**

"Dinamina" "Divaina"

"Thinakaran"

Feature Articles

1. Would you let nematodes have your *potato*crop?
Eknayake R Ms, RO, CARI/Gannoruwa

2. Unfavourable era for paddy cultivation>
Emitiyagoda S, AD/Agric, HQ (TT Div)

3. Lunugamwehera braves water scarcity.
Ranjit WJKV, AD/Agric, Hambantota

4. Easy method of producing bud grafted *jak* plants.
Dandeniaratchchi P, Farm Manager, Bandaragama

5. Diseases affecting *gotukola*.
de Soysa IJ Ms, Pathologist, CARI/Gannoruwa

6. Water management for *OFC*. *(Thinakaran; from supp 9)*
Gamage H, Addl DD/TT, HQ (TT Division)

7. Fertilizer recommendations for *Big Onion* and *Red Onion*.
Anonymous (Thinakaran)

8. *OFC* cultivation in Yala. *(Thinakaran)*
Anonymous

9. Golden nematode in *potato*. *(Thinakaran)*
Anonymous

Quiz Contest

Name 4 crops that could be intercropped with **potato** *to control Golden Cyst Nematode.*

Farmer Problems

SUPPLEMENT 21 **25 JUNE 1993**

"Dinamina" "Divaina"

"Thinakaran"

Feature Articles

1. Grow a good quality *avocado* plant.
Nanayakkara KPPA, RO, CARI/Gannoruwa

2. A *durian* plant suitable for the small home garden.

Jayatilleke KNK, Horticulture Farm, Horana

3. *Avocado!* Bread spread!
Ekanayake S, RO,ARI/Gannoruwa

4. Easy method of producing bud grafted *jak* plants.
Dandeniaratchchi P, Farm Manager, Bandaragama

5. Unfavourable era for paddy cultivation.
Emitiyagoda S, AD/Agric, HQ (TT Division)

6. *Durian* budding.
Anonymous (Thinakaran)

7. *Avocado* cultivation.
Anonymous (Thinakaran)

8. Pesticide labels.
Anonymous (Thinakaran)

News Items

1. The *Big Onion* farmers who visited India.

2. The messages in the "colour bands" on pesticide labels.

3. *Grapes* from Kataragama area. *Ratnasiri S*

4. This Exhibition (Horticulture) is for you.

5. A group that tamed bees. *Wickramatilleke S, AI, Urapola*

Quiz Contest

What is the most satisfactory method of grafting durian?

SUPPLEMENT 22 **30 JULY 1993**

'Dinamina" "Divaina"

"Thinakaran"

Feature Articles

1. Brown Plant Hopper control in Ampara.
Dayaratne PMN, AD/Agric, Ampara

2. A hint for nurserymen.
Heenkenda HMS, RO, RARC, Bandarawela

3. Are pod borer caterpillars causing you problems?
Wijesekera RS, AD/Agric, ISTI, Aralaganwila

4. An enemy of the *Big Onion* crop.
Wijeratne B, AD/Agric, AD/Agric, Kandy

5. Can insect pests be controlled without insecticides?
Iddagoda CH, SMO, Plant Protection Service, Peradeniya

News Items

1. National Farmers' Day Commemoration 1993.
2. Farm Machinery Repair for Self Employment:
3. Cut Flowers: A new source of foreign exchange.

Quiz Contest
What is the best mango variety for use as root stock?

5. IMPORTATION OF GERMPLASM

Orchids: Orchids represent a valuable source of foreign exchange for Sri Lanka, and GOSL therefore encourages cultivation on commercial lines for export purposes. DOA plans in this context are directed mainly towards assisting small farmers and also women in agriculture. These plans envisage the supply of high quality planting material of exportable varieties of orchids to the growers. Such material however is presently not available with DOA. An allocation of $10000 from DARP/SPF was therefore made for import of orchid germplasm to serve as parent material in orchid breeding and improvement programmes, and also as mother plants for direct multiplication (both *in vivo* and *in vitro*) and supply to growers.

Thailand, which has a great diversity of orchid germplasm and is also the leading producer and exporter of orchids in the region, was selected as the source from which the germplasm was to be obtained. Two officers from the Royal Botanic Gardens, *(Mr H Rajapakse, Curator, and Mr DG Ranamukaaratchchi, Research Officer)* were therefore sent to Thailand on a 10-day mission (from 02 to 13 July 1992) specifically to examine, select, purchase and despatch orchid germplasm to Sri Lanka. This mission was a complete success and resulted in 3073 acquisitions. Details of types and numbers of plants purchased are shown in Table 1 *(see page 2)*. The purchases were made from the following nurseries:

1. *Kasem Boonchoo Nursery,*
   109/3 Phaholyotin soi 15, Sapan Kwai, Bangkok 4.

2. *Kultana Orchids*
   39/6 Nawong Pracha Patana Road, Donmuang, Bangkok 10210.

3. *Chao Praya Orchi Nursery Ltd (Export Office),*
   63/2 Moo 1, Samkhok Sena Road, Samkhok, Pathumthane 12160.

Tropical Fruit: In view of the growing demand for fruit and fruit products of Sri Lankan origin both locally and abroad, agricultural policy is now being oriented towards strengthening Sri lanka's hitherto largely ignored horticultural sector. Such strengthening requires, among other things, the genetic improvement of the production base. But the pool of variability currently available in Sri Lanka is too small to sustain a fruit crop breeding and improvement programme. In this context the enrichment of the gene pool through infusion of imported germplasm assumes crucial significance. DARP/SPF was accordingly made available for importation of germplasm.

Although several sources of germplasm exist, it was decided in the present instance to import from Australia. This was in order to utilize the opportunity of a DARP supported horticultural study tour *(10-31 March 1993)* in that country by a team of senior agricultural scientists from DOA to also select, purchase and

ship/hand carry the material to Sri Lanka. *(Study tour team: Dr S Amarasiri, Deputy Director/Research; Research Officers L Dissanayake, JL Sirisena, HP Ariyaratne, and S Pieris, and Mr BASS Padmalal, Assistant Director/Seeds & Planting Materials)*. A total of 679 acquisitions was thus obtained at a total cost of $879 (Rs.42192). Most of the material was purchased from commercial nurseries in Queensland, while a few lines were received *gratis* from the Maroochy Horticultural Research Station, Nambour, Queensland. The tropical fruit germplasm thus introduced to Sri Lanka through DARP is listed in Table 2 *(see page 3)*.

Table 1: Orchids purchased from Thailand with DARP/SPF

Type of Orchid	Nursery			Total
	Boonchoo	*Kultana*	*Chao Praya*	
Dendrobium	1247	300	165	1712
Vanda	256	118	20	394
Ascocentrum	10	-	-	10
Ascocenda	44	50	30	124
Aranda/Mokara/Kagawara	12	50	80	142
Oncidium	23	50	10	83
Doritis	3	-	-	3
Den.densifolium	6	-	-	6
Rhyncostylis	9	-	-	9
Cattleya & BLC	90	60	-	150
Phalaenopsis	-	50	-	50
Aeridis	-	-	20	20
Vascocenda	-	-	10	10
Ctna.Jamaica Red	-	-	10	10
Bonus plants	-	350	-	350
TOTAL	1700	1028	345	3073

Table 2

Tropical Fruit Germplasm
DARP Funded Acquisitions from Australia (1993)

Crop	Latin Name	Acqns	Material	Units	Location
Abiu	*Pouteria caimito*	2	seedling	2	PGRC
Apple	*Malus spp*	4	grafts	4	PGRC
			scion wood	na	Bandarawela
Banana	*Musa spp*	9	*in vitro*	9 (flasks)	PGRC
Barbados Cherry	*Malphigia glabra*	1	seedling	2	PGRC
Blueberry	*Vaccinium ashei*	2	seedling	4	PGRC
Carambola	*Averrhoa carambola*	8	scion wood	57	PGRC
Clementine	*Citrus reticulata*	2	scion wood	34	PGRC
Custard Apple	*A sq x A cheri*	2	scion wood	19	PGRC
Durian	*Durio zibethinus*	6	grafts	10	PGRC
Grape	*Vitis vinifera*	5	cuttings	8	PGRC
Grape Fruit	*Citrus paradisi*	3	scion wood	26	PGRC
			grafts	2	PGRC
Guava	*Psidium guajava*	2	sticks	3	PGRC
			layers	3	PGRC
Jaboticaba	*Myriaria cauliflora*	1	seeds	5	PGRC
			seedlings	2	PGRC
Jak	*A'carpus h'phylla*	3	grafts	4	PGRC
			seeds	5	PGRC
Jak x Champaden		1	graft	1	PGRC
Lemonade	*Citrus spp*	2	graft	2	PGRC
Longan	*Euphoria longana*	2	layers	3	PGRC
			seeds	3	PGRC
Lychee	*Litchie chinensis*	6	layers	16	PGRC

Mandarin	*Citrus reiculat*	7	scion wood	79	PGRC
			grafts	2	PGRC
Mango	*Mangifera indica*	15	scion wood	154	PGRC
Mangosteen	*Garcinia mangostana*	1	seedling	2	PGRC
Nashi	*Pyrus pyritolia*	4	grafts	2	Bandarawela
			scion wood	3	Bandarawela
Nectarine	*Prunus persica*	3	scion wood	3	Bandarawela
Orange	*Citrus sinensis*	2	grafts	5	PGRC
Papaya	*Carica papaya*	1	seeds (F_2)	50	PGRC
Passion F	*Passiflora edulis*	2	seeds	20	PGRC
	P flavicarpa	4	seeds	40	PGRC
Peach	*Prunus persica*	3	scion wood	3	Bandarawela
Pear	*Pyrus communis*	2	scion wood	2	Bandarawela
Persimmon	*Diospyrus kaki*	1	scion wood	1	CARI
Plum	*Prunus salicina*	2	scion wood	2	Bandarawela
Pumello	*Citrus grandis*	4	grafts	2	Bandarawela
			scion wood	10	Bandarawela
			seedlings	4	Bandarawela
Pomegranate	*Punica granatum*	5	cuttings	73	PGRC
Sapodilla	*Achras sapota*	2	scion wood	1	CARI
			scion wood	1	PGRC
Sapote		1	layers	1	CARI
Tamarind	*Tamrindus indicus*	1	seedlings	2	PGRC
Tangelo	*C reti. x C paradisi*	2	grafts	2	PGRC
Zysigium		1	seeds	2	PGRC

6. BIO-TECHNOLOGY WORKSHOP

Recent government agricultural policies have focused on market-oriented crop production. The challenge presented thereby to satisfy both domestic and export markets calls for reorientation and reformulation of DOA strategies for research and extension. In this regard, the newly emerging bio-technologies offer prospects that are potentially highly promising. DARP/SPF was accordingly availed of to hold a workshop on "Application of Bio-technology in Agricultural Development". The workshop was conducted at the BMICH, Colombo on 12 June 1992 under the Chairmanship of the Minister of Agricultural Development & Research. The cost incurred inclusive of that for publication of the "Proceedings" was $7,500/-

The contents of the workshop proceedings are listed in the annex 3. It is evident from this list that the workshop had provided a forum for scientists from government departments, universities and the private sector to share their knowledge, identify focal points, and propose future strategies and methodologies for sharing resources to benefit the farmers of this country. The workshop in essence therefore defined how the biotechnologists of this country could integrate their work to achieve specific objectives and provide a basis for determining macro-policy.

Annex 3

APPLICATION OF BIOTECHNOLOGY IN AGRICULTURAL DEVELOPMENT

Proceedings of Workshop
12 June 1992: BMICH, Colombo

C O N T E N T S

Foreword
Mr Dixon Nilaweera, Secretary, Agricultural Development & Research

Remarks from sponsor
Dr Preston S Pattie, Chief-of-Party, Diversified Agriculture Research Project

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Perspectives

Prospects and challenges for agricultural development in Sri Lanka
Dr SPR Weerasinghe, Director of Agriculture

Inaugural Address
Hon RM Dharmadasa Banda, Minister of Agricultural Development & Research

Biotechnology in crop improvement
Dr P Ganashan, Head, Plant Genetic Resources Centre

SESSION I *GENERATION OF TECHNOLOGY*

Application of innovative techniques in rice breeding
Mendis MH, Hettiaraatchchi A, Dhanapala MD & Ganashan P

Application of tissue culture in fruits and some medicinal plants of economic importance
Rajapakse DP, Wickramasingghe A & Ganashan P

Plant tissue culture in sugar cane breeding
Krishnamoorthi M

In vitro micrografting in fruit crops: cashew and mangosteen
Ramanayake SMSD & Kovoor A

Discussion

Overview
Professor YDA Senanayake, Post Graduate Institute of Agriculture

SESSION II *APPLICATION OF TECHNOLOGY*

Seed potato production through rapid multiplication technique
Samarasinghe PWSM

Mechanical decapitation technique for rapid multiplication of pineapple planting material
Heenkenda HMS & Samaratunge H

In vitro propagation of cardamom
Swarnathilaka DBR

Biotechnology: Private sector interests and achievements
Senanayake S

Discussion

Overview
ALT Perera

SESSION III *REPORTS AND RECOMMENDATIONS OF WORKING GROUPS*

National policies and institutional mechanisms

Current status, future needs and priorities

Discussion

POSTERS

Elimination of virus in *citrus sp.* through micrografting
Ranamukaaratchchi DG & Fernando K

In vitro propagation of Bamboo (*Thyrostachys oliveri* Gamble) and Brazil nut (*Bertholettia excelsa* Bonpl)

In vitro propagation of Nedun *(Pericopsis mooniana)*
Abeyratne WM, Bandara DC, Senanayake YDA & Sumithraaratchchi DB

Mass propagation of Anthurium (*Anthurium andraeanum* Linden ex Andre) *in vitro*.
Abeyratne WM & Yogarajah A.

Meristem culture of Komarika (*Aloe vera* (L) Burn)
Hettiaratchchi A, Rajapakse DP, Mendis MH, Ganashan P & Jayawardene G.

Micropropagation of Niyangala (*Gloriosa superba* L)
Samarajeewa PK, Dassanayake MD, Hettiaratchchi A, Mendis MH & Jayawardene G

Micropropagation and somatic embryogenesis in Banana
Rupasinghe HP, Mendis MH, Samarajeewa PK, Rajapakse DP & Jayawardene G

7. SEED MARKETING STUDY

Development of the seed industry has been one of the principal areas of concentration under the DAR Project. Originally emphasis was placed on reducing the number of government seed farms as a means of opening opportunities for formation of independent seed enterprises. Gradually it became apparent that the private sector needed more direct encouragement, guidance, and support to become involved in the production and distribution of seed. The Seed Marketing Study, conducted by the Seed Development Unit of the Seed and Planting Materials Division, is one such means of support to provide useful information needed by emerging seed enterprises.

In the study, an effort was made to quantify total seed requirement and effective demand of major seed crops. Emphasis was then placed on identifying the benefits that farmers expect to obtain from using high quality seed of different crops. Means of increasing effective demand through improving quality, and through better promotion and distribution were then investigated. It was also hoped that the information will help bring focus to public policy.

The study focused on individual crops for which the potential market for seed is of an important volume and value. It also emphasized the kinds of seeds which are likely to be grown locally.

Development of the design and methodology was carried out from May to July of 1991. A sample of over 120 Grama Niladhari areas was selected from which to interview about 400 farmers. Random numbers tables were used to select individual farmers from lists of voters. Non-farm families encountered were skipped. The questionnaire was designed to cover 1991 Yala and 1990/91 Maha seasons. The interviews required about 1.5 hours to complete. Field work required travel to many remote areas of the island, expect to the troubled north and east. A four-person team worked from August through November, 1991, to complete field work. Tabulation was completed in February 1992.

Special Project Funds were used to print the questionnaire and cover costs of three enumerators who carried out field work and data tabulation. The enumerators were Mr Jayantha Senanayake, Mr H M S Herath, and Mr S K P M K Esselle. The team was led by a DOA Officer from the S&PM Division. Unfortunately, the officer who participated in the design, Mr Govinage Sunil, met with a traffic accident on the day before field work was to begin. DOA assigned another officer to guide the team during field work.

After data tabulation, work on the study was suspended for several months. In 1992, the DARP Seed Enterprise Manager began his assignment, and later that year, several seed enterprises began operation. With the growing need for market information, analysis of data from the study was resumed. Final editing is now in process. Mr P Madawanarachchi, Head of the Seed Development Unit, and Dr Preston S Pattie are co-authors.

8. RESEARCH PROJECTS

A novel feature of the extension phase of DARP was the disbursement of SPF as individual grants for specific topics of research relevant to crop diversification in paddy lands or to horticultural production. There was a total of 17 applications for these grants, but only 16 were accepted for funding. These comprised 13 from the Research Division, 2 from the Gardens Division, and 1 from the Plant Quarantine Unit of the Seed Certification & Plant Protection Division.

Of the 13 studies from the Research Division, 7 related to field crops and vegetables (leafy vegetables, potato, grain legumes, cucurbits, chilli, onion) and 6 to fruits (passion fruit, pineapple, banana, mangosteen, apple and pear). All 3 of the remaining studies (from the Gardens Division and the PQ Unit) were on foliage and ornamental plants.

The research topics pertained to pests and diseases (8 studies), food technology (2 studies), tissue culture (3 studies), agronomy (2 studies) and crop botany (1 study). Brief outlines of these studies are annexed. (Annex 4).

A workshop was conducted on 06 May 1993 to discuss and clarify issues pertaining to the administration and utilization of the research grants. The goods and services to be obtained with the funds were defined, and the expenditures incurred accordingly are shown in Table 1 *(see page 2)*.

Activities under the Research Grant programme were concluded with a Seminar held at the PGRC, Gannoruwa, on 04 August 1993. Participants were provided with guidelines for presentation of results. It was emphasised in these guideleines that the seminar was not intended to be a peer review, but an opportunity to present results to an audience interested in practical solutions to real problems felt by farmers, agro-enterprises, policy makers etc. The presentations made accordingly were both impressive and interesting, and clearly pointed to the success of the programme. This suggests that grant schemes should be considered as an effective means of supporting research in future.

(Note: Abstracts of the presentations made at the research seminar are given in a separate report compiled and edited by Dr BMK Perera, Research Officer, and Dr S Nagarajah, Additional Deputy Director/Research).

DARP WORK PLAN TECHNICAL AREA 4 - ITEM 9 : RESEARCH GRANTS
STATEMENT OF EXPENDITURE

RES.GRANTS	CHEMICALS	LABWARE (GLASS/PLASTIC)	APPRATUS[1]	MIS.LAB &[2] FIELD REQTS.	FERTILISER & MANURE	AGRO CHEMICALS	FUEL	PER DIEMS	SPECIAL[3] SERVICES	TOTAL
	Rs	Rs	Rs	Rs	Rs	Rs	Rs	Rs	Rs	Rs
4-9-01	111,360	27,530	46,420	114,720	523	78	13,779	26,640	57,970	399,020
4-9-03	7,760	16,761	0	43,416	1,550	805	11,197	6,477	10,453	98,419
4-9-04	0	11,102	0	42,177	1,248	13,200	13,243	18,815	1,569	101,354
4-9-05	0	37,181	0	38,441	745	1,447	11,715	24,125	32,809	146,463
4-9-06	65,299	23,677	0	18,999	0	3,206	654	5,150	62,041	179,026
4-9-07	8,955	4,284	0	29,991	1,035	12,833	357	0	433	57,888
4-9-08	27,284	122,657	0	80,367	6,100	24,189	4,854	0	1,040	266,491
4-9-09	104,395	14,168	1,310	10,817	0	0	1,895	400	23,800	156,785
4-9-10	1,000	0	17,150	27,956	0	0	0	755	521	47,382
4-9-11	827	3,720	0	20,677	0	385	6,955	33,818	5,861	72,243
4-9-12	0	9,525	0	6,105	0	3,349	0	561	0	19,540
4-9-13	10,100	18,773	0	15,651	0	0	12,095	9,300	58,055	123,974
4-9-14	9,900	4,787	280	36,673	75	100	9,013	17,226	470	78,524
4-9-15	74,133	3,000	0	48,691	0	1,246	1,808	0	30,550	159,428
4-9-16	0	15,875	0	35,963	92	2,971	818	0	25,850	81,569
4-9-17	5,800	0	0	120,612	2,025	8,835	6,473	1,930	582	146,257
TOTAL	Rs 426,813	313,040	65,160	691,256	13,393	72,644	94,856	145,197	312,004	2,134,363
	$ 8,986	6,590	1,372	14,553	282	1,529	1,997	3,057	6,569	44,934

[1] APPARATUS : pH meters, balances etc.

[2] MISCELLANEOUS EQUIPMENTS : mammoties, garden tools, detergents etc.

[3] SPECIAL SERVICES :Wages, Technical assistants, Photographic services, Postage etc.

Annex 4

DEVELOPMENT OF CROSS PROTECTION FOR PASSION FRUIT MOTTLE VIRUS (PFMV)

Dassanayake EMD Dr (Ms) & Wickramasinghe DL
RARC, Bombuwela

Background

Passion fruit is a potentially exportable popular fruit crop in Shri Lanka. Expansion of cultivation and production nevertheless is hindered by virus diseases of which three are prevalent in the country. The most common is PFMV. This virus is transmitted only by aphids, of which the most important is *Aphis spiraecola*. PFMV control measures based on eradication of the vector have not proved effective, especially in large scale cultivations. In Australia, Hawaii, and Thailand, the control of passion fruit woody virus (PWV) has been achieved through cross protection. The restricted host range of PFMV suggests that it too may be amenable to control through cross protection. The objective of this project was to develop cross protection technology for application in the major passion fruit growing areas of Shri Lanka.

Work Plan 1992

i) Conduct survey to collect, isolate, and identify strains of passion fruit viruses in Shri Lanka.
ii) Importation of mild strains of PWV from Australia for comparative studies under strictly restrictive conditions.
iii) Short study tour to Australia, Hawaii, and Thailand to observe their cross protection programmes.
iv) Strengthen infrastructure facilities for virus research at RARC, Bombuwela.

Work Plan 1993

i) Generation of local mild strains of PFMV for experimental purposes.
ii) Field evaluation in research station of local and imported mild strains.
iii) Evaluation of selected mild strains on adaptive research basis in farmers fields.

Work Plan 1994

i) Isolation and multiplication of the most effective mild strain for mass immunization programme.

MANAGEMENT OF MEALY BUG WILT OF PINEAPPLE

Sulaiman SMF (Ms)
RARC, Makandura

Background

Mealy bug wilt disease is the major constraint to profitable production of pineapple. Ants are known to have a commensal relationship with mealybugs. Results from previous studies suggest that the relationship of ant populations to weed density should be examined. The results should help in formulating an effective management package combining cultural and chemical measures for controlling mealy bug wilt.

Work Plan 1992/93

To study the intensity of mealy bug wilt disease in relation to density of weeds and ant populations in pineapple grown under coconut.

VARIETAL DEVELOPMENT OF LEAFY VEGETABLES

Senanayake LO
RARC, Bombuwela

Background

Leafy vegetables are rich in minerals, vitamins and proteins, and constitute an important component of the diet of most Sri Lankans. The three most popular are *mukunuwenna, gotukola* and *kankun*, the consumption of which is increasing significantly as indicated in the spread of cultivation from the traditional areas around Colombo to the outlying districts. But up to now no systematic study has been conducted to identify and characterize the many types of these vegetables being cultivated.

As the initial step in this project therefore it is proposed to make as complete a collection as possible of local germplasm and establish descriptors for identification of varieties. Promising lines will then be assessed in field plots for yield and other features desirable for both commercial and home garden cultivation.

Work Plan 1992/93

Germplasm collection and establishment of descriptors for identification of varieties of *mukunuwenna, gotukola* and *kankun*.

EVALUATION OF RESISTANCE OF MAJOR VEGETABLE PESTS TO COMMONLY USED INSECTICIDES

Bandara KANP & Ekanayake R Dr (Ms)
CARI, Gannoruwa

Background

Application of insecticide is the usual means employed in controlling vegetable pests. But reports of failure of the commonly used insecticides to give effective control are increasing. Such failure may be due to development of pest populations resistant to these insecticides, or to use of incorrect dosages and methods of application, or a combination of both factors. Confirmation of resistance will help to develop and prescribe alternative control measures. It will also help to compare local rsistance levels with those reported from other countries.

Work Plan 1992/93:

To evaluate under laboratory conditions the susceptibility to commonly used insecticides of populations of *Plutella xylostella*, *Spodoptera litura*, *Heliothis armigera* and *Aphis craccivora* collected from areas of intensive vegetable production using insecticides, through comparison with reference populations from areaa where insecticide use is negligible.

RIPENING OF BANANA

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Background

Banana is the major fruit crop in Sri Lanka. Even though widely cultivated, its price however keeps increasing. This phenomenon is usually attributed heavy post-harvest losses. Such losses can be minimized by proper post-harvest storage and controlled ripening to ensure a regulated supply to the market. In this context the development of appropriate technology, based on harvesting at different stages of maturity, and proper storage prior to ripening, will be of much relevance to the banana industry in Sri Lanka.

Work Plan 1992/93:

To study the ripening behaviour of banana in relation to the dgree of maturity with a view to regulating harvesting to correspond with market demand.

PRE-BASIC SEED POTATO PRODUCTION THROUGH MERISTEM CULTURE

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RARC, Bandarawela

Background

Due to restrictions in the importation of seed potato it is very essential to have a basic seed potato production programme in the DOA to meet national requirements. However the conventional method of multiplication using tubers leads to "degeneration" due to microbiological causes. Meristem culture offers an excellent alternative means of producing disease free planting material for use as nucleus or pre-basic material in a basic seed potato production programme.

Work Plan 1992/93

Develop pathogen tested in-vitro plantlets of potato through meristem culture and provide disease free nucleus planting material for a seed potato multiplication programme.

CONTROL OF IMPORTANT FUNGAL DISEASES OF APPLE AND PEAR

Kelaniygoda DB Dr & Heenkenda HMB
RARC, Bandarawela

Background

Apple and pear though once grown on a commercial scale are now essentially backyard crops. This degeneration of the industry is attributed mainly to the prevalence of fungal diseases, for which up to now no proper control measures have been developed and extended to the growers. The objective of this study is to remedy this situation after systematic sampling, isolation and identification of the predominant strains of *scab*, *powdery mildew*, and *bitter rot* of apple and pear.

Work Plan 1992/93

To screen fungicides and develop application schedules and methods for control of *scab*, *powdery mildew*, and *bitter rot* of apple and pear.

PHYSICO-CHEMICAL AND COOKING QUALITY STUDIES IN FOOD LEGUME AND COARSE GRAIN (FLCG) CROPS

Ekanayake S
CARI, Gannoruwa

Work Plan 1992/93

Evaluation of physico-chemical characteristics and cooking time of some commonly utilized FLGC, and also some under-utilized FLCG crops such as sorghum, pigeon pea,horse gram, velvet bean, and the small millets grown in Sri Lanka.

Background

Food legumes and coarse grains are good sources of protein and essential amino acids. Some such as maize, green gram, soya and groundnut are commonly grown and widely utilized. The utilization of others such as the small millets, pigeon pea etc. is limited due to certain constraints associated with them such as the difficulty of removing seed coats, longer cooking time, and the possible presence of anti-nutritional factors. The development of technologies to eliminate these constraints will help to increase the utilization of these latter crops, and thereby, not only nutritional standards, but also farmer incomes.

The physico-chemical analysis,characterization, and evaluation of FLCG crops collected island wide will be the first stage of the studies. The second stage will be the evaluation of factors associated with processing and cooking quality.

THE USE OF PLANT GROWTH REGULATORS (PGR) WITH CUCURBITS TO PROMOTE FEMALENESS AND PRODUCTIVITY

Pieris S & Gunawardene D
RARC, Aralaganwila

Background

Cucurbit yield depends on the number of female flowers produced. The male:female ratio is governed by genetic and environmental factors affecting the balance of endogenous male and female hormones. This ratio responds also to external application of PGR. The PGR however vary in effect with concentration, growth stage, soil, and climatic conditions. PGR nevertheless are advantageous; for application does not a) require special skills and equipment and b) pose any environmental hazard. The present study was therefore designed to evaluate three PGR of which commercial formulations are now available in Shri Lanka.

Work Plan 1992/93

To study the effect of NAA, ETHREL, and PACLOBUTARZOL on floweing, yield and other characteristics of butternut, cucumber, luffa and bitter gourd.

CONTROL OF LATEX EXUDATION IN MANGOSTEEN

Tantirige S (Ms)
RARC, Bombuwela

Background

Mangosteen is frequently observed to exude a latex fom the pericarp that imparts an unpleasant taste to the fleshy aril which constitutes the edible part of the fruit. This disorder of unknown aetiology is generally referred to as "gamboge disease". The spoilage caused by this disorder cannot be detected until the fruit is opened. The risk of incurring a loss is therefore high both to the ordinary consumer and the fruit processor. The

development of technology to eliminate this condition is therefore important as mangosteen has the potential to become a high value export crop.

Work Plan 1992/93

Study external physical factors, soil moisture stress and nutrition on latex exudation in mangosteen fruits.

CHILLI NARROW LEAF DISORDER INVESTIGATION

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CARI, Gannoruwa

Background

Crop diversification in irrigation schemes makes chilli an important component of the cropping pattern. Nevertheless, expansion of acreage under chilli is constrained due to the incidence of the disorder known as "chilli narrow leaf" which affects productivity adversely. The factors responsible for this disorder have not been established conclusively, but it seems that genetic, physiological, pathological, and soil physical factors are all involved in its manifestation. Identification of the factors causing this disorder with a view to developing remedial technologies is an urgent need because of the major economic significance of chilli in Shri Lanka.

Work Plan 1992/93

Investigate the role of soil physical factors on the incidence and severity of "narrow leaf disorder" of chilli grown under green house conditions.

INSECT PESTS AFFECTING THE FOLIAGE AND CUT FLOWER INDUSTRY

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Background

There is considerable potential in the Foliage and Cut Flower Industry of Shri Lanka for development as a significant foreign exchange earner for the country. But, as revealed in the course of quarantine inspection for export certification, the incidence of pest damage in consignments prepared for export is frequently unacceptably high. Better pest control is therefore needed in this sector for export consignments to conform to quarantine specifications. This area of pest control has not however been of major concern to the DOA until now. It is therefore proposed through this project to initiate an in-depth study of the pests infesting foliage and cut flower crops, and to develop technologies for their effective management under various production systems.

Work Plan 1992/93

To study the insect pests detrimental to the foliage and cut flower industry in Shri Lanka, and to develop appropriate procedures to minimize quarantine risk.

CONTROL OF LEAF TWISTER DISEASE OF ONION

Kuruppu NPU (Ms) & Fernando WARN
RARC, Makandura & ARS, Kalpitiya

Background

"Leaf Twister" disease of onion, popularly known as "disco" disease among cultivators causes crop losses of 20-60% in the Kalpitiya area. This disease of unknown aetiology was first reported in the 1980's from Trincomalee District, but is now seen in other areas also. Because of the increasing popularity of onion as a diversification crop, it is necessary to establish measures as soon as possible to minimize the potentially heavy losses from this disease.

Work PLan 1992/93

To identify the cause of "Leaf Twister" disease of onion and to study the correlation of its incidence and severity with climatic and other environmental factors.

TISSUE CULTURE OF FICUS benjamina

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Background

The floriculture industry is now established as a lucrative source of foreign exchange for Shri Lanka. Thus the annual value of exports since 1990 has been about $ 500,000/- , with about 52% being accounted for by foliage plants alone.Currently the most popular foliage plants are the ornamental Ficuses, with the demand being greatest for Ficus benjamina in particular.A major constraint to expanding the output of F. benjamina is the lack of techniques to raise quality planting material in bulk. Conventional methods based on seeds and stem cuttings are inappropriate for this purpose. Tissue culture is an alternative means of rapid multiplication, but techniques for its application specifically to F. benjamina have to be developed and perfected for extension to commercial nurseries. This research project has been developed for this purpose.

Work Plan 1992/93

Stage 1: Collection and maintenance of F. benjamina germplasm.
Stage 2: Assessment of the rooting and proliferation ability of ex-plants from the above germplasm using various hormones and culture media.

Stage 3: Multiplication of plantlets, rooting in selected media, acclimatization in lath house, and preparation for freighting.

WEANING OF TISSUE CULTURED ANTHURIUM

Ranamukhaarachchi DG
Royal Botanical Gardens, Peradeniya

Background

Anthurium production accounts for a major share of the cut-flower industry. The export trade however needs standard sized, high quality flowers in larger quantities than are currently pr ed through conventional propagation techniques. The feasibil of using tissue culture for mass production of anthurium is therefore being examined at the RBG. And accordingly a successful culture medium has been developed for anthuriums at the RBG. However, in the weaning and hardening of the plantlets thus produced the rate of success achieved so far has been low. This research proposal is directed towards identifying the causes for this low success rate, and establishing appropriate measures to eliminate them.

Work Plan 1992/93

Study 1: Perfecting the removal of plantlets from aseptic culture conditions: Assessment of the effect of relative humidity and sterile culture media.
Study 2: Hardening of plantlets prior to field establishment: Asessment of the effect of light and temperature.
Study 3: Field exposure of hardened plantlets: Assessment of the effect of daylight intensity on growth and development under net house conditions.

OPTIMUM PLANT DENSITY AND FERTILIZER REQUIREMENT FOR TUBERLET CULTURE IN POTATO

Kahandawela JBDS Dr
ARS, Sita Eliya

Background

Tuberlets (28 mm diameter) are a popular form of planting material among potato farmers, particularly in the Badulla area. At present however, there is no package of recommended agronomic practices for tuberlet culture of potato. This study therefore is expected to lead to an identification of the plant density and fertilizer level optimal for using tuberlets in production of potato.

Work Plan 1992/93

To test a range of plant densities and fertilizer levels to ascertain the best combination for tuberlets used as planting material in potato.

9. ONION STORAGE AND STRUCTURE IMPROVEMENT

Two kinds of onion are consumed in Sri Lanka, known as red onion and big onion. They are distinguished by their size, rather than colour. Red onion, the smaller of the two, are multiplied from dry sets. The farmer plants bulbs, and harvests bulbs. A portion of the harvest is held over to plant the following season. Big onion is planted from true seed. The farmer markets his entire production of bulbs, and purchases seed for the following season. Most big onion seed is imported.

Red onion has been traditionally grown in the northern areas of Sri Lanka. With the disturbances in the north and east, supplies have been erratic. Production is increasing in other areas of the country. Big onion has been mostly imported. Recently, however, local production has been encouraged by the DOA. Although consumption of big onion is on the increase, local supply is rising even faster, resulting in a greater degree of self sufficiency in this commodity. A serious limitation now being faced is the seasonality of big onion production.

Onion Storage

The dramatic increases in big onion production have created serious gluts on local markets in recent years during the September-October period. Onion storage at the farmer level has been promoted as a partial remedy by the Technology Transfer Division of the DOA in collaboration with Provincial Extension personnel. (See the attached instruction from the Deputy Director of Agriculture/Technology Transfer to extension personnel relating the methods of implementing the program and providing additional technical guidelines for both onion storage and true seed production.)

Sixteen DARP grants were given to farmers in various parts of the country to help defray the costs of building onion storage units. Most are used to store big onion. However storing red onion during the critical period also helps alleviate the market glut. The two kinds of onion are near perfect substitutes for the consumer. In the Ratnepura District, where red onion production has increased most recently, the Sabaragamuva Provincial Council financed about 20 additional storage units based on the DARP-financed model.

True Seed Production

Seed supply for big onion production has been a matter of concern for several years, as the quality and availability of imported seed has often faltered. One measure taken by the DOA has been to promote true seed production (TSP) by onion growers to ensure at least a portion of their seed requirements. TSP requires selection of high quality mother bulbs from the harvest in

September/October. The bulbs are transported to storage facilities in the cooler up-country area of Bandarawela for vernalization. The following January, the bulbs are returned to

production areas for planting. Seed is harvested in time for planting onion the following season.

As the amount of high quality mother bulbs was limited, DOA purchased the bulbs and carried out the steps of transport and cold storage. DARP financed the purchase of this material and the costs of distribution back to onion growers. Seed production levels reported by farmers were satisfactory. Labor requirements make this small scale production somewhat costly compared to imported seed. Still, farmers indicate their intentions to continue on their own as supplies of imported seed are still considered unreliable. Fortunately, vernalization may not be required in the future, according to some recent trials conducted by DOA.

Related Activities

These activities financed under Special Project Funds were complemented by a study tour where six farmers led by a DOA Officer visited onion production regions in India. After the study tour, the Honourable Minister of Agricultural Development and Research convened a nationally televised seminar where the participants reported on their experience to other farmers as well as to DOA personnel. In addition, a report on the economics of onion demand and supply was prepared by the Division of Agricultural Economics and Planning.

10. OFC DEMONSTRATIONS IN MEDA 1992

Introduction

In most of the paddy fields planted during the Maha, the soil tends to remain moist even several weeks after the harvest. This residual moisture is not generally exploited, and the fields lie idle until the Yala. This period of 10-12 weeks between Maha and Yala is referred to as the Meda or middle season.

Some exploratory studies made under DARP indicated that the residual moisture from Maha can be harnessed to raise short aged varieties of grain legumes and vegetables. In view of the significant economic potential inherent in such a cropping system, considerable emphasis was given in the current phase of DARP to its promotion in the Meda seasons of 1992 and 1993 through use of block demonstrations and mass media techniques. It was intended through the demonstrations to also focus attention on the use of the "Inverted T" seeder for direct seeding into the stubble.

Plans and programmes for promotion of Meda cultivation were drawn up by the TT Division of the DOA, while input costs were met from DARP/SPF. This report relates to the demonstrations carried out in Meda 1992.

Meda 1992: Programme Outline

i) Total extent proposed for planting: 40 acres
ii) Total extent actually planted: 39 acres
iii) Crop/variety: Greengram/HARSHA
iv) Distribution of acreage:

Interprovincial	
Amparai	*11 ac*
Anuradhapura	*10 ac*
Kandy (Hassalaka)	*03 ac*
Polonnaruwa	*06 ac*
Provincial	
Kandy	*02 ac*
Kurunegala	*05 ac*
Puttalam	*02 ac*

Meda 1992: Field Implementation Details

Amparai (IP)

1. Locations: Eragama, Damana, Thottama, Namalthalawa, Central Camp
2. Planting: 05-06 Feb 1992. "Inverted T" seeder used.
3. Farmer training and field days: 6
4. Harvest dates: From 01-05 April 1992
5. Yields: No harvest was taken (see below).
6. Notes: a) Early growth of the crop was retarded due to non-application of a top dressing of urea.

   b) Most of the plots were ploughed in at about

flowering time due to early issue of water for the Yala paddy crop.

c) Growth of surviving plots was adversely affected by water logging due to seepage from inundated neighbouring *liyaddas*.

Anuradhapura (IP)

1. Locations: Rajangana LB, Rjangana RB, Sravastipura, Galenbindunuwewa, Rambewa
2. Planting: Latter half of February 1992 (Rambewa: 18-02-92) "Inverted T" seeder used.
3. Farmer training and field days: Nil
4. Harvest dates: 25 April to 05 May 1992 (Rambewa only)
5. Yields: Not measured, but the 2 ac at Rambewa gave approximately 05 gunny bags of pods.
6. Notes: a) At all location except Rambewa, water for the Yala paddy crop was issued much earlier than expected, and so all the demonstration plots were destroyed before they could be harvested.

Kandy (IP)

1. Locations: Hassalaka, Devahuwa.
2. Planting: 3-18 April 1992. Four methods of seeding compared. (See note "a" below).
3. Farmer training and field days: 6
4. Harvest dates: 01-20 June 1992
5. Yields: 22 kg/ac with seeder; 103 kg/ac average for other methods.
6. Notes: a) 4 methods tested: i) seeding into stubble with "Inverted T" seed drill, ii) row seeding by hand in furrows made in stubble with buffalo drawn country plough, iii) broadcasting seed into stubble, and iv) broadcasting seed into clean weeded plot. Broadcasting into stubble gave biggest yield (150 kg/ac).

Polonnaruwa (IP)

1. Locations: Giritale Colony (5 ac "Harsha")
   Yoda Ela (1 ac MI-5 green gram)
2. Planting: 20 March 1992 (2 ac); 20 April (3 ac)
3. Farmer training and field days: 2
4. Harvest dates: Early June 1992
5. Yields: Approximately 180 kg/ac from early sowing.
   Insignificant yields from other plantings.
6. Notes: a) All plantings done with "Inverted T" seeder.
   b) 20 March planting was immediately after the paddy harvest.
   c) Variety MI-5 was severely affected by drought.

Kandy (Provincial)

1. Locations: Medamahanuwara (Watuliyadda tract)
2. Planting: 1st week May 1992. Row seeded manually.
3. Farmer training and field days: 1
4. Harvest dates: 1st week July 1992

5. Yields: Not measured, but reportedly 100-120 kg/ac

6. Notes: a) A late Meda is characteristic of this area.

b) Green gram was intercropped with tobacco, the traditional Yala crop in these paddy fields. The legume functioned as a nurse crop for the tobacco seedlings. The benefit to tobacco from the green gram was seen very clearly.

Kurunegala (Provincial)

1. Locations: Polpithigama AI Range
2. Planting: Latter half of May 1992. "Inverted T" seeder used.
3. Farmer training and field days: 1
4. Harvest dates: Not recorded
5. Yields: Approximately 41 kg/ac on 8.25 acres.

6. Notes: a) The demonstration plots formed one continuous block of 8.25 acres.

b) Planting was delayed due to late sowing of paddy in the Maha. As a result, the green gram crop ran into wet weather at flowering, and so yields were reduced.

Puttalam (Provincial)

1. Locations: Mahakonwewa, Ipalogama, Navagatthegama
2. Planting: 17.3 (Maha), 31.3 (Ipalo), 04.04 (Nava) "Inverted T" seeder used.
3. Farmer training and field days: 2
4. Harvest dates: Not recorded
5. Yields: Not recorded.

Meda 1992: Evaluation

1. The "Inverted T" Seeder

Although the "Inverted T" seeder was used at all demonstration sites, it proved to be less advantageous than previously believed. The major disadvantages identified both by farmers and extension staff with this seeder were:

a) the non-availability of sufficient tractors at the correct time;
b) cost incurred in tractor hire.

ii) Low efficiency of the seeder on the heavy clay soils characteristic of most paddy fields: e.g. a) failure of the furrow formed by the seeder to close; b) seeder being bogged down in the wet soil; c) clogging of seeder with mud and stubble.

As a result of the above disadvantages, only about 10 ac were actually planted with the seeder. The rest of the area was either broadcast or row-seeded in shallow furrows opened the mammoty.

2. "HARSHA" Greengram

The new variety of greengram named "Harsha" was used although it had not been officially released by the DOA. The demonstrations nevertheless provided a good opportunity for its large scale testing under a broad range of agro-climatic situations and farmer conditions. Unfortunately however, no arrangements had been made to

collect data on growth, flowering pattern, yield parameters etc. Nevertheless, general observations indicated that:

i) "Harsha" is capable of giving good yields at all locations.

ii) "Harsha" in comparison with MI-5 or other un-named varieties of greengram is a vigorous grower, very tolerant of drought and highly resistant to mosaic virus.

iii) It is possible in all areas to harvest the crop at about 55-58 days from planting.

3. Water issues for Yala

At several places e.g. Amparai, Rajangane, standing crops of greengram had to be ploughed in due to early issue of water for the Yala paddy crop. This seemed to be a risk associated with lands under major irrigation works, and therefore, such lands should probably not be considered for inclusion in a Meda cropping programme.

4. Cattle damage

In general the demonstration plots formed isolated lots within an otherwise uncultivated tract in which cattle and buffalo are allowed to graze. These plots therefore are invariably invaded by these animals. Such damage can be minimized only by having very large contiguous areas under demonstration, or by fencing. The former is probably the better alternative.

Meda 1992: Conclusions.

1. The "Inverted T" seeder, introduced as an easy means of direct seeding into stubble proved, as at Amparai and Hassalaka, to be almost totally ineffective where the soil is heavy and clayey. It may be effective in lighter soils, but even so, as shown at Hassalaka, results with broadcasting tend to be better.

2. The greengram variety "Harsha" proved to be ideal for Meda season planting on account of its age (55-60 days), hardiness, and apparent resistance to mosaic disease.

3. Meda season crops should be planted as early as possible so as to avoid the risk of rain at the time of flowering.

4. Lands that are rainfed or under minor irrigation tanks (e.g Hassalaka) are not subject to sudden water issues for Yala, and
therefore seem more appropriate for Meda cultivation than those under major tanks (e.g.Rajangane, Amaparai).

5. As the demonstration plots were small and isolated they were frequently subject to invasion by cattle. This problem can be mitigated by having large blocks.

11. OFC DEMONSTRATIONS IN MEDA 1993

Introduction

A workshop for extension managers was held in November 1992 to formulate the programme for Meda 1993 in the light of experience gathered in Meda 1992. After review of the Meda 1992 programme it was concluded that the extent of paddy land suitable for Meda cultivation is potentially very large. The decision for Meda 1993 therefore was that individual plots as well as total area under demonstrations should be much larger than in Meda 1992. It was expected thereby to enhance their impact and also mitigate if not overcome the problem of cattle damage.

Meda 1993: Programme Outline

In contrast to the 39 ac planted in Meda 1992 (4 Interprovincial and 3 Provincial administrative divisions), the extent proposed for Meda 1993 amounted to about 837 ac *(pulses 814.5 ac; vegetables 22.5 ac)* distributed over 22 administrative divisions (6 Interprovincial, 12 Provincial, 4 Mahaweli Systems) as shown below.

Interprovincial

Ampara	*:25 ac*	*Anuradhapura:*	*70 ac*	*Kandy*	*: 50 ac*
Hambantota:	*70 ac*	*Moneragala :*	*20 ac*	*P'naruwa*	*: 50 ac*

Provincial

Kandy	*: 20 ac*	*Anuradhapura:*	*20 ac*	*Hambantota:*	*30 ac*
Matale	*: 25 ac*	*Trinco'Vavu :*	*15 ac*	*Moneragala:*	*40 ac*
Kegalla	*: 05 ac*	*Kurunegala :*	*48 ac*	*Badulla:*	*30 ac*
Matara	*: 15 ac*	*Puttalam :*	*32 ac*	*Ratnapura :*	*13 ac*

Mahaweli Systems

System H	*: 100 ac*	*System B*	*: 50 ac*
System C	*: 75 ac*	*Walawe SP*	*: 35 ac*

Meda 1993: Programme Outline

i) Total extent proposed for planting: 837 acres
ii) Total extent actually planted: acres
iii) Crop/variety: Greengram/HARSHA/MI5, Cowpea/MI35, vegetables iv) Inputs supplied

Seed (quantity and value)	*8452 kg*	*Rs.426810/=*
NPK (quantity and value)	*13000 kg*	*Rs.114723/=*
Expenses on field days etc.		*Rs.119598/=*
Total expenditure	*$ 13878*	*Rs.661131/=*

It was also decided at the workshop that the Assistant Directors should promote the Meda concept with publicity material in the form of posters and banners prepared by themselves at the district level. Six posters (K'gala, P'naruwa, A'pura IP, Kandy IP, System B and System H) and one banner (K'gala) were thus produced. Nevertheless, the districts were also supplied with

a banner promoting OFC that was produced at headquarters under the Multi Media Campaign (Completion Report No.03).

Meda 1993: Evaluation

The Meda 1993 demonstrations once again confirmed the feasibility of exploiting the residual moisture from the preceding Maha season to grow a short aged cash crop with minimum inputs.

In view of the adverse observations reported in Meda 1992 on the performance of the "Inverted T" seeder, it was not used at all in the Meda 1993.In general, the method of planting preferred by both growers and extensionists was that of direct sowing, either into the stubble, or into the standing crop immediately prior to harvesting.

Similarly, the other conclusions from Meda 1992 were confirmed in the 1993 programme.

12. YALA FIELD DEMONSTRATIONS - OFC IN PADDY LAND

Introduction

Farmer incomes based on two rice crops a year are generally regarded as being inadequate either to sustain or to improve the living standards of an average farm family. Thus rice farmers would need to seek other farming options to escape economic stagnation. An attractive alternative in this connection for paddy lands is crop diversification with Other Field Crops (OFC), the demand for which is increasing.

Paddy farmers in general however are not versed in the raising of OFC as irrigated crops in paddy lands. A strategy was therefore devised by the TT Division of the DOA for transfer of such technology through use of block demonstrations and multi-media campaigns.

Special Project Funds were accordingly made available under Technical Area 4 - Item 8 of the DARP Work Plan for promotion of OFC in paddy fields during the Yala. The crops selected for promotion were: big onion, black gram, chilli, cowpea, green gram, groundnut, red onion, soya, sweet potato and vegetables.

Programme Achievement

Most districts achieved their respective targets. Achievement fell short in Trincomalee and Vavuniya due to restrictions on the movement of extension officers. In the case of Kurunegala, the increase in price of onion seed necessitated reduction in area to keep within the approved budget. The total extent planted therefore was 43.9 ha or 91.5 percent of the target. Table 1 shows the distribution of this extent between districts and crops, and respective yields reported.

Farmer Training and Field Days

A total of 137 training classes and field days of 7-8 hrs duration each were held in connection with the Yala 1992 demonstrations. The participants consisted of farmers, of whom there was a total of 2847, as well as extension and research staff. The cost per event averaged about $ 64/-

Table 1. Distribution of Block Demonstration - Yala 1992 .

CROP

DISTRICT	Greengram	Groundnut	Cowpea	Soybean	Blackgram	Chilli	B-onion	R-onion	Sweetpotato	Vegetables	Total
	Extent: Hectares										
INTERPROVINCIAL											
AMPARA	4.0	-	-	-	-	0.4	-	0.1	-	0.5	5.0
ANURADHAPURA	-	-	-	-	-	2.5	1.5	-	-	-	4.0
HAMBANTOTA	-	-	-	-	-	-	-	-	1.2	2.8	4.0
KANDY	-	-	-	-	-	-	0.5	-	0.1	-	0.6
MONARAGALA	0.6	-	-	-	-	1.5	0.4	-	-	0.4	2.9
POLONNARUWA	-	-	-	3.0	0.8	-	-	-	-	-	3.8
PROVINCIAL											
ANURADHAPURA	1.2	-	1.2	1.6	-	-	-	-	-	-	4.0
KANDY	-	-	-	-	-	-	-	-	2.0	-	2.0
KEGALLE	-	-	-	-	-	-	-	-	2.0	-	2.0
KURUNEGALA	-	-	-	-	-	-	1.0	-	-	-	1.0
MATALE	4.0	-	-	-	-	-	-	-	-	-	4.0
PUTTALAM	-	0.5	-	-	-	0.7	0.8	-	-	-	2.0
RATNAPURA	1.0	1.0	-	-	-	1.0	-	-	-	-	3.0
KALAWEWA	-	-	2.0	-	-	-	-	0.1	-	-	2.1
TRINCOMALEE	1.5	-	-	-	-	-	-	-	-	-	1.5
VAUNIYA	0.25	1.25	-	-	-	-	0.5	-	-	-	2.0
TOTAL	2.55	2.75	3.2	4.6	0.8	6.1	4.7	0.2	5.3	3.7	4

YIELD

	Greengram	Groundnut	Cowpea	Soyabean	Blackgram	Chilli	B-Onion	R-Onion	Sweetpotato	Vegetables
	Average Yield : kg/Ha									
INTERPROVINCIAL										
AMPARA	787	-	-	-	-	675	-	6000	18633	2600
ANURADHAPURA	-	-	-	-	-	-	-	-	-	-
KANDY	353	-	-	-	-	-	-	-	-	-
HAMBANTOTA	-	-	-	-	-	-	-	-	8835	75559
MONERAGALA	925	-	-	-	-	1190	9029	-	-	17833
POLONNARUWA	-	-	-	-	-	-	-	-	-	-
PROVINCIAL										
ANURADHAPURA	5000	-	-	-	-	-	-	5000	-	-
KANDY	-	-	-	-	-	-	-	-	52237	-
KEGALLE	-	-	-	-	-	-	-	-	36214	-
KURUNEGALA	-	-	-	-	-	-	-	53320	-	-
MATALE	549	-	-	-	-	-	-	-	-	-
PUTTALAM	-	-	-	-	-	-	-	-	-	-
RATNAPURA	148	1456	-	-	-	6250	-	-	-	-
SYSTEM H	-	-	-	-	-	-	-	-	-	-
TRINCOMALEE	-	-	-	-	-	-	-	-	-	-
VAUNIYA	955	2112	-	-	-	-	[illegible]	-	-	-

Amparai (IP)

1. Demonstration crops and locations:
   Greengram: Pallanoya (13 sites), Damana (7 sites)
   Chilli: Central Camp, Damana, Namaltalawa
   R'onion: Central Camp, Damana, Namaltalawa, Uhana
   S'potato: Central Camp, Uhana, Mayadunne
   Vegetables: Padiyatalawa *(beetroot, knolkohl)*
2. Planted : May/August
   Harvested : mid June to end November
3. Farmer training and field days: 41 field days; 898 participants

Anuradhpura (IP)

1. Demonstration crops and locations: *Big onion*: Rambewa
2. Planted : mid May
   Harvested : mid August
3. Farmer training and field days: 2 field days; 44 participants

Kandy (IP)

1. Demonstration crops and locations : *Greengram*: Medamahanuwara
2. Planted : mid April
   Harvested : mid June
3. Farmer training and field days: 3 field days; 70 participants

Hambantota (IP)

1. Demonstration crops and locations:

   Beet: Wirawila, W/New Town, Bandagiriya, Tissa, Kaltota
   Okra: W'wila, WNT, B'giriya, Tissa, Beraligala, Kaltota
   Radish: W'wila, WNT, B'giriya, Tissa, Berali, Kaltota
   Carrot: Wirawila, W/New Town, Tissa
   Sweet potato: Beraligala, Kaltota
2. Planted : May/June
   Harvested : mid August/mid September
3. Farmer training and field days: 37 field days; 749 participants

Moneragala (IP)

1. Demonstration crops and locations:
   g'gram, chilli, b'onion, cabbage, capsicum: Siyambalanduwa
2. Planted : late May/early July
   Harvested : August/October
3. Farmer training and field days: 2 field days; 52 participants

System H: Kalawewa (IP)

1. Demonstration crops and locations:
   Green gram: DC-04, DC-05, DC-06, Nidigama
   Cowpea:DC-04, DC-05
   Red onion:DC-04
2. Planted : June/July
   Harvested : August/September
3. Farmer training and field days: information not available

Kandy (P)

1. Demonstration crops and locations: *Sweet potato*: Menikdiwela
2. Planted : mid May
   Harvested : mid July
3. Farmer training and field days: 4 field days; 75 participants

Kegalle (P)

1. Demonstration crops and locations: *Sweet potato:* Mawanella
2. Planted : mid July
   Harvested : mid October
3. Farmer training and field days: 9 field days; 73 participants

Matale (P)

1. Demonstration crops and locations: *Greengram:* Nalanda, Galewela, Wahakotte, Dambulla
2. Planted : May/June
   Harvested : August
3. Farmer training and field days: information not available

Ratnapura (P)

1. Demonstration crops and locations: *Chilli:* Godakawela
   Greengram & Groundnut: Weligepola
2. Planted : 4th week July
   Harvested : October/November
3. Farmer training and field days: 13 field days; 302 participants

Kurunegala (P)

1. Demonstration crops and locations: *Big Onion:* Kotawehera, Mahawa, Nantheriya, Ambanpola, Polpithigama, Awulegama, Nagollagama
2. Planted : June
   Harvested : September/October
3. Farmer training and field days: 12 field days; 285 participants

Vavuniya (P)

1. Demonstration crops and locations:
   Green gram: Pampaimadu, Kovilkulam
   Groundnut : Pampaimadu
   Big Onion : Pampaimadu
2. Planted : late July
   Harvest period: mid October
3. Farmer training and field days: 6 field days; 89 participants

13. REPAIRS AND IMPROVEMENTS

Modifications to Computer Room

An increasingly important role is now being played by the Division of Agricultural Economics and Projects (DAEP) of the DOA in providing input into policy directions, and in the formulation of development plans and strategies. This has necessitated expansion of facilities for the computer unit of the DAEP. DARP/SPF was therefore made available specifically to modify a room earmarked in the premises of the DAEP for this purpose.

Plans, specifications and an estimate for the proposed computer room were provided by the Engineering Division of the DOA. Tenders were invited for the work up to 25-05-92. After evaluation of the three tenders that were received, the DAEP Tender Board recommended acceptance of the lowest tender of Rs.82940 ($1,885) submitted by Mr WG Gamini Harischandra of Beddegama, Wattegama.

he work was supervised by the Engineering Division, and completed satisfactorily by 28-09-92. After final measurement of work, the payment actually made was Rs.70513 ($1,603).

Repairs to SC&PP Buildings

The work of the Seed Certification & Plant Protection Division (SC&PP) was being hampered due to the dilapidated state of several of the buildings housing its field level operational units. DARP/SPF was therefore made available for repairs that were needed urgently. Major repairs were needed in the case of: i) the Laboratory cum Office Building at Gannoruwa, ii) the Screen House at Gannoruwa, iii) Officers Quarters at Katunayake (2 units), and Officers Quarters at Mattakuliya (1 unit). Relatively minor repairs on the other hand were needed in respect of: i) the Seed Laboratory at Gannoruwa, ii) the Post-Control Field Laboratory at Maha Illuppallama, and iii) the SCS Office Buildings at Ampara, Kantale, Maha Illuppallama, Nikaweratiya, Polonnaruwa, Dambulla and Sita Eliya. Estimates and Bills of Quantities for all these works were provided by the Chief Engineer of DOA.

It was decided by DOA that the major repairs should be undertaken on contract, while the minor repairs would be effected by the SC&PP Division directly with materials supplied under DARP.

Tenders for the major repairs were accordingly invited by DOA in July 1992 from local contractors. Tenders were evaluated by the Tender Board of the SC&PP Division and the contracts awarded in August 1992 to the lowest tenderers. The names and addresses of the respective contractors are shown below:

1. Screen House, Gannoruwa	*Wickramasinghe AB, Veneesha Hardwares, Peradeniya.*
2. Lab/Office, Gannoruwa	*Ranasinghe GAN, Pallegunnepana, Polgolla.*
3. Quarters No.1, K'nayake	*Athauda KB, 22/18/02, Amabagahalandawatte Yakkala.*
4. Quarters No.2, K'nayake	*Athauda KB, " "*
5. Quarters No.1, Mattakkuliya	*Athauda KB, " "*

Materials for the minor repairs were obtained using the lowest quotations from suppliers in the areas in which the buildings were situated.

Supervision of work was by the Engineering Division. All contracts were completed satisfactorily, and the buildings were handed over to DOA in November/December 1992.

Details of costs incurred on the repairs to SCS buildings under DAR/SPF activity 6.2.02 are shown below:

Major Repairs

Screen House, Gannoruwa			*Rs 79205*
Lab/Office, Gannoruwa			*Rs 47295*
Quarters No.1, Katunayake			*Rs 36418*
Quarters No.2, "			*Rs 31701*
Quarters No.1, Mattakkuliya			*Rs 23310*
	Total	*$ 4637*	*Rs 217929*
Minor Repairs	*Total*	*$ 5653*	*Rs 265684*
	Total	*$10290*	*Rs 483613*

14. INSTALLATION OF SEED CLEANERS

Introduction

Expansion and improvement of the seed cleaning facilities at the three major seed processing centres of the DOA, namely Alutarama, Nikaweratiya and Pelwehera were needed to cope with increasing demands for quality seed. Each centre therefore was provided with a set of 2 new seed cleaners and accessories imported from USA under the DARP procurement scheme. DARP/SPF was utilized for fabrication at site of some accessories such as bins, ducts and cyclones, and for installation of the equipment.

Plans and specifications for the fabrication and installation works were prepared for each centre by the Central Engineering Consultancy Bureau. Work supervision was undertaken by the Mechanical Engineer of the DOA *(Engr SSG Perera)*. Prospective bidders were invited through press notices to pre-qualify for the contracts to be awarded separately for each site.

Installation at Nikaweratiya

Bids for this contract were received from the following companies:

Heavyfab Limited, 15A, 25 Station Road, Colombo 4.
Samuel, Sons & Co Ltd, 45 Jayantha Mallimarachchi Mawatha, Colombo 14.
Squire Mech Engineering (Pvt) Ltd, 277/1 Nawala Road, Nawala.
United Tractor & Equipment Co Ltd, 683 Kattiyawatte Road, Mabole, Wattala.

The contract was awarded to the lowest bidder, M/s Squire Mech Engineering (Pvt) Ltd for Rs892642.10 ($18,992) on 29 July 1992 and work commenced on 04 August 1993. tAlthough he contract was scheduled for completion within 79 days of commencement, due to delay in arrival of the elevators from USA, the contractor was able to complete work only on 22 March 1993. After rigourous testing the installations were officially commissioned on 15 June 1993.

Installations at Alutarama and Pelwehera

Separate bids for these contracts were received from the following companies:

Agro Consultants Ltd, 56/42 Deveni Rajasinghe Mawatha, Kandy.
Colombo Commercial Co Ltd, ?? Sir James Pieris Mawatha, Colombo 2.
Franco Industrial Co, 89 Hewaheta Road, Tennekumbura, Kandy.
Samuel, Sons & Co Ltd, 45 J Mallimaratchy Mawatha, Colombo 14.
Serendib Engineering & Agencies Ltd, 21 Flower Road, Colombo 7.
Squire Mech Engineering (Pvt) Ltd, 277/1 Nawala Road, Nawala.
Technical Services Centre, Alexandra Estate, Minuwangoda Road, Jaela.

The lowest bids for both contracts were those of M/s Technical Services Centre, but in the case of the Pelwehera bid, the difference between Technical Services Centre and the next lowest bidder, M/s Squire Mech Engineering, was only marginal. It was

therefore decided to award the contract for Alutarama to M/s Technical Services Centre at Rs.914371/= ($19,455), and the contract for Pelwehera to M/s Squire Mech Engineering Ltd for Rs.888380/= ($18,902).

The contract for Pelwehera was awarded on 18 February 1993. Machinery was commissioned on 02 July 1993. Formal handing over to DOA took place on 12 August 1993.

The contract for Alutarama was awarded on 03 March 1993 due to a delay in submission of the bank guaranteed performance bond. Commissioning took place on 07 July 1993, and formal handing over on 17 August 1993.

15. HORTICULTURAL EXHIBITION

Introduction

Development of the the horticultural sector has been accorded a high priority rating in recent GOSL agricultural policies on account of its potential as a significant means both of generating new employment opportunities and of enhancing export earnings. To further highlight the importance of this sector these policies also provide for the grant to it of special incentives during the "Decade of Exports" (1993-2002). In this context the need for new and relevant horticultural technologies is evidently a matter of great urgency. The holding of a National Horticultural Exhibition was therefore proposed as a means of swiftly focussing public attention on the wealth of horticultural expertise and technology available with DOA for exploitation by growers, entrepreuners and industrialists.

The exhibition was the first ever organized and conducted entirely by the DOA, and was held at its agricultural complex at Gannoruwa, from 19-26 July 1993. His Excellency The President of Shri Lanka performed the formal opening. The exhibition stimulated great national interest and attracted massive crowds of viewers.

Budget

It was agreed that DOA and DARP would share the cost of the exhibition in roughly equal proportions. The DARP/SPF contribution however was to be utilized only for materials, contracted works and certain specific publicity activities. The SPF thus expended on the exhibition finally was $54,500 (Rs.2,616,000).

Action Planning and Progress Monitoring

A special Steering Committee *(Chairman: Dr N Vignarajah, Addl DD/Research; Secretary: Dr SBJA Jayasekera, Research Officer)* was appointed by DA to plan, coordinate and monitor all activities pertaining to the exhibition. Sub-committees functioning under Convenors were in turn instituted by the Steering Committee to plan and execute specific activities; these numbered 17 made up as follows: 7 for finance, administration and common services, and 1 each for the 10 subject areas around which the exhibition was organized; these sub-committees are listed below.

Impact

Massive crowds attended the exhibition every day despite rains that prevailed.

In response to numerous requests, the exhibition was extended by a day to 26 July 1993. Keen interest was shown by all visitors in the various technologies that were

demonstrated. All publications displayed by the TT Division (inclusive of those financed by DARP) were sold out. Students found the posters displayed with the exhibits of great educational value. Farmers and farmer groups showed great interest in the new varieties of vegetables, the root and tuber crops, and and the cropping models demonstrated.

NATIONAL HORTICULTURE EXHIBITION SUB-COMMITTEES

FINANCE, ADMINSTRATION & COMMON SERVICES:

Finance
Publicity
Construction, Electricity, Water Supply
Common Amenities & Stalls Management
Security
Exhibition Staff Facilities
Audi-Visual Services

SUBJECT AREAS

Fruits
Vegetables
Roots & Tubers
Homestead Development
Ornamemtals & Landscaping
Food Processin & Post-Harvest Handling
Biotechnology
Soil Science & Soil Conservation
Plant Quarantine & Seed Certification
Seeds & Planting Material