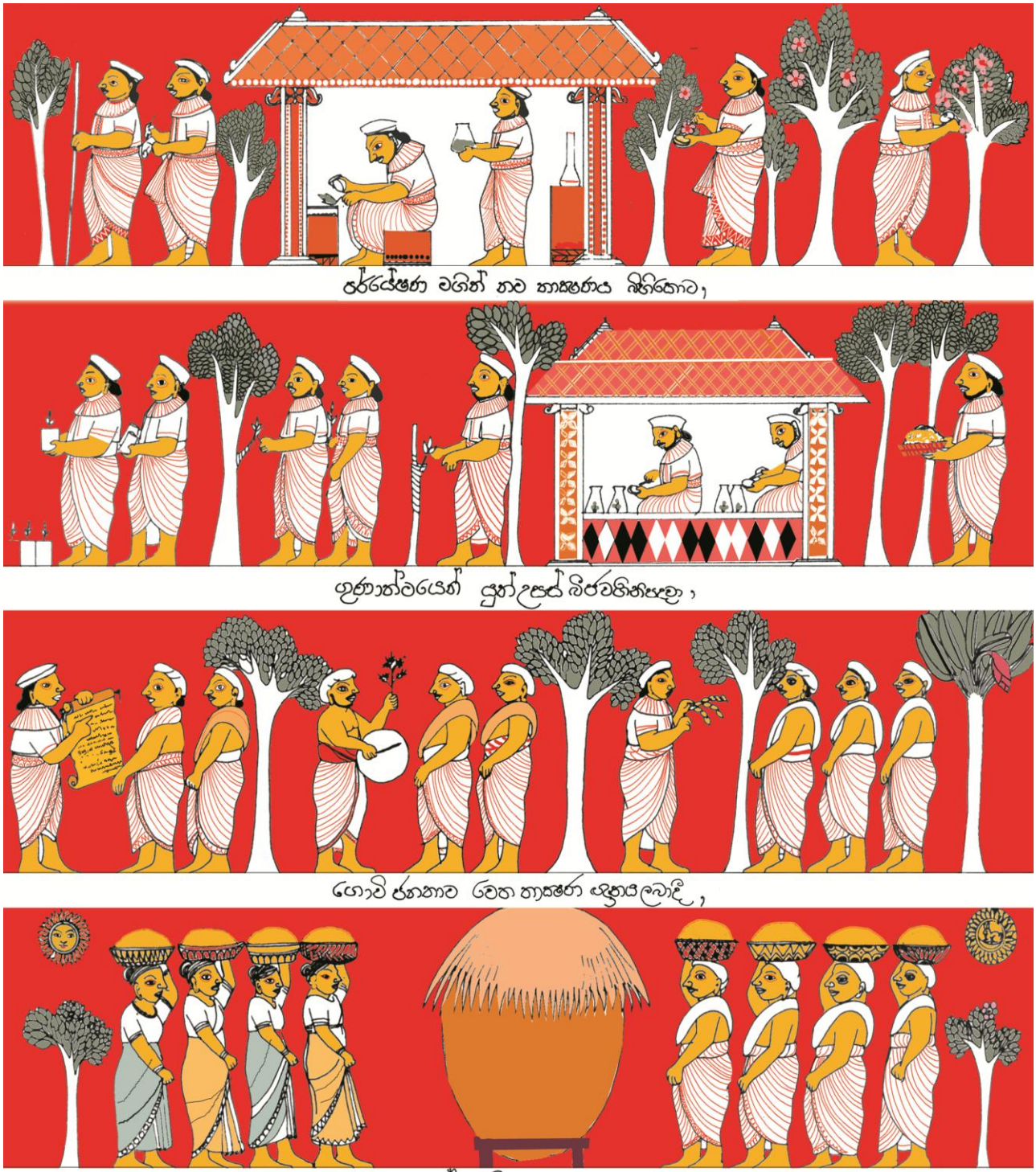
Annual Performance Report 2010



Department of Agriculture, Peradeniya, Sri Lanka

ANNUAL PERFORMANCE REPORT 2010

DEPARTMENT OF AGRICULTURE

PERADENIYA

SRI LANKA

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This report was compiled by the Progress Monitoring and Evaluation Unit of the Department of Agriculture, Peradeniya, Sri Lanka.

Vision

Achieve excellence in agriculture for national prosperity.

Mission

Development and dissemination of improved agricultural technology and providing related services to all stakeholders with emphasis on farmers to achieve an equitable and sustainable agricultural development to ensure food and nutritional security for the nation.

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FOREWORD

Annual Performance Report highlights the progress achieved during the year on delivering the services by the Department. As in the past during the period under review various programmes are being implemented with the objectives of development and dissemination of improved agricultural technology and providing related services to achieve sustainable agricultural development. Our budgetary allocation for the year 2010 is about Rs. 2312 million.

In 2010, a special attention has been given to increase crop production and productivity, reduce foreign exchange spent on food imports, promoting use of organic manure, production and distribution of quality seed and planting materials, hybrid seed development etc. Now that we have achieved near self-sufficiency in rice, priority has been given to improve the quality characteristics of rice as well as to increase the production of other food crops with a view to restricting imports.

I am grateful to all the officers of the Department who contributed in various ways to achieve the objectives of the Department. I also extend my sincere thanks to officers who contributed towards the preparation of this document.

K.N. Mankotte

Director General of Agriculture

ABBREVIATIONS & ACRONYMS

Ac - acre

AER – Agro Ecological Region

AI – Agricultural Instructor

AVRDC – Asian Vegetable Research and Development Centre

AWRN – Api wawamu rata nagamu

BL- Rice Blast

BLB – Bacterial Leaf Blight

BPH – Brown plant hopper

BSV – Banana Streak Virus

Bu – bushel

CABI – Commonwealth Agricultural Bureau International

CARE – Cooperative Assistance and Relief Everywhere

CARP – Council for Agricultural Research Policy

CEC – Cation Exchange Capacity

CIP – International Potato Centre

CLS – *Circosphora* Leaf Spot

CNLD – Chilli Narrow Leaf Disorder

CRI – Coconut Research Institute

CRVT – Coordinated Rice Varietal Testing

CZP – Crop Zoning Project

DAS - Days After Sowing

DATC – District Agricultural Training Centre

DL - Low Country Dry Zone

DOA – Department of Agriculture

DRF – Dependable Rainfall

DUS – Distinctness, Uniformity and Stability

ESCAP – Economic and Social Commission for the Asia Pacific

FAO – Food and Agricultural Organization

FSV – Farmer Services Vote

FTF – Farmer Trust Fund

GAP – Granary Area Programme

GM – Gall Midge

GPS – Global Positioning System

HERP – High grade Eppawala Rock Phosphate

ICRISAT – International Crop Research Institute for Semi Arid Tropics

IITA – International Institute for Tropical Agriculture

IL – Low Country Intermediate Zone

IM - Mid Country Intermediate Zone

INFORM – Information for Agricultural Research Management

INGER – International Network for Genetic Evaluation of Rice

IPM – Integrated Pest Management

IPO – Intellectual Property Office

IRFAON – International Rice Fine and Aromatic grain Observation Nursery

IRRI – International Rice Research Institute

IRSSTN – International Rice Soil Stress Tolerance Nursery

ISCAP – Implementation of Soil Conservation Act Programme

ISPM – International Standards on Phytosanitary Measures

ISTA –International Seed Testing Association

IU - Up Country Intermediate Zone

IW/ CPE – Irrigation Water/ Cumulative Pan Evaporation

JICA – Japan International Cooperation Agency

KKS – Karyala Karya Sahayaka

KVSN – Krushikarma Vyapthi Seva Niladhari

LCWZ – Low Country Wet Zone

LSVAT – Large Scale Varietal Adaptability Trial

M.Ec. – Master of Economics

M.Sc. – Master of Science

MAI – Moisture Availability Index

mg – Milli gram

ml – Milli litre

mm – Milli meter

MPET – Medium density Poly Ethylene Terephthalate

mt – Metric ton

MYMV – Mung bean Yellow Mosaic Virus

MYT – Major Yield Trial

NBPGR – National Bureau of Plant Genetic Resources

NCB – Non Calcic Brown

NCRVT – National Coordinated Rice Varietal Trial

NCVT – National Coordinated Varietal Trial

NEAP – National Environmental Action Plan

NIAS – National Institute of Agrobiological Sciences

NPK – Nitrogen, Potassium and Phosphorus

OFC – Other Field Crops

PCCC – Permanent Crop Clinic Committee

PECRODEP – Perennial Crop Development Project

PET – Potential Evapotranspiration

PGR – Plant Genetic Resources

Ph.D. – Doctor of Philosophy

ppm – Parts per million

PTWG – Provincial Technical Working Group

PYT – Preliminary Yield Trial

RA – Research Assistant

RAPD – Random Amplified Polymorphism Detection

REAP – Regional Economic Advancement Project

RGM – Rice Gall Midge

RSC – Rooted Stem Cuttings

RTWG – Regional Technical Working Group

RYP – Red Yellow Podzolic

SLANRMP – Sri Lanka Australia Natural Resources Management Project

SLUSDA – Sri Lanka – United States Development Agency

SOA – School of Agriculture

SriLanKoRDAA – Sri Lanka – Korea Rural Development Administration Allium

t – Metric ton = 10^3 kg

TOT – Training of Trainers

TSP – Triple Super Phosphate

VAT - Variety Adaptability Trial

WL – Low Country Wet Zone

WM – Mid Country Wet Zone

WU – Up Country Wet Zone

1. WEATHER REPORT

Meteorological data collected from 13 agro-meteorological observation stations representing different agro-ecological regions in Sri Lanka during 2009/2010 Maha (September – February) and 2010 Yala (March – August) seasons have been summarized in this report. The report was prepared by the Agro-meteorology Division, Natural Resources Management Center (NRMC) of the Department of Agriculture.

Low Country Wet Zone

Bombuwala (WL1b)

Cumulative seasonal rainfall of Maha season in this region was 20% lower than the expected amounts of rainfall compared to its long term average. The reduction of cumulative seasonal rainfall in this region was mainly attributed to the below normal rainfall experienced during the months of October and January. Meanwhile, rainfall during November was significantly higher than that of the expected levels. Even though, the distribution of rainfall was erratic, it may not have caused significant impact on the agricultural production of the area having other weather conditions within a favourable range, especially the potential evapotranspiration.

In contrast, the cumulative seasonal rainfall during 2010 Yala season was about 48% higher compared to its long term average. This was mainly due to the positive anomalies of rainfall experienced during the period of March to June as a result of intensified convectional activities and early southwest monsoon rains. Meanwhile, all other agro-meteorological parameters, namely, potential evapotranspiration, wind speed, humidity and bright sunshine hours had remained as a favorable combination for a successful crop production in the area during 2010 Yala season.

Mid Country Wet Zone

Peradeniya (WM2b)

The cumulative Maha season rainfall was about 35% above the expected levels of rains in this region due to above normal rainfall received during November and December. Usual dry weather conditions and cooler nights prevailed in the area during January and February. However, hardly any chance prevailed to develop soil moisture stress conditions during active growth phases of the crops grown during 2009/2010 Maha season.

Cumulative seasonal rainfall during 2010 Yala season in this region was about 60% higher compared to its long term average. It was mainly attributed to the above normal rainfall received during April, July and August. The usual dry weather condition of August was not experienced during this season. Nevertheless, rainfall of each month of the season was well in excess of the potential evapotranspiration throught the season.

Up Country Wet Zone

\Sita Eliya (WU3)

Cumulative seasonal rainfall for 2009/2010 Maha season in this region was about 1,244 mm, which indicates about a 16% increase compared to its long-term average. Both the months of November and December experienced above normal rains while January and February were noted to be unusually dry. As expected, potential evapotranspiration in the area remained far below the normal rainfall of each month during the season. Under the situation of low evaporative demand of the atmosphere experienced in this region, there was hardly any chance to develop soil moisture stress conditions during the season. The maximum temperature during the season ranged from 15 ^{0}C to 24^0 while the minimum temperature was in the range of 7 ^{0}C to 15 ^{0}C without ground frost occurrences, a situation contrary to a normal season.

The cumulative Yala season rainfall of 2010 in this region was 1,125 mm, which amounted to 45% increase over the long-term average. This increase was mainly attributed to the above normal rainfall experienced during March, May, June and August. However, the distribution of rainfall within the season and other agro-meteorological parameters remained to be a favourable combination for a successful crop growth in this region. The maximum temperature during the season ranged from 19 ^{0}C to 24 ^{0} while the minimum temperature was in the range of 6 ^{0}C to 16 ^{0}C.

Low Country Intermediate Zone

Batalagoda (IL1a)

The cumulative seasonal rainfall of 2009/2010 Maha season was about 12% lower than expected rates of seasonal rainfall compared to its long-term average. It was mainly attributed to the dry conditions which prevailed in the region during October, January and February. However, the region experienced comparatively higher rainfalls in the month of December. Meanwhile, the cumulative monthly potential evapotranspiration in the region remained far below the total rainfall received during each month of the season. Other agro-meteorological parameters remained to be favourable combination during the season.

The cumulative seasonal rainfall of 2010 Yala season was about 1,124 mm, which shows about 62% increase over the long-term average of the region. This significant positive anomaly of rains was mainly attributed to above normal rainfall experienced during the period of April to July as a result of enhanced convectional activity during April and increased southwest monsoonal activity during the season. The total rainfall received during each month of the season was in excess of the cumulative potential evapotranspiration and thus, soil moisture stress would not have been possible in upland crops grown in the region as well as rice crops grown under rainfed and minor irrigation schemes.

Moneragala (IL1c)

A 13% reduction in seasonal rainfall during 2009/2010 Maha season has been recorded in this region due to some negative anomalies of rainfall during September and January. However, it is unlikely for the said reduction to have caused any significant impact on the crop production in the area as all other months during the season experienced expected levels of rains or more.

The cumulative seasonal rainfall of 2010 Yala season was 878 mm which is about 55% higher compared to its long term average. This

significant positive anomaly of seasonal rainfall was mainly attributed to the above normal rainfall received during March, May and August. As a result, only the period between June and July experienced a negative rainfall over the cumulative potential evapotranspiration creating a favourable condition for short aged crops.

Girandurukotte (IL2)

This agro-ecological region has recorded a near normal cumulative seasonal rainfall of 1,687 mm during 2009/2010 Maha season with a fairly good distribution within the season.

The cumulative Yala season rainfall in this region was about 687 mm, which shows about a 60% increase compared to its long term average. This was mainly attributed to the above normal rainfall received during the months of March, April and July, which is considered as a rare meteorological phenomenon experienced in this region.

Mid Country Intermediate Zone

Kundasale (IM3a)

The cumulative rainfall of 2009/2010 Maha season in this region was 918 mm, which is about 14% higher compared to its long term average. This increase was mainly attributed to the above normal rains experienced in October, December and January. Along with this positive change of seasonal rainfall, all other agro-meteorological parameters also indicated a good combination for a successful crop production in this region.

The cumulative seasonal rainfall of the 2010 Yala season was about 20% above the expected levels due to above normal rainfall experienced during the months of April and August. Other agro-meteorological parameters also remained at levels which favoured a good crop growth.

Up Country Intermediate Zone

Bandarawela (IU3c)

This region experienced a below normal cumulative rainfall amounting to about 25% during 2009/2010 Maha season compared to its long-term average. However, the cumulative potential evapotranspiration values remained far below the rainfall received during each month of the active crop growing periods of the season and thus, avoiding development of any moisture stress conditions. The maximum temperature during the season ranged from 19 ^{0}C to 29 ^{0}C while the minimum temperature was in the range of 9 ^{0}C to 19 ^{0}C.

Cumulative rainfall of 2010 Yala season was about 52% higher than the long-term average. This was mainly attributed to the above normal rainfall received during the months of March, April, May and August. The potential evapotranspiration values remained far below the rainfall levels during a major duration of the season. It may have favoured rainfed vegetable production in this region. The maximum temperature during the season ranged from 23^{0}C to 30 ^{0}C while the minimum temperature was in the range of 11 ^{0}C to 20 ^{0}C.

Dry Zone

Maha-Illuppallama (DL1b)

The cumulative Maha season rainfall in the North-Central part of the DL1b agro-ecological region was 743 mm, a value which amounts to about 26% decrease in comparison to its long term average. The reduction of the cumulative seasonal rainfall was mainly attributed to the receipt of a below normal rainfall during

September and October with a delayed onset. Nevertheless, atmospheric demand of water remained far below the rainfall received during each month of the active growing period in the season.

There was about a 44% increase in cumulative seasonal rainfall during 2010 Yala season compared to its long term average of 384 mm. This increase of rainfall was mainly attributed to the above normal rainfall experienced throughout the season except in the month of June. Atmospheric demand of water remained far below the rainfall during the first three months of the season and hence, short aged upland crops may have thrived well without being exposed to moisture stress conditions.

Angunakolapelessa (DL1b)

The southern part of the DL1b agro-ecological region also experienced a below normal cumulative rainfall during 2009/2010 Maha season with an approximately 14% reduction. This negative anomaly was mainly attributed to the below normal rainfall received during the months of September and October with a delayed onset. Meanwhile, the cumulative monthly potential evapotranspiration of the season remained far below the monthly rainfall during the active growing period of the season.

An increase of about 45% was shown in the cumulative seasonal rainfall of 630 mm in 2010 Yala in this region. This positive anomaly of seasonal rainfall was mainly attributed to the higher levels of rains received during April and May. But, the potential evapotranspiration remained in excess of the monthly rainfall during the other months of the season except April and May. Hence, rainfed upland crops planted late may have suffered through soil moisture stress conditions unless supplementary irrigation had been provided.

Aralaganwila (DL2b)

This region also experienced a 14% below normal seasonal rainfall during 2009/2010 Maha season due to the reduced rainfall during September, October and January. However, rainfall during December was well above the expected level thus making the gap of the negative anomaly negligible. Meanwhile, Atmospheric demand for water remained far below the cumulative rainfall of each month of the active growing period during the season. Hence, there was hardly any possibility of developing soil moisture stress conditions in crops grown on highlands in this region.

There was a 40% increase in cumulative seasonal rainfall in 2010 Yala season in this region mainly due to the above normal rainfall received in April and May. But, evaporative demand of the atmosphere was well above the rainfall during the latter part of the season. Hence, Yala season crops may not have survived unless supplementary irrigation was provided. Usually the Yala season does not exist in this region but, weather records reveal that 2010 Yala had been a reasonably good season for the region. A similar kind of weather conditions have prevailed in the neighboring IL2 region during 2010 Yala season.

Weerawila (DL5)

As in the other regions of the country, DL_5 agro-ecological region bears no exception and it also recorded about 29% below normal cumulative seasonal rainfall during 2009/2010 Maha season compared to its long-term average of 823 mm. The reduction of rainfall was experienced mainly in the months September and October. However, increased rainfalls were experienced in November.

Table 1.1: Total rainfall (mm) of 2009/2010 *Maha* & 2010 *Yala* seasons

Agro-met Station	Agro Ecological Zone	Maha 2009/10 Sep-Feb	Maha Ten Year Average (1999-08)	Yala 2010 Mar-Aug	Yala Ten Year Average (1999-08)
Bombuwala	WL_{1b}	1257.1	1571.9	2097.3	1421.1
Peradeniya	$WM_{2\,b}$	1278.l	946.6	1505.3	944.3
Sita-Eliya	WU_3	1244.2	1075.6	1125.5	778.1
Batalagoda	IL_{1a}	913.0	1032.2	1124.4	694.8
Makandura	IL_{1a}	1059.6	1095.6	1162.4	915.7
Moneragala	IL_{1c}	1096.8	1265.8	877.8	565.3
Girandurukotte	IL_2	1687.4	1651.4	687.3	428.1
Kundasale	IM_{3a}	918.3	796.5	698.6	586.1
Bandarawela	IU_{3c}	771.9	1038.3	916.8	590.6
Maha-Illuppallama	DL_{1b}	743.3	1006.5	552.7	384.2
Angunakolapellessa	DL_{1b}	650.1	758.9	630.1	432.8
Aralaganwila	DL_{2b}	1302.7	1515.4	507.3	362.0
Weerawila	DL_5	584.6	823.1	293.8	306.9

Table 1.2: Monthly total rainfall 2009/10 (mm)

	2009			2010								
Agro-met station	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**
Bombuwala	253.4	109.9	538.3	230.7	33.8	91.0	221.3	406.2	714.8	338.6	251.0	165.4
Peradeniya	169.4	397.5	372.4	294.9	36.4	7.7	119.2	450.6	126.5	203.0	302.4	303.6
Sita-Eliya	165.2	230.6	350.0	352.3	108.0	38.1	170.4	196.9	218.4	255.1	133.0	151.7
Batalagoda	117.9	209.4	223.7	304.5	55.8	1.7	127.3	311.5	298.5	128.1	160.9	98.1
Makandura	292.6	150.3	270.4	262.6	77.9	5.8	94.8	320.2	498.5	149.7	83.6	15.6
Moneragala	16.0	222.9	468.6	271.9	94.2	23.2	159.2	172.7	308.8	49.4	26.4	161.3
Girandurukotte	50.4	211.7	414.3	767.7	171.3	72.0	92.3	311.1	71.2	40.9	116.4	55.4
Kundasale	71.3	238.3	240.3	306.3	45.6	16.5	42.7	255.1	94.2	78.6	79.6	148.4
Bandarawela	27.5	136.2	263.9	285.7	47.6	11.0	192.8	259.1	240.9	51.1	137.8	35.1
Maha-Illuppallama	1.0	114.4	312.4	215.0	68.6	31.9	95.4	236.5	63.2	2.6	55.9	99.1
Angunakolapellessa	79.4	42.2	339.6	155.6	14.2	19.1	35.3	172.0	203.9	73.9	42.5	102.5
Aralaganwila	25.6	117.3	336.4	652.9	123.7	46.8	21.8	149.6	221.8	35.4	31.8	46.9
Weerawila	22.1	65.1	329.9	146.2	15.3	6.0	18.5	146.0	79.5	14.4	11.9	23.5

Table 1.3: Monthly average Rainfall in mm (1999-2008)

Agro-met station	Month											
	Sep	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**
Bombuwala	298.5	536.2	295.2	193.0	157.5	135.1	139.6	282.5	434.0	224.5	152.6	188.0
Peradeniya	132.9	249.0	263.6	161.2	99.3	74.0	145.4	305.3	119.4	153.2	126.7	94.3
Sita-Eliya	151.7	243.1	240.3	187.5	203.0	95.2	100.7	167.4	134.4	148.9	123.4	103.3
Batalagoda	111.4	335.7	275.5	148.7	107.7	84.9	120.8	250.2	92.9	96.3	63.3	71.3
Makandura	163.4	419.9	263.7	92.7	73.3	83.8	136.8	246.9	194.2	151.9	85.5	100.4
Moneragala	107.7	292.6	344.1	236.8	207.8	123.1	83.8	252.8	78.9	32.3	54.2	63.3
Girandurukotte	79.8	186.3	439.7	426.5	441.3	214.3	117.3	161.9	48.4	18.3	32.4	49.8
Kundasale	78.7	176.5	216.5	164.1	121.4	82.6	114.7	184.4	68.4	90.4	60.6	67.6
Bandarawela	126.4	286.1	259.4	166.8	144.3	80.5	114.7	215.3	112.0	49.5	44.6	54.5
Maha-Illuppallama	92.6	273.1	268.1	185.6	117.2	106.1	84.5	183.8	55.1	23.7	19.7	17.5
Angunakolapellessa	97.0	166.6	228.1	124.5	87.7	72.0	111.4	104.5	75.3	47.9	41.9	51.8
Aralaganwila	69.2	266.5	399.2	364.3	302.7	162.2	77.3	125.4	48.3	28.0	33.4	49.7
Weerawila	48.9	167.9	292.0	160.6	95.9	65.9	69.8	125.0	44.6	17.9	14.5	35.1

Table 1.4: Monthly Potential Evapotranspiration(mm) - 2009/10

Agro-met station	2009				2010							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwala	81.6	86.8	55.2	71.9	74.4	76.2	101.7	86.4	76.9	76.9	64.5	67.0
Peradeniya	74.4	86.8	50.4	59.5	89.3	112.0	121.5	84.0	71.9	74.4	71.9	69.4
Sita-Eliya	50.4	69.4	38.4	47.1	69.4	91.8	104.2	67.2	57.0	59.5	54.6	*
Batalagoda	84.0	86.8	60.0	62.0	84.3	91.8	111.6	81.6	89.3	86.8	79.4	86.8
Makandura	91.2	89.3	67.2	69.4	96.7	100.8	109.1	86.4	84.3	81.8	111.6	99.2
Moneragala	122.4	109.1	50.4	54.6	69.4	85.1	109.1	81.6	91.8	86.8	91.8	91.8
Girandurukotte	103.2	106.6	62.4	*	67.0	69.4	94.2	*	101.7	*	96.7	104.2
Kundasale	96.0	81.8	48.0	52.1	64.5	96.3	104.2	76.8	101.7	71.9	94.2	81.8
Bandarawela	67.2	71.9	40.8	39.7	59.5	71.7	79.4	64.8	64.5	69.4	69.4	69.4
Maha-Illuppallama	100.8	76.9	38.4	37.2	54.6	67.2	96.7	64.8	79.4	89.3	94.2	94.2
Angunakolapellessa	112.8	131.4	60.0	76.9	101.7	112.0	129.0	110.4	99.2	106.6	109.1	124.0
Aralaganwila	168.0	131.4	55.2	49.6	67.0	69.4	91.8	91.2	109.1	119.0	124.0	129.0
Weerawila	144.0	133.9	79.2	*	74.4	94.1	106.6	91.2	91.8	109.1	121.5	129.0

* - Data Not Available

Table 1.5: Maximum and Minimum air temperature (^{O}C) – 2009/10

Agro-met station	2009												2010											
	Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		June		July		Aug	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Bombuwala	30.4	24.0	31.2	22.9	30.4	22.7	31.0	22.6	31.5	21.7	31.8	22.4	32.3	22.8	32.3	23.8	31.4	23.7	30.7	23.3	30.3	23.5	29.9	25.1
Peradeniya	29.2	21.3	30.6	20.5	29.6	20.6	29.0	20.8	29.4	19.7	31.9	19.2	33.4	20.8	32.8	22.1	31.3	22.3	29.8	22.0	29.3	21.5	28.7	21.6
Sita-Eliya	19.1	12.9	20.5	11.9	19.2	12.8	19.2	12.7	19.7	11.7	21.8	11.4	22.6	12.2	22.3	13.9	*	14.6	*	13.9	*	13.4	*	*
Batalagoda	31.2	23.8	32.3	22.6	31.1	22.7	30.1	22.5	30.1	21.4	32.8	21.2	35.3	22.2	34.1	24.1	32.6	24.4	31.1	24.0	30.7	23.5	30.5	23.5
Makandur	30.9	24.2	32.1	23.6	31.3	23.3	30.5	23.3	31.7	22.3	34.0	22.4	34.9	23.6	33.5	24.6	32.3	25.4	31.6	25.0	31.1	24.7	31.3	24.9
Moneragala	36.4	*	35.2	*	29.9	*	30.9	*	30.7	*	32.6	*	35.6	*	35.0	*	34.4	*	34.0	23.1	34.4	22.0	34.7	22.1
Girandurukotte	34.7	23.6	34.6	23.1	31.0	23.2	29.7	23.3	29.9	22.1	31.2	22.2	33.9	23.0	34.6	24.6	35.1	24.9	*	*	*	23.7	34.8	23.7
Kundasale	29.6	21.3	31.0	21.9	29.2	19.9	28.7	19.8	28.1	19.0	31.1	18.4	32.9	19.7	32.5	21.5	31.2	22.0	29.8	21.5	29.2	21.1	28.4	20.9
Bandarawela	27.4	16.8	26.8	15.9	24.5	16.6	23.7	16.6	23.7	15.4	26.5	13.9	27.9	15.2	27.3	17.5	27.8	17.5	27.0	17.6	26.7	16.8	27.2	17.0
Maha-Illuppallama	32.7	24.5	33.3	22.8	30.4	22.7	29.7	22.6	30.6	20.9	32.4	21.3	35.1	22.7	34.8	24.6	33.1	25.0	32.9	24.9	33.0	24.1	32.1	24.1
Angunakolapellessa	32.6	23.9	33.7	23.1	30.7	22.5	31.2	22.7	31.6	21.5	33.1	21.7	34.1	22.8	33.8	23.8	32.4	24.3	32.4	24.1	32.5	23.9	32.7	24.6
Aralaganwila	35.8	23.2	35.7	22.3	31.5	22.6	30.4	22.6	31.0	21.3	32.3	21.3	35.3	21.9	36.7	23.6	36.0	24.0	35.1	24.2	34.0	23.5	34.4	22.7
Weeravila	34.5	24.6	34.9	24.2	31.4	23.4	32.8	23.1	31.9	23.8	32.6	23.6	35.0	24.1	34.4	24.7	32.9	25.2	33.6	25.1	34.5	24.6	34.5	24.4

* - Data Not Available

Table 1.6: Relative Humidity(%) – 2009/10

Agro-met Station	2009												2010											
	Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		June		July		Aug	
	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E
Bombuwala	83	76	82	74	88	80	85	75	81	62	85	69	82	67	87	77	88	81	88	80	87	80	84	79
Peradeniya	80	75	80	71	86	79	88	80	82	68	75	55	77	55	83	73	85	77	83	79	83	77	84	77
Sita-Eliya	91	88	79	85	88	91	88	90	77	82	63	67	62	74	81	87	88	89	91	90	93	91	*	*
Batalagoda	84	72	86	66	91	76	91	80	87	68	86	59	83	51	87	72	86	77	84	77	86	78	85	82
Makandura	84	75	79	69	86	76	89	79	87	71	85	68	87	76	88	83	90	84	89	85	89	84	89	87
Moneragala	73	66	77	72	89	85	88	84	86	77	84	68	80	66	85	76	88	77	82	67	80	72	78	60
Girandurukotte	72	56	76	58	90	80	91	85	91	75	90	71	87	61	85	*	84	*	79	*	80	65	78	59
Kundasale	72	68	78	62	74	76	84	75	77	70	77	53	77	49	81	62	87	70	78	72	80	72	79	68
Bandarawela	72	65	74	65	86	81	89	82	84	75	75	67	75	62	81	77	79	78	72	70	73	68	71	64
Maha-Illuppallama	77	58	81	56	90	77	93	79	91	65	89	59	85	49	85	71	85	74	81	63	82	66	83	68
Angunakolapellessa	78	70	75	67	87	83	88	81	86	73	83	72	80	69	81	77	84	79	83	74	81	70	77	68
Aralaganwila	62	48	68	55	85	77	89	81	86	71	87	64	83	57	74	63	76	58	71	57	68	59	67	56
Weeravila	70	62	68	59	84	83	88	80	81	70	78	71	75	62	80	68	85	76	77	67	76	61	74	61

M - Reading at 8.30 hours
E - Reading at 15.30 hours
* - Data Not Available

Table 1.7: Bright Sunshine Hours – 2009/10

Agro-met station	2009				2010							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwala	6.6	7.9	4.7	6.5	8.3	8.2	8.1	6.5	5.9	6.1	5.3	5.5
Peradeniya	5.8	7.1	3.6	3.1	6.8	8.2	7.9	6.5	5.6	4.5	3.7	4.1
Sita-Eliya	3.2	4.3	1.4	2.9	5.9	8.2	7.8	5.7	3.8	4.0	4.1	*
Batalagoda	7.6	8.1	4.9	4.9	7.9	8.7	8.4	7.1	6.6	6.1	5.3	5.5
Makandura	*	*	*	*	*	*	*	*	*	*	*	*
Moneragala	*	*	*	*	*	*	*	*	*	*	*	*
Girandurukotte	7.2	6.8	3.2	2.7	5.3	6.6	7.1	6.1	6.3	5.9	5.3	6.2
Kundasale	5.6	4.7	3.0	3.2	5.6	7.7	7.0	6.4	7.3	5.1	5.4	5.1
Bandarawela	5.6	5.8	2.8	2.9	5.0	6.9	7.1	5.7	5.3	6.0	5.8	6.1
Maha-Illuppallama	8.2	7.6	4.1	3.4	6.8	7.7	8.3	7.2	7.5	7.8	7.3	6.1
Angunakolapellessa	*	*	*	*	*	*	*	*	*	*	*	*
Aralaganwila	8.7	7.8	4.7	3.2	6.7	7.8	8.3	8.1	8.7	7.7	7.4	7.5
Weeravila	8.0	7.9	3.7	4.7	7.4	8.4	8.2	7.5	6.7	7.8	7.7	7.5

* - Data Not Available

Table 1.8: Wind Velocity (Km.p.h) – 2009/10

Agro-met station	2009				2010							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwala	4.5	2.6	1.1	1.4	1.3	1.6	2.2	1.9	2.4	2.7	1.7	2.6
Peradeniya	*	*	*	*	*	*	*	*	*	*	*	*
Sita-Eliya	15.2	8.6	5.5	6.0	5.9	6.8	7.6	5.2	7.2	14.3	*	*
Batalagoda	7.7	4.6	3.5	4.2	5.1	4.8	3.8	3.4	6.1	8.4	7.1	7.9
Makandura	5.4	4.0	2.5	3.3	4.5	4.8	3.3	3.6	4.2	4.8	5.1	5.5
Moneragala	2.3	1.9	1.1	1.6	1.9	1.9	1.6	0.8	1.3	1.7	1.3	1.3
Girandurukotte	*	*	*	*	*	*	*	*	*	*	*	*
Kundasale	*	*	*	*	*	*	*	*	*	*	*	*
Bandarawela	4.5	3.9	3.3	3.0	3.4	3.3	3.5	2.8	3.2	4.7	5.3	4.7
Maha-Illuppallama	8.5	4.7	3.0	3.5	3.7	3.9	3.4	2.9	6.0	8.1	7.2	7.6
Angunakolapellessa	6.4	5.8	3.3	4.5	5.6	6.0	5.5	4.5	5.1	6.2	6.1	7.1
Aralaganwila	5.6	3.9	2.1	2.3	2.5	2.5	2.6	2.3	2.8	4.8	5.1	4.8
Weeravila	7.4	4.4	1.7	2.0	3.0	3.8	2.7	2.0	4.7	6.7	6.6	7.2

* - Data Not Available

2.1 FIELD CROP RESEARCH AND DEVELOPMENT INSTITUTE (FCRDI) - MAHAILLUPPALLAMA

FCRDI, Mahailluppalama has been given the mandate of conducting research and development programmes related to Other Field Crops (OFCs) and formulate technologies and strategies for the enhancement of production of these crops. Other Field Crops include condiments (chilli and onions), grain legumes (mung bean, cowpea, black gram), oil seeded crops (ground nut, soy bean, sesame and sunflower) and coarse grains (maize, finger millet, sorghum and other millets). FCRDI also caters to enhance production of regionally important fruits and vegetables. Further, FCRDI collaborates with the government and non-government extension organizations to disseminate the new technologies to increase OFC production in the country with particular reference to the Dry Zone.

In addition, FCRDI also undertakes the following programmes.

- Breeder seed production of other field crops and vegetable crops of regional importance
- Technology dissemination to farmers, seed producers and students and advisory services and other interested personnel involved in OFC production
- Site-specific fertilizer recommendations based on soil testing

BUDGET

Allocation received and expenditure, under different votes and projects are given in the Table 2.1.1.

Vote	Allocation	Expenditure	Expenditure %
Capital	6,185,852	2,190,966	35
Recurrent	18,896,746	16,857,271	89
Projects			
"Api Wawamu Rata Nagamu"	3,181,000	1,462,274	46
Enhancement of Organic Fertilizer Production and Utilization	2,300,000	1,134,000	49
Hybrid Variety Development, Seed Production of Local Maize Hybrid "Sampath"	2,700,000	1,787,091	66
CARP Project -Development of Quality Protein Hybrids	579,000	563,799	97
Agro Business Development in Chilli Promotion	250,000	80,032	32
Use of HERP/ ESSP on OFCs	200,000	97,094	49
Total	**34,292,598**	**24,172,527**	**70**

PROGRESS

CROP IMPROVEMENT

Condiments

Chilli

- Breeding lines MICH-06 and Weraniya Selection will be submitted to the Varietal Release Committee (VRC). Important characteristics of these breeding lines are given below.

  MICH-06:

- Highly suitable for green chilli production
- The potential green chilli yield is > 15 t/ ha
- Pods are medium in size (8-10 cm long),dark green in colour and have a shiny appearance
- Moderately resistant to chilli leaf curl complex

  Weraniya Selection:

- Suitable for home garden cultivation
- Pods are long in size (15-18 cm long) and yellowish green in colour
- Good as a green chilli and a vegetable as well, due to being low in pungency

Onion

- Eight new big onion lines were selected from mixed onion populations collected from Kalatthewa, Dambulla and Galewela areas. These lines will be purified in *Yala* 2011.

- Growth performance of direct seeded onion crop of Dambulla Selection and exotic variety Red Boll (especially developed for direct seeding in India) were comparable with their transplanted crops. But the yield was not harvested due to unexpected heavy rains which prevailed during the harvesting stage. The experiment will be repeated in *Yala* 2011.

- Temperature prevalent during the period of 25th November to 21st December in 2009 at Rahangala and the upper part of Riverstern area was favourable for vernalization of big onion variety 'Dambulla Selection'. The experiment will be repeated in *Maha* 2010/11 season at both research stations and farmer fields to obtain confirmation of results.

Grain Legumes

Mung Bean

- Lines with desirable characters (high yield, MYMV and CLS tolerance, uniform maturity and low hard seed content) selected from germplasms are being used as parents in the hybridization program for making single and three way crosses to transfer the desirable traits to the recommended varieties, Ari and MI-6.
- The imported mung bean line Chi Nut 72 was tested with the DOA recommended varieties MI-5 and MI-6. Results revealed that the Chi Nut 72 produced relatively low yield (125 kg/ha) over the recommended varieties. Further, the line was susceptible to Mungbean Yellow Mosaic Virus (MYMV), which is a serious disease in mungbean cultivation.
- New mung bean accessions obtained from Plant Genetic Resources Centre (PGRC) AC0259, AC0219, AC2993, AC0099, AC3022, and AC5179 were tested along with the DOA recommended varieties for yield and seed characters. None of the accessions was promising in yield or seed characters.
- Seven promising mung bean lines were selected for NCVT. Accession 8452 had a very low percentage of hard seeds (< 0.01 %) and this accession will be used as a parent in the hybridization programme.

Cowpea

- Two IITA lines were tested in different agro ecological regions for adaptability under NCVT. These lines performed similarly to the check varieties with yields above 2 t/ ha having higher consumer acceptability than the check varieties. These lines will be further tested in farmer fields in the next season.

- Hybridization and selection programme was initiated in *Yala* 2009 season for improving the existing recommended varieties. Six out of the 15 F_1 generations were selected for further evaluation.

Black Gram

- Three promising blackgram lines are being further tested in NCVT for the selection of lines with good adaptability.

Oil Seeded Crops

Soy Bean

- Sixteen exotic soybean lines were evaluated for desirable characters and yield performance. None of the lines performed better compared to Pb 01 (check variety).

- Six AVRDC large seeded vegetable soybean lines were evaluated. Two lines were found to be promising by producing the yield over 7t green pods/ ha. The experiment will be repeated to confirm the results.

Groundnut

- Four large seeded, medium-duration (3 $^1/_2$ months) lines selected from VAT were tested along with the DOA recommended medium duration varieties at farmer fields. ICGV97045, ICGV98396 and ICGV93704 were identified as farmer preferred groundnut lines. These lines are being tested in DUST.

Coarse Grains

Maize

- Three Quality Protein Maize (QPM) hybrids were selected for DUST.

- Adaptability of 31 exotic maize hybrids was tested. Performance of 28 hybrids was at our acceptable level.

- Seven promising finger millet accessions were tested in Advanced Yield Trials and 3 accessions were selected for NCVT.

- Adaptability of 5 exotic sorghum hybrids was tested and the performance of 2 hybrid varieties, PAC 501 and PAC 509 were found to be at acceptable level.

Vegetables

- Two promising vegetable cowpea lines were evaluated in NCVT at 4 locations and the short age high yielding promising line (Thai 1) was selected for VAT.

- A hybridization programme was initiated to incorporate the Yellow Vain Mosaic Virus (YVMV) tolerant trait to the popular okra variety MI 5 by crossing it with virus resistant/ tolerant wild okra. The programme will be continued during 2011.

- Three promising okra lines with high tolerance to YVMV and consumer acceptable fruit characters (resembling to MI-5) were evaluated in NCVT at 4 locations. OKS 1 and OKS 3 produced promising results and they were selected for VAT.

Fruits

Grapes

- Exotic grape varieties, Niagara, French MI, Muscat MI, and Israel Blue are being

maintained in the form of a germplasm collection.

- A study was initiated to identify a low cost vine training system for grapes. Four recommended varieties are being evaluated (Israel Blue (V1), Muscat MI (V2), French MI (V3) and Khandara (V4)) on four different training systems (GDC (Geneva Double Curtain - spacing 2.6 x 4 m), Tatura (spacing 2.6 x 4 m), DG (Double Guyot- spacing 2.6 x 4 m) and Pandol (spacing 8 x 4 m) in the trial. The experiment will be continued during the forthcoming seasons.

Wood Apple

- Eight wood apple accessions were evaluated during the last six years. One wood apple accession was identified to be promising.

Melon

- Two water melon hybrids Hunter and Lantha were evaluated with the check variety Thilina for yield and fruit quality. Only the variety Hunter was acceptable.

AGRONOMY

- Studies on the effect of potassium fertilizer as a top dressing for irrigated maize revealed that there was no significant yield increase.

- The optimum seed rate and N level for the broadcasted black gram under rain-fed conditions were found to be at 62.5 kg/ ha and 30 kg/ ha, respectively. Findings will be submitted to the Technology Releasing Committee.

- Three NCRVTs were conducted in respect of new rice varieties of three different age classes. Collected data were sent to RRDI, Batalagoda for final analysis.

CROP PROTECTION

Pathology

- Variety Oshada could be recommended to be cultivated during *Maha* season by transplanting with proper nursery management or broadcasting with recommended seed rate.

- Application of systemic fungicides Pyraclostrobin 250 g/ l EC, Propiconazole 250 g/ l EC, Thiophanate methyl 500 g/ l SC, Tetraconazole 40 g/ l ME and Tebuconazole 250 g/ l EW at 3rd, 5th and 7th weeks after planting could be recommended to control the rust disease (*Puccinia polysora*) in moderately resistant hybrid maize varieties (Sampath, Ruwan Badra).

- Three new fungicides: Trifloxystrobin + Tebuconazole 75 WG, Pyraclostobin + Metiram 60 WG and Fluazinam 500 g/ l SC can be used to control both anthracnose and purple blotch diseases in onion cultivation.

- The causal organism of the seedling blight disease which was reported for the first time in hybrid maize variety Sampath was identified as *Penicillium* spp.

Entomology

- Two insecticides were identified as effective to reduce the leaf curl damage in chilli. The experiment will be continued for confirmation of the results.

- Thiamethoxam 70 % WS was found as an effective seed treatment to reduce chilli leaf curl damage. Further, combination of seed treatment and foliar application found to be more effective. The experiment will be repeated to confirm results.

- It was found that high doses of Nitrogen increase the severity of stem borer attack in maize. The experiment will be continued to confirm the results.

- Three insecticides namely, Thiacloprid, Imidacloprid and Dinotefuran were found to be effective in controlling pod sucking bugs in cowpea. Recommendations will be given on completion of pilot testing.

Weed Management

- Population study of the biological control agent *Neochetina bruchi* of water hyacinth (*Eichhornia crassipes*) under the dry zone water bodies was started in 2006. Introduction of *Neochetina bruchi* into five tanks (Kudakalaththewa, Pallekagama, Hiripitiyagama, Thambuththegama and Kudabiliwewa) was found to be effective in controlling water hyacinth.

- Topramezone 336 g/ l SC on maize showed successful control of grasses and broad leaves except *Cyperus rotundus*.

- Pendimethalin 455 g/ l CS showed significant control of weeds except the prominent sedge *Cyperus rotundus* without any pyto-toxic effects on onion.

- Six new herbicides were tested under the National Coordinated Herbicide Screening trial for wet-seeded rice in *Maha* 2009/ 10 and *Yala* 2010. The data collected were submitted to RRDI, Batalagoda for final analysis.

SOIL FERTILITY

- The recommended nitrogen fertilizer levels for irrigated maize and chilli could be cut down by 25 % through incorporation of gliricidia loppings at 6t/ ha on a fresh weight basis.

- Experiments were conducted to identify suitable organic manure for integrated plant nutrient system for maize and onion. Results showed that incorporation of sunhemp or vegetable cowpea to the soil results in better performances than cow dung or compost. This has to be repeated to confirm the results.

- The result of a series of experiments confirmed that a mixture of 10 t/ ha of cattle manure and 10 t/ ha of gliricidia leaves (air dry weight basis) gave maize yield similar to the DOA recommended rate of inorganic fertilizer. The treatment will be implemented in field demonstrations in the forthcoming seasons.

- High Grade Eppawala Rock Phosphate (HERP) and Eppawala Single Super Phosphate (ESSP) were tested in maize cultivation. ESSP gave comparable yields with the recommended levels of Triple Super Phosphate whereas, HERP has failed. The experiment will be continued to confirm the results.

WATER MANAGEMENT

- An investigation was carried out to find out the optimum irrigation water requirement for hybrid maize, Sampath, grown in RBE soil. The highest water use efficiency was found in the Irrigation Water (IW)/ Cumulative Pan Evaporation (CPE) ratio combination of 0.7, 1.15 and 1.15 for the first, the second and the third months of the growth period, respectively. Further studies will be conducted to confirm the results.

- A study was initiated to evaluate soil water distribution pattern in RBE soil under drip irrigation system in order to develop an appropriate drip irrigation package for chilli. Investigations showed that there was no effect of the distance implemented up to 25 cm from the lateral to the plants on green chilli yield. Further studies will be carried out to confirm the results.

FOOD TECHNOLOGY

- Flour of coarse grains; maize, sorghum and finger millet could be used 100% to prepare cakes and biscuits with acceptable sensory qualities.

- Dhawala and MICP01 were found to be highly acceptable in sensory qualities than MI35.

SEED PRODUCTION

Breeder Seed Production

Quantities of breeder seeds produced and supplied by FCRDI are given in Table 2.1.2.

Certified Seed Production

The Institute has initiated a certified seed production programme under “Api Wawamu - Rata Nagamu Programme” to assist the seed production programme of the Department of

Agriculture. Detai of the certified seed production of OFC in *Maha* 2009/ 10 and *Yala* 2010 are given in Table 2.1.2.

Table 2.1.2: Quantities of breeder and certified seeds produced during 2010

Crop	Variety	Breeder seed production (kg)	Certified seed production (kg)
Maize	CML 20 (Parents of hybrid maize sampath)	580	
	CML 348 (Parents of hybrid maize Sampath)	233	
	Sampath F_1	714	
	Ruwan	100	600
Finger millet	Rawana	5	
Chilli	MI Green	2	
	Galkiriyagama Selection	2	
	KA 2	2	
Mung bean	Ari	25	60
	MI 5	32	103
	MI 6	25	610
Big onion (Breeder mother bulbs)	Dambulla Selection	40	
Black gram	MI 1	25	25
	Anuradha	15	487
Soy bean	Pb 01	100	205
	PM 13	13	
Cowpea	Dhawala	24	356
	MI 35	41	60
	Waruni	45	
	Bombay	05	
	Wijaya	10	10
Vegetable cowpea	BS 1	13	
Tomato	KC 1	1	
Total		**2051**	**2516**

TECHNOLOGY DISSEMINATION

Training Programmes, Lectures, Workshops, Field Demonstrations, Plant clinics, Field Days, Exhibitions, Technical Advices

Details of programmes conducted during the year are given below.

- Training programmes & demonstrations on OFC production for farmers and for school, university and technical college students- 51 (Total No. of participants 1379)
- Representation as resource personnel for,
  - 48 field demonstrations
  - 19 field days
  - 9 plant clinics
  - 3 exhibitions
- Technical advice provided - for 750 clients
- No. of leaflets distributed on technical information - 12,500
- No. of free samples of OFC seeds issued for farmers and other institutes – 650

TV/ Radio Programmes

- 15 radio programmes were broadcasted during 2010.

Newspaper Articles

- 3 newspaper articles were published during the year.

OTHER PROJECTS/ SERVICES

- **Evaluation of Packaging Materials for Maize Seeds**

  Germinability of seeds of maize hybrid Sampath could be maintained above 80 % for six and half months (8 months after harvesting) when stored in Metalized Polyethelene Terapthalate packs in contrast to Woven Polypropelene, Black Low Density Polyethylene and Woven Polypropylene lined with Low Density Polyethylene, which can maintain germinability of over 80 % only for less than 3 months.

  Vacuum packing using Metalized polyethylene Terepthalate could preserve germinability up to 9 months with 1.5 times higher germinability compared to normally packed Metalized polyethylene Terepthalate. Seeds of hybrid variety Sampath and open pollinated variety Ruwan showed no difference in storage behaviour with these packing methods.

- **Enhancement of Production and Use of Organic Manure**

  Following quantities of organic manure were produced and distributed.

  Compost - 5075 mt
  Distribution of compost inoculum -1160 kg
  The demonstration site on "Potential Green Manure Sources in the Dry Zone" was maintained and used during technology dissemination programmes conducted for farmer groups, school children and agriculture extension officers.

  In addition, 75 kg of Sun hemp (*Crotalaria juncea*) seeds were produced and are being used in seed multiplication activities of green manure at the Institute.

- **'Model Village' Programme**

  The programme was initiated with the objective to uplift local food production. Initially, three villages (Hiripitiyagama, Thilakapura and Pinpara) of the Ipalogama Divisional Secretariat division were selected with the assistance of the Department of

Agrarian Development. Soil conservation bunds were established in 9 Ac of land.

- **Soil Testing Programme**

  One hundred and twelve (112) soil samples of upland and paddy soils, from Provincial and Inter Provincial areas of Anuradhapura and Mahaweli H area, were analyzed and soil test based fertilizer and organic matter recommendations were provided.

- Biological control agents of salvinia and water hyacinth were reared and samples were given to individual farmers, farmer organizations and state authorities of relevance.

PLAN FOR 2011

RESEARCH

Condiments

- Production of new crosses for chilli hybrids/ OP varieties and onion and evaluation of newly developed hybrids
- Evaluation of chilli and big onion germplasm, selection, purification and seed multiplication of promising lines and regionally important chilli land races
- NCVT for promising chilli breeding lines
- Generation advancement of chilli breeding lines and cluster onion
- VAT for promising chilli breeding lines
- Evaluation of exotic chilli hybrids
- Studies on effect of shade and liquid fertilizer on the development of Chilli leaf curl virus
- Testing of seed treatment (Thiomethoxam 70 % WS) against chilli leaf curl complex
- Screening of insecticides to control chilli leaf curl complex and thrips in onion
- Development of a bud clipping technique for chilli
- Development of improved big onion varieties of short duration suitable for off season cultivation & true seed production under low temperature conditions during Maha through stratified mass selection
- Seeds and bulb multiplication of promising onion lines and selected accessions
- Study on the possibility of big onion vernalization in Riverstern area
- Control of onion tip burning through different agronomic practices

Grain Legumes

- NCVT for mung bean, black gram, cowpea & soybean
- Evaluation and selection of mung bean, black gram, cowpea & soybean
- Hybridization and selection programme for mung bean, black gram & cowpea
- VAT for mung bean, black gram & cowpea
- Identification of management practices for *Ascochyta* blight disease in legumes
- Screening of germplasms against collar rot of cowpea
- Studies on combined effect of ploughing depth, solarization and application of organic amendments for the management of collar rot in cowpea
- Seed multiplication of promising varieties of chickpea
- Development of a cluster seed establishment method for legumes grown under rain fed conditions

Oil Seeded Crops

- NCVT for medium duration promising ground nut lines

- Seed multiplication of promising lines of ground nut
- Germplasm evaluation of ground nut
- DUST- medium duration large-seeded promising ground nut lines

Coarse Grains

- Evaluation of QPM maize hybrids & finger millet accessions in NCVT and VAT
- Evaluation of promising hybrids developed with local inbred lines
- Development of inbred lines of maize from population `Hybrid Mix'
- Evaluation of exotic sweet corn hybrids
- Seed production of promising hybrids and parent lines
- Marker aided selection of QPM inbred lines
- Development of variety screening technique for sheath rot of maize
- Screening of fungicides against rust of maize
- Laboratory evaluation of plant powders to control maize weevil
- Effect of different nitrogen levels on stem borer damage in maize
- Maintenance of promising Meneri & foxtail millet germplasm
- Studies on the effect of seed rate & method of planting on the development of blast in finger millet

Vegetables

- Varietal improvement of okra for resistance/ tolerance to yellow vein mosaic virus (YVMV) with high yield and acceptable fruit quality
- Evaluation of vegetable cowpea germplasm received from PGRC and selection of better lines to be used as parental lines for varietal improvement
- NCVT for brinjal
- VAT for promising lines of okra & vegetable cowpea
- Maintenance of a demonstration block of drumstick

Fruits

- Maintenance of grape & mango germplasm
- Evaluation of wood apple germplasm
- Maintenance of mother plants of three grape varieties
- Varietal development of local hybrid varieties of papaya
- Evaluation of grape vine training systems
- Maintenance of a demonstration block of dragon fruit

Rice

- NCRVT for different age groups
- VAT for different age groups

Weed Management

- Weed control efficacy of Quizalop-p-ethyl 50 g/ l EC on chilli and groundnut and Halosulfuron-methyl 75 WG on maize
- Rain fastness ability of Trigger [Carfentrazone-ethyl 6.5 g/ l + glyphosate (a.e.) 179 g/ l CS]
- National Coordinated Herbicide Screening trial for wet seeded rice
- Weed control efficacy of Imazethapyr on legumes

Soil Fertility, Fertilizer and Environment

- Study the response of maize in relation to application of HERP and ESSP
- Evaluation of Mycorriza roots on growth and yield of chilli (pot experiment)
- Identification of optimum level and time of Gliricidia application with nitrogen fertilizer to ensure optimum yield of maize & chilli in farmer fields

- Identification of suitable integrated plant nutrient (N) management system for chilli, maize & onion
- Long term soil fertility monitoring of alley cropping field
- Long term soil fertility monitoring of organic matter and chemical fertilizer added OFC cultivated in RBE soil
- Soil testing programme

Water Management

- Study the irrigation water requirement for hybrid maize (Sampath) in RBE soil
- Evaluation of soil water distribution pattern in RBE soil under drip irrigation system
- Effect of irrigation interval on growth and yield of chilli in well-drained and imperfectly drained drainage classes of Rhodustalfs in DL1b agro-ecological region
- Development of efficient water management packages for chilli and onion in the dry zone soils

Food Technology

- Determination of protein quality of maize varieties
- Evaluation of crude fat and protein content of soybean and cowpea lines
- Use of coarse grain flour in bakery products
- Product development of Aloe vera
- Determination of storage life of hybrid maize seeds using MPET
- Determination of pesticide residues of maize green cobs
- Production of corn flakes using local maize varieties
- Pickling of silver skin onion
- Evaluation of storage life of chilli varieties for green chilli
- Quality evaluation of varieties/breeding lines of OFC/fruits/vegetables submitted by breeders

Breeder Seed Production

- Breeder seed production of recommended varieties of chilli (KA2, MI-Green and Galkiriyagama selection), maize (Badra, Ruwan & Sampath (Parental lines), finger millet (Oshadha), mung bean (MI 5, MI 6 and Ari), black gram (MI 1, Anuradha), vegetable cowpea (BS 1), tomato (KC 1), okra (Haritha), cowpea (Dhawala, MI 35, Waruni and Bombay) & soybean (Pb 1 and PM 13)
- Breeder mother bulbs and seed production of the recommended variety of onion (Dambulla selection)

STAFF LIST

Cadre Post	No.
Research Officer	16
Agricultural Economist	01
Programme Assistant (Agriculture)	06
Research Assistant	17
Agricultural Instructor	10
Research Sub Assistant	09
Public Management Service Assistant	15
Karyala Karya Sevaka (KKS)	02
Driver	06
Budder	01
Storeman	01
Circuit Bungalow Keeper	01
Tractor Operator	03
Watcher	10
Sanitary Labourer	01
Labourer (Permanent)	136
Labourer (Contract)	168
Total	**403**

2.1.1 GRAIN LEGUMES AND OIL CROP RESEARCH AND DEVELOPMENT CENTRE (GLORDC) – ANGUNAKOLAPELESSA

Grain Legumes and Oil Crop Research and Development Centre, the major agricultural research centre located in the Southern Dry Zone, is mainly focused on research and development programmes of grain legumes and oil seed crops and transfer of technology to enhance their productivity. All the research programs are focused on both national and regional research needs in the thematic areas of crop improvement, agronomy, plant protection and soil and water management.

In addition, the centre provides breeder seeds and basic planting materials of recommended varieties, provision of recommendations on site specific fertilizer application and dissemination of technical information to field officers, farmers and other interested personnel.

BUDGET

The total budget and allocation and expenditure under different votes during the year 2010 are given in Table 2.1.1.

Table 2.1.1: Annual budget -2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	3,868,554	1,613,762	42
Recurrent	7,755,500	7,358,746	95
Projects			
Production and use of organic manure	2,500,000	578,077	23
Development of hybrid rice, maize, fruit & vegetables	425,000	419,012	99
'Api Wawamu Rata Nagamu' programme	1,206,200	1,165,480	97
Total	**15,755,254**	**11,135,078**	**71**

PROGRESS

INFRASTRUCTURE DEVELOPMENT

Land development

- Five hectares of land in the right bank side of the farm was developed aiming to establish a coconut and mango plantation.

Laboratory development

- Soil and water management laboratory was partially upgraded using funds from the "Production and popularization in the use of organic fertilizer project.

CROP IMPROVEMENT

Oil Seed Crops

Groundnut

- Three groundnut lines tolerant to bud necrosis disease were selected for VAT
- Evaluated the adaptability performance of medium duration, high yielding (>2 t/ha) two groundnut varieties in VAT

- Evaluated adaptability performance of large seeded (>650mg), medium duration (105 days) and confectionary type groundnut varieties in NCVT
- Yield performance of "Bambara" groundnut, a new *Vigna spp.* collected from Eastern Sri Lanka was studied.
- Evaluated red testa groundnut in NCVT

Sesame

- Newly selected 30 white seeded sesame lines and 25 black seeded sesame lines were characterized with the objective of developing high yielding (>1800 kg/ha) varieties. Further evaluation will be carried out during next season.

Mustard

- Six promising mustard lines having good performances were selected from Major Yield Test (MYT) and NCVT was initiated.

Grain Legumes

Cowpea

- Sixteen high yielding (2000kg/ha) lines were selected for Preliminary Yield Test (PYT) from F_6 generation of different cowpea crosses under the variety development programme
- Four high yielding accessions (>1000kg/ha) with desirable agronomic characters were selected from the germplasm evaluation programme for NCVT.
- Twelve foreign elite varieties with drought tolerance, early maturation and pest and diseases tolerance were obtained from IITA, Nigeria and evaluation of those under local condition is being continued.
- Sixty new local accessions were collected from farmer fields
- Drought screening programme was initiated to study the drought tolerance of available germplasm.
- Major constraints for cowpea cultivation in three AI ranges of Monaragala were identified through a field survey. Unavailability of good quality seeds, lack of knowledge on new varieties, uncertainty of rainfall, occurrence of pests and diseases, poor attention by farmers and unavailability of suitable varieties for rain fed conditions were the major constraints identified and these constrains will be considered under the research and development programme.
- Conducted NCVT to test performance under Southern Dry Zone conditions

Mung bean

- Seventy three germplasm accessions were evaluated for yield and agronomic characters.
- Conducted NCVT to test performance under Southern Dry Zone conditions

Horse gram

- Six high yielding (600-1600kg/ha) accessions with uniform seed colour were selected for MYT through germplasm evaluations.

Black gram

- Conducted NCVT to test performances of Black Gram under Southern Dry Zone conditions

Vegetables

Tomato

- Conducted NCVT to test performances of Tomato under Southern Dry Zone conditions

Vegetable Cowpea

- Conducted NCVT of vegetable cowpea to test performances under Southern Dry Zone conditions

Fruits

Pineapple

- Established pineapple mother plants to obtain plantlets continuously.

PLANT PROTECTION

- The effectiveness of neem based products and synthetic insecticides against the damage of post podding pests of mung bean were evaluated under field conditions. Synthetic insecticide treated mung beans showed the least damage during both *Yala* and *Maha* seasons. Seed water extract was the most effective treatment among the neem based products,

- Efficacy of plant based protectants against Cowpea bruchids (*Callosobruchus maculatus*) was evaluated under laboratory conditions. Percentage of damaged seeds was lower in seeds treated with coconut oil compared to all other protectants used. Timely application of chilli powder and citronella oil, were similarly effective as synthetic insecticides against *C. maculatus* damage of cowpea.

- Study conducted to control pod bug (*Elasomolomus sordidus*) in groundnut showed that carbosulfan had significantly reduced the percentage damaged pods. Removal of vegetative parts and arranging them as bundles was equally effective.

- IPM was effective than other pod borer controlling methods in cowpea. Neem, garlic and soap mixture was the most effective easily applicable non chemical method than other plant extracts.

- Identified three plant species, namely *Cassia fistula, Cassia alata* and *Bougainvillea* spp. for their antifungal activity.

- *Trichoderme harsiana* seed treatment was identified as the best method for reducing stem and root rot disease in sesame.

SOIL & WATER MANAGEMENT

- The Sulphur requirement for large seeded groundnut was studied and a nine percent yield increase was observed with the application of sulphur @10 kg /ha.

AGRO CLIMATIC DATABASE

- Daily recording of agro climatic data and maintenance of the data base was continued.

DEVELOPMENT ACTIVITIES

Compost and Green Manure Production

- 42 tons of compost was produced using different types of organic residues.
- Established 100 m allay cropping system covering 2 ac area
- Seed production of green manure crops

Crotolaria juncea (Sun hemp)	15kg
Sesbania rostrata	1kg
Mucuna prurika	3kg

(Wanduru Me)

TECHNOLOGY TRANSFER & TRAINING

Exhibitions

- Participated and provided exhibits for the Southern Province Agricultural Exhibition held in Labuduwa
- Assisted the Agro Tech Park, Bata Atha by establishing and maintaining field crops for Govi Sathiya. The Centre took part in the exhibition by offering stalls on field crops, low country vegetables, fruit crops, biotechnology, compost and green manure production.

Model Village Programme

- Maha Aluthganara village was the selected model village for the programme. Preliminary awareness programmes on mung bean, cowpea, ground nut and sesame cultivation with land preparation techniques were conducted. Seed samples of each crop were distributed among villagers to increase self seed production.

Farmer advisory services and visitors

- The centre provided necessary advice and recommendations for about 175 farmers who visited the centre
- Twenty one soil samples from farmer fields were analyzed and soil test based fertilizer recommendations were provided for different crops.

Training and Radio Programmes

- Six radio programmes were conducted on Thibbatu cultivation, pest and disease control of Solanaceous crops and bean yellowing.
- Conducted a training programme on tissue culture for students of the School of Agriculture.
- Provided resource personnel for training progammes on other field crops conducted for the Technical Officers of the Southern Province
- Conducted three training programmes for farmers on “Thumba” and groundnut cultivation.
- Provided resource personnel for 15 plant clinics organized by the DOA.
- Approximately thirty field visits were made by the officers to solve regional site specific problems.
- Conducted 12 training programmes for officers and farmers on pest and disease control.
- Conducted theory and practical training classes on compost production for 370 farmers, 250 students and 40 government officers.

- 5000 bags of 5kg compost inoculants were distributed among farmers.
- Conducted 15 trainings on soil moisture conservation, compost production, soil fertility management, fertilizer use efficiency, soil sampling and laboratory techniques.

Foreign Trainings

- Ms D.G.C. Jeewani, RO of Division of Oil seeds, received a three month short term training on oil crop comprehensive technology for developing countries sponsored by the government of China.
- Dr P. Weerasinghe attended the consultative meeting on National Agricultural Research system in SAARC counties in Bangladesh.

SEED AND PLANTING MATERIAL

Quantities of seed and planting material produced are given in Table 2.1.2.

Following quantities of planting materials were also produced.

Banana	4,650 plants
Thumba karawila	1,665 plants
Pineapple	500 plants

PLAN FOR 2011

CROP IMPROVEMENT

Oil Seed Crops

- Identification and characterization of parental groundnut lines for hybridization
- Breeder seed production of groundnut and sesame
- VAT for groundnut
- Yield trials for groundnut
- Identification of better performing lines for hybridization to develop high yielding (1.8 -2 t/ha), white & black seeded disease tolerant sesame varieties

Crop	Variety	Breeder seed (kg)	Registered seed (kg)	Certified seed (kg)
Groundnut	Walawa	36	274	-
	Indi	106	-	-
	Tikiri	87	-	-
	Tissa	139	862	1,031
Sesame	Malee	5		
Cowpea	Dhawala			663
	Bombay			750
Mung bean	MI5			644
Maize (Hybrid)	Sampath			645

- Germplasm evaluation of mustard lines to develop high yielding (>800 kg/ha) mustard / rape seed variety
- NCVT of mustard lines
- Development of high yielding (>800 kg/ha) mustard variety

Grain Legumes

- Replicated yield assessment trials of selected high yielding cowpea lines
- Hybridization programme to produce high yielding cowpea and extra short mung bean varieties
- Evaluation of F_2 generation of cowpea crosses & mung bean germplasm aiming high yield, pests & disease and drought tolerance
- Studies to identify drought tolerant cowpea varieties
- Multiplication, characterization and field evaluations of collected cowpea germplasm
- NCVT and VAT of cowpea varieties and selected horse gram accessions

Fruits

- Basic planting material production of dragon fruit and recommended banana varieties through conventional methods.

Vegetables

- NCVT of Brinjal varieties
- Breeder seed production of pumpkin Ruhunu
- Germplasm collection of pumpkin & Thumba and hybridization of pumpkin
- Development of okra Hybrid variety
- Maintenance of mother plant stock of recommended Thumba varieties, Visal & Keshara
- Planting material production of Thumba through stem cuttings
- Maintenance of Thumba germplasm

PLANT PROTECTION

- Field management of post podding pests and bruchids of mung bean using Neem based products (pilot scale testing)
- Evaluation of efficacy of protectants against Cowpea bruchids (*Callosobruchus maculatus*) under storage conditions
- Assessment of the yield loss and possible controlling method for sesame pod bug (*Elasomolomum sordidus*) (pilot scale testing)
- Comparison of efficacy of selected *synthetic insecticide* combinations on preventing the emergence of mosaic virus infestation in mungbean
- Screening of cowpea germplasm for pod borer resistance
- Effectiveness and applicability of IPM techniques for controlling pod borers in Cowpea (pilot scale study)
- Identification of pest management techniques for controlling leaf curl complex in chilli
- Observational study to assess efficacy of plant extracts against aphids in cowpea
- Pot experiment on antifungal effect of plant extracts against

Macrophomina phaseolina (sesame stem & root rot)

- Identification of the best method for control *Sclerotium rolfsii* using *Trichoderme harsiana*
- Study the plants extract efficacy to control the *Sclerotium rolfsii* in groundnut under research field conditions
- Antifungal effect of plant extracts against *Fusarium oxysporum sp.cubencis* under farmer field conditions

BIOTECHNOLOGY

- Development of a media protocol for in-vitro propagation of banana variety "Nethrampalam"
- Selection and evaluation of medicinal plants for their antifungal activity to be used as botanical pesticides
- *In-vitro* production of 1000 plantlets of "Nethrampalam" banana

SOIL AND WATER MANAGEMENT

- Effect of Nitrogen and Zinc on growth and yield of hybrid Maize (Var. Sampath)
- Influence of different organic materials on total and available soil nitrogen
- Preparation of IPNS packages for OFC
- Impact of different levels of Sulphur on growth and yield of irrigated groundnut

STAFF LIST

Cadre Post	No. of personnel
Additional Director (Actg.)	01
Research Officer	09
Farm Manager	01
Research assistant	13
Agriculture Instructor	08
Administrative Officer	01
Public Service Management Assistant	06
Driver	07
Peon/ Office Care Taker (KKS)	01
Watcher	12
Labourer - (Grade II)	51
Labourer - (Grade III)	04
Labourer - Contract	76
Skilled Labourer	05
Economist Assistant	01
Agricultural Monitoring Officer	01
Programme Assistant	04
Research Sub Assistant	03
Storeman	01
Welder	01
Circuit bungalow keeper	01
Tractor operator	02
TOTAL	**05**

2.1.2 REGIONAL AGRICULTURAL RESEARCH AND DEVELOPMENT CENTRE (RARDC) - ARALAGANWILA

The centre is responsible for the development and dissemination of relevant technologies for mandated regions of the Mahaweli Systems B, C, D & G, Eastern province and inter-provincial areas. The centre is focused on research and development programmes both of national and regional importance. Though the centre is responsible for research and development activities of Other Field Crops, it also deals with rice, fruits and vegetables as regionally important crops. The research programme is executed under different disciplines such as Agronomy, Entomology, Genetics and Plant Breeding, Plant Pathology, Socio-economics and Soil & Water Management

BUDGET

Table 2.1.2.1: Annual budget – 2010 (Rs.)

Vote	ALLOCATION	EXPENDITURE	EXPENDITURE %
Recurrent	8,033,000	6,397,884	80
Capital	3,016,096	1,577,437	52
Projects			
'Api Wawamu Rata Nagamu' programme	815,000	371,840	46
Experimenting on Compost production and utilization	2,200,000	1,744,395	79
Community based seed production programme	75,000	60,000	80
Banana planting material production sub programme	215,000	193,252	90
Home garden development	70,000	16,912	24
TOTAL	**14,424,096**	**10,361,720**	**72**

PROGRESS

RESEARCH

Agronomy

Chili

Three chili lines were evaluated and 'Weraniya' accession produced better performances according to the data collected.

Rice

- Four rice crop establishment methods, i.e. direct sowing, normal transplanting, system of rice intensification and aerobic rice cultivation were evaluated with At 307, Bg 357, Bg 379/2 and Bg 300 for their productivity. Direct sowing recorded the highest yield. Bg 300 and At 307 recorded the highest grain yields in Maha 09/10 and Yala 2010 seasons respectively.
- Yellowing in rice crop was successfully controlled by proper fertilizer management.Addition of compost manure @ 10 t/ha reduced chemical fertilizer by 25%.
- Application of urea based on leaf color chart reduced yellowing in rice.
- New entries of 3, 3½ and 4½ month age classes were tested with standard checks under NCVT programme which was coordinated by the RRDI in Maha 09/10 and Yala 2010. In Maha 09/10,
- Bg 3026 and Bg 07-1350 (4m) performed well, yielding 5.67 and 5.68t/ha respectively compared to Bg 379/2 which yielded 5.61t/ha.
- At 05-1621 (3 ½ m) and Bw 03-1073 (3 m) are promising lines compared to recommended varieties
- In Yala 2010, Bg 985 and At 07-800 (3 m). Ld 5-5-14, At 07-1440 and Bw 05-1621 (3 ½ m) were the higher yielders and recorded 6.68, 6.70 and 6.17 t/ha respectively.
- All new entries were resistant to common pests and diseases.
- Both 3 and 3½ month varieties were also tested under Varietal Adaptability Trials (VAT)

Fruits & Vegetables

The drainage condition of moderately well drained NCB soil was improved by forming ditches and dikes. Orange, guava, banana, papaya, pomegranate and dwarf morringa were grown successfully in dikes.

Cowpea

Two breeding lines; 'Waruni' and 'Dhawala' were tested with standard checks, in the NCVT program coordinated by FCRDI. IJ 97k-499-39 accession had higher yield and resistance especially to leaf miner damage.

Genetics and Plant Breeding

Cluster Onion

Five new lines were selected for NCVT.

Spine gourd (Thumba)

Planting material production was continued to establish mother vines for assurance of quality planting materials supply.

Entomology

Paddy

Paddy varieties common in the dry zone were screened for sheath mite resistance. Almost all the varieties were susceptible at different levels especially during Yala and the damage was lower during Maha season.

Horticulture

Mango

Ten accessions were maintained in the field gene bank and 10 selected accessions were multiplied for NCVT.

Papaya

Amendments to the approved drainage system recommended for commercial cultivation of papaya under ill drained conditions was tested further for broader soil extremities.

Plant Pathology

Rice

Five selected five fungicides were tested for grain discoloration and Difenaconazole controlled fungal attacks successfully.

Cluster Onion

Accessions were screened for purple blotch and bulb rot to find out resistant lines.

Soil and Water Management

- Effective irrigation scheduling for brinjal was evaluated using IW/CPE ratio. 1.5 IW/CPE ratio was found to be most productive. However, 1 IW/CPE ratio was found to be sufficient to obtain higher production in organic manure applied fields. Conveyance efficiency from main sluice of the Maduru oya reservoir to the field canals of paddy fields in system "B" was evaluated. Highest conveyance efficiency of 88.6% was observed in main canal, while 73.92%, 59.31%, and 30.81% efficiencies were recorded at distributory (D) to sub distributory (SD), sub distributory (SD) to field canal (FC), Field canals (FC) to paddy fields respectively.

- The long term trial established to asses the effect of long term application of organic residues with chemical fertilizer on productivity and soil fertility (*in situ* & *ex situ*) of fields under rice, rice legume crop rotation experiments were continued..

Weed Science

- Four new herbicide candidates and combinations with standard Oxidiazon EC (Ronstar 25 EC), Bispyribac sodium (Nominee), Tillergold and Propanil fb MCPA 60% were tested in Maha 09/10 and Yala 10. Bentazone 48%EC and Fenoxyprop-p-eyhyl 60g EC controlled all weeds similar to Propanil fb MCPA 60%. Pendamethalin (Stomp) was failed.

- The Experiment confirm the development of weedy characteristics in recommended varieties of *Oryza sativa* in the first season and emergence of off types are prominent in At 401, Bg 94-1, Bg 357 and Bg 352.

DEVELOPMENT

Dragon fruit

A total of 190 potted plants were distributed for field establishment during the year.

Spine gourd (Thumba)

Twenty six potted vines were distributed to establish mother vines.

Tibbatu

Breeder seeds of *Bindu* variety were distributed on requests among farmers all over the country. (550g for cultivating 110 ha was sold and another 562g for cultivating 112 ha was also distributed free of charge)

OTHER

Participation in inter-national forums and symposia

- Dr S.H.A.de Silva, Deputy Director (Research) participated for SAARC TCARD meeting which was held in Dhaka, Bangladesh on 10-12th October 2010 on behalf of the government of Sri Lanka.

Projects and other programmes

Organic fertilizer production, utilization and development

The project continued throughout the year and organic fertilizer was provided to trial fields as well as demonstration fields. Six hundred and twenty seven (627) personnel have been trained and compost culture samples were provided along with leaflets to the trainees.

Banana planting material production sub programme

Established mother plants (800) were maintained in the field for planting material production.

Home garden

A model home garden was established and maintained at the centre.

Dissemination of Technical Knowledge

Leaflets

Leaflets on onion, papaya, dragon fruit and spine gourd and their new technologies have been distributed among people during awareness programmes.

Field days and Trainings

Training programmes

Officers from different disciplines conducted training programmes for AOs, FAs, farmers and school children. Eleven training programmes were conducted at the centre for 627 personnel on compost production and another 24 programmes in outstations on different topics.

Crop clinics

Officers attended 13 crop clinics in Mahaweli B, C, D and G as resource personnel and 35 field inspections and 4 field days during the year. Technical solutions were provided to farmers on field problems related to entomology, pathology, soil science etc.

Provincial and Mahaweli Technical Group Meetings

Required technical assistance was provided at 09 of the Mahaweli and Provincial technical meetings and their relevant preparatory meetings. Provided technical solutions for field problems of the farmers specifically in Mahaweli Systems of B and C; with emphasis on plant protection issues based on field visits and others were based on sample analysis.

SERVICES

Soil testing

A total of 320 soil samples were analyzed and site specific fertilizer recommendations were provided accordingly.

PLAN FOR 2011

Agronomy

- Evaluation & characterization of mango germplasm and expanding the existing gene bank
- Management techniques of yellowing of rice in large fields
- Management techniques for weedy rice
- Productivity and economics for maize based intercropping system

Entomology

- Management of sucking pests in chilli and onion in system B
- Assessment of rice sheath mites and paddy leaf mites in cultivated paddy in Dry Zone

Genetics and Plant Breeding

- Varietal development of under utilized crops
- NCVT for Cluster onion and rice (3, 3½ & 4½ months)
- National Coordinated Herbicide Screening Trials (NCHST) for rice coordinated by RRDI
- Production of rooted vine cuttings
- Breeder seed production of 'Tibbatu'

Plant Pathology

- Screening fungicides to control basal rot in cluster onion and grain discoloration in rice

Soil and Water Management

- Development of IPNS packages for onion with NCB soils.
- Study on impact of agriculture on soil and heavy metal accumulation in soil
- Assessment of water security in Sri Lanka using crop simulation and water management models
- Amendment of effective drainage system recommended for commercial cultivation of papaya
- Evaluation of long term application of chemical fertilizers and organic matter on crop productivity and soil fertility (*in-situ* and *ex-situ*).
- Estimation of irrigation water requirements for brinjal using IW/CPE ratio
- Effect of different soil conservation measures on soil erosion and runoff in NCB soil

- Modification of ill drained NCB soils for cultivation of upland crops
- Runoff loss study in upland NCB soils

Weed science

- Genetics and plant breeding approach for controlling weedy rice
- Production, utilization and development of compost from locally available materials

STAFF LIST

Cadre Post	No. of Personnel
Deputy Director (Research)	01
Research Officer (SLAgS)	04
Agriculture Monitoring Officer	01
Programme Assistant	01
Research Assistant	03
Agriculture Instructor	04
TOTAL	**13**

2.1.3 REGIONAL AGRICULTURE RESEARCH AND DEVELOPMENT CENTRE (RARDC) - KILINOCHCHI

The mandate of the Regional Agriculture Research and Development Centre, Kilinochchi including its satellite stations located at Vavuniya, Murunkan and Paranthan is to conduct agricultural research and development activities especially on other field crops which are economically important for the region (DL 1, DL 3 & DL 4), to cater to the needs of farmers in the Northern Province. This Centre is affiliated to the FCRDI, Maha lluppallama.

It was not possible to carry out meaningful research and development activities at Kilinochchi and Paranthan due to unsettled condition in the area during the last fifteen years. However, the situation has gradually changed to normal from 2010 onwards.

Therefore, the preliminary research and development activities have since started at Regional Agriculture Research and Development Centre, Kilinochchi and Rice Research Station Paranthan. The activities mentioned in this report have been conducted mostly at Adaptive Research Centre, Vavuniya, Agriculture Research Station, Murunkan, Regional Agriculture Research and Development Centre, Kilinochchi and Rice Research Station Paranthan.

BUDGET

The budgetary allocation and expenditure under different votes are presented in Table 2.1.3.1.

Table 2.1.3.1: Annual budget - 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	2,953,500	2,336,487	79
Capital	854,498	72,238	8
Projects			
‘ Api Wawamu Rata Nagamu’	198,000	158,459	80
Organic Manure Production and utilization	500,000	80,000	16
TOTAL	**4,505,998**	**2,647,184**	**59**

.

PROGRESS

Crop Improvement

Groundnut

Tested 5 lines with checks Indi, Red testa and Tissa to select promising lines for different agro ecological regions. Line ICGV 01270 significantly performed well during *Yala* 2010 and line ICGV 93704 during *Maha* 2009/10.

Black gram

Conducted studies on 35 black gram lines with checks MI-1 and Anuradha to develop high yielding well adapted combine resistant black gram variety for farmer cultivation and selected 10 lines for further studies.

Cowpea

Tested 3 lines with check Waruni to select promising lines for different agro ecological regions. Line IT 98K-205-8 performed significantly well during Y*ala* 2010.

Rice

Evaluated 12 rice varieties at Adaptive Research Centre, Vavuniya for their adaptability and none of the entries showed better adaptation.

Evaluated a pure line accession from locally popular land race of unknown origin (Attakkari) and found one line of medium duration (105 days) with sufficient adaptability and resistance to lodging and BPH . This red pericarped line was included in NCRVT for *Maha* 2010/11.

NCRVT and VAT

Conducted 3 Months, 3½ Months, 4 Months age group NCRVT at RARDC Vavuniya and Murunkan under both rain-fed and irrigated conditions. Results were reported to RRDI. Also, conducted Varietal Adaptability Trail in Rice to identify a suitable variety for Mannar and Vavuniya Districts.

Plant Protection

Chilli

Evaluated 6 chilli lines for thrips incidence with the variety MI -2 as check. TVC- 5 recorded the highest yield of 4.6 t/ha and very low thrips damage. Lines TVC -1 and TVC-3 also performed well in Vavuniya District.

Brinjal

Evaluated 3 traditional varieties of brinjal, Ekku vellai, Kathipidyan, Anjalee (Plastic) and Thinnavely purple as check against shoot and pod borer (*Leucinodes orbanalis*) at Adaptive Research Centre, Vavuniya. The variety Ekkuvellai performed well and recorded highest marketable yield 15.2 t/ha than other varieties and showed very low incidence of shoot and pod borer damage.

Observational Studies on Botanicals and Agro Chemicals

- Margosa leaf smoke has reduced 70% of the fruit fly damage in Bitter gourd and mango
- Acetamprid (Mospilan) was very effective against mealy bug in papaw
- *Lantana camara* (Nayunni) leaf smoke has reduced 80% of the of leaf hopper population in mango trees

Soil and Water Management

Testing of soil samples

Tested soil samples collected from salinity affected areas of Mannar District for pH and CEC and the remedial measures were given to farmers based on the salinity level.

Seed Production

Rice

The pure line of Attakkari rice seed production was in progress in 3 ha at Rice Research Station, Paranthan.

Basic seed production

Following quantities of seeds were produced at RARDC, Kilinochchi during *Yala* 2010.

Table 2.1.3.2: Quantities of basic seed produced during 2010

Crop	Variety	Amount
Bittergourd	Thinnavely white	06 kg
Snake gourd	Thinnavely long	02 kg
Brinjal	Thinnavely purple	03 kg
Chilli	KA-2	03 kg
Tomato	KC-1	100 g

Maintenance of the Fruit Germplasm

Maintained the Germplasm of *Kathali, Kappal, Monthan, Embon* (Ash, Green), *Itharai* and *Cavandish* varieties of banana at Adaptive Research Centre, Vavuniya.

Table 2.1.3.3: Seed production under Api wawamu Rata nagamu programme

Crop	Variety	Amount
Maize	Ruwan	50 kg
Finger millet	Oshada	50 kg

Organic manure production and utilization

produced following quantities of organic manure

Compost	-	15 tons
Sun hemp seed	-	750 kg
Sun hemp for green manure	-	01 ha
Gliciridia plants	-	0.2 ha

Technology transfer

Four radio programmes were broadcast through National Service (Thenral) of the Sri Lanka Broadcasting Corporation.

Advisory Services

Research officers and Extension staff visited the farmers' fields and identified their problems and remedial measures were provided for pest and disease incidences.

A total of 870 school students, 22 teachers from 12 schools, 51 Diploma in Agriculture students and a team of farmers lead by DD (Ext) Jaffna visited the station.

Development activities

- Main office complex, bachelors' hostel, peripheral fence and two Grade IV quarters of the RARDC, Kilinochchi were reconstructed and rehabilitated under the "Waddakin Wasantham" project.

- Agronomy laboratory building, part of the peripheral fence, workers' rest room and three tube wells at RARDC, Kilinochchi have been constructed under the Emergency Northern Recovery Project.

PLAN FOR 2011

- Efficacy of botanical pesticides against the diseases of chilli for eco friendly management of diseases
- Population dynamic evaluation against major pests of chilli
- Evaluation of botanical pesticides against pests on bitter gourd and mae
- Development of appropriate technology for management of nematodes
- Preliminary Yield Trial for thrips resistant chilli lines
- Testing of local cultivars of brinjal for high yield and resistant to shoot and pod borer
- Genetic variability and associated studies of black gram lines to develop a high yielding well adapted combine resistant variety
- Testing of promising black gram lines for different agro ecological regions
- Evaluation of seed quality of black gram stored under different storage environments
- To study the effect of alternate furrow irrigation on growth and yield of tomato
- "Group planting" of cucumber and bitter gourd for saving water
- To study the effect of plant density on growth and yield of locally popular red rice variety of 3 ½ month age group
- To study the performance of rice varieties under aerobic conditions in the Northern region
- Purification of red pericarped rice land races well adapted to farmer fields
- Comparison of herbal phosphorus with TSP
- Testing of salinity affected soils
- *In situ* conservation of Onion germplasm
- Breeder seed production of bitter gourd variety Thinnavely white
- Evaluation of performance of rice under aerobic conditions
- Purification of rice land races
- Management of onion nematode and diseases by using available organic manure to encourage the organic farming and reduce the usage of harmful inorganic pesticides
- Maintenance of germplasm, of Banana, Jack, Mango, Sweet orange, Lime, Pomegranate, Grapes, to produce quality stocks of pure germplasm to supply the farmers in Jaffna District
- A study on weed infestation
- Production of breeder seeds of tomato (KC 1)
- Intercropping of water melon with local melon
- Evaluation of performance of crops under alley cropping

STAFF LIST

Cadre Post	No. of Personnel
Deputy Director (Research)	01
Research Officer In Charge	01
Research Officer	06
Agricultural Instructor	07
Research Assistant	02
Research Sub Assistant	02
Management Assistant	01
Watcher	02
Unskilled Labourer	36
TOTAL	**58**

2.2 HORTICULTURAL CROP RESEARCH AND DEVELOPMENT INSTITUTE (HORDI) – GANNORUWA

The Horticultural Crop Research and Development Institute (HORDI) is mandated with enhancement of national horticultural crop production through research and development programmes. The crops under the mandate include vegetables, fruits, mushroom, root and tuber and floriculture. The research programmes mainly focus on the development of improved crop varieties, improved crop production and management technologies, plant nutrient management, pest & disease management, post harvest and food processing methods, planting material production and home gardening.

BUDGET

Table 2.2.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	23,613,862	13,346,003	57
Recurrent	48,757,000	44,037,420	90
Projects			
One Crop One Village	3,870,000	2,933,516	76
Development of Hybrid Fruit and Vegetable varieties and Seed Production	3,060,000	1,989,493	65
Production and Promotion of Organic Fertilizer Usage	13,400,000	8,650,347	65
Crop Leader – Vegetable	8,000,000	5,367,335	67
TOTAL	**100,700,862**	**76,324,115**	**76**

PROGRESS

PROJECTS

- **Hybrid seed production of vegetables and fruits**

Research for development of superior quality Hybrid vegetable and fruit varieties, maintenance of parental lines of recommended varieties and production of hybrid seeds are the main activities under this programme. Conducted research on tomato, brinjal, luffa, capsicum, cucumber, yard long bean, bitter gourd and fruits (Papaya).

Started Hybrid seed production of some of the newly developed vegetable varieties at the DOA as well as at selected farms of private sector organizations in collaboration with HORDI. Amount of hybrid seeds and the types of vegetables produced during 2010 by different institutes are given in the Table 2.2.2.

Table 2.2.2: Hybrid seed production during 2010

Crop / Variety	Institute	Amount produced (kg)
Tomato (Bhathiya)	DOA	9.23
	Private sector	13.5
Tomato (Maheshi)	DOA	14.88
	Private sector	9.1
Brinjal (Amanda)	DOA	10

- **Crop Leader – Vegetables**

This programme was initiated to enhance vegetable production through the introduction of high yielding vegetable varieties by increasing availability of quality seed and planting material, promoting effective integrated pest & disease management methods, commercial scale farming, post harvest management technology and value added product development technology. Targeted vegetables were tomato, bean, brinjal, mae, winged bean, okra, potato, root & tuber crops and leafy vegetables.

- **One crop one village**

This programme aimed at establishing crop zones for identified high potential fruit crops to increase national fruit production while promoting high potential fruits in selected zones. Following table shows the planting material produced for selected fruit crops and most of the planting materials have been distributed among target farmers through relevant provincial councils to be established in the crop zones.

Table 2.2.3: Planting material produced

Fruit	Amount (Planting materials)
Rambutan	23,155
Orange	4,000
Durian	4,250
Mango	7,450
Pineapple	91,970
Pears	2,450
Mandarin	3,360
Grapes	2,815
Strawberry	5,635
Pomegranate	2,500
TOTAL	**147,585**

Established mushroom villages under this programme in different regions (Table 2.2.4). Trained around 50 farmers on mushroom production through training programmes and workshops.

Table 2.2.4: Establishment of mushroom villages

District	D.S. Division	Village	No. of Beneficiaries
Matara	Kamburupitaya	Kamburupitiya, Malimbada	10
NuwaraEliya	NuwaraEliya	Meepilimana	10
Gampaha	Walpita	Walpita	1
Kurunegala	Pannala	Elabadagama, Horawadunna	15
Kandy	Kundasale	Phala Thennakumbura	10
	Gangawata Korale	Kengalla, Maluvegama	5

- **Production & Promotion of Organic manure**

The aim of the project is to promote the usage of organic manure among farmers in Sri Lanka. The main activity of the project was to produce large quantity of inoculum and the distribution among farmers in order to initiate organic manure production in their own farm fields. Analysis of organic manure samples and raw materials used for making compost were also carried out. Conducted Integrated Plant Nutrient System (IPNS) trials to develop new packages for different crops on efficient use of organic manures. Activities conducted during 2010 are summarized in Table 2.2.5.

Table 2.2.5: Major activities conducted under the organic farming project

Activity	Progress
Training & awareness programmes on compost production	
Farmer training (No. of persons)	1,830
Officer training (No. of persons)	155
School children (No. of persons)	783
Production of compost	
Cultivation of green manure (ha)	5.95
Compost production (mt)	443
Compost research and analysis (Development of IPNS packages and other research)	21
Development of Analysis Station (Infrastructure development of analytical centers)	4
IPNS demonstrations	24

- **Model village programme**

Main target of this programme is enhancing farmer livelihood by increasing farmer awareness on correct crop production technologies, recommended crops, and pest and disease management practices by developing model farm villages. Farmers in model villages were supplied with seed & planting material at subsidiary rates and expert knowledge while training with field visits were also provided.

VEGETABLE DIVISION

Breeder Seed Production

Produced Breeder seeds of Tomato, Bitter gourd, Mae and Winged bean varieties. Also, provided parental varieties required for hybrid seed production of tomato varieties 'Bathiya' and 'Maheshi' to cater to the needs of Private Seed Companies.

Table 2.2.6: Breeder seed production by HORDI

Crop	Variety	Quantity (kg)
Tomato	Thilina	225
	Rajitha	33
	T 24	26
	Parents of Bathiya	0.38
Bitter gourd	Matale green	60
Mea	Hawari	16
	Polon	18
Winged bean	Krishna	28

Tomato

- Released a cherry type variety of tomato developed through mutation breeding named 'Lanka Cherry'. It is an indeterminate variety suitable for cultivation in open fields.
- Identified promising varieties – HF3 a high yielding hybrid variety and M127 a mutant with determinate growth.. They will undergo further testing to verify their adaptability.
- Evaluation of exotic varieties - Tomato introductions F1 Tyking 5 and Mongal were superior in fruit yield to the check varieties. Performance of varieties F1 15043, TM 701, Star 9062, Star 9064 was also identified as acceptable. Overall performance of the introductions NS 537, Star 9012, Star 9063 and Star 9065 were deemed to be unacceptable for importation.

Capsicum

- Promising varieties identified – HCA1 a hybrid capsicum variety has performed to be promising by giving high fruit yields.
- Evaluation of exotic varieties - Capsicum introductions FST 403 (18.7 t/ha) and HP 210 (14.7 t/ha) were found to be high yielding. The performance of varieties Tonus F1 and 21348 were also acceptable. Varieties FST 102 and FST 519 are high yielding bell pepper types while Perfecto and Magnificio were acceptable "Jalapeno" types suitable for pickling.

Luffa

- Identified 2 promising hybrids
- Maintained genetic purity of six parental lines Obtained Hybrid seeds from 12 crosses.
- NCVT is in progress in 2 locations (2 varieties)
- VAT is in progress in 3 Districts (2 varieties

Bean and Winged bean

- Bean NCVT is in progress in 3 locations
- Bean VAT is in progress in 4 Districts
- Breeder seed production of winged bean variety 'Krishna' is in progress

Cucumber

- Identified new entries H 50. H51, H42 and H44 through PYT
- Maintained genetic purity of 8 parental lines .
- Obtained seeds from 12 crosses.
- NCVT is in progress in 4 locations
- VAT is in progress in 4 Districts

Bitter gourd

- Maintained genetic purity of 10 parental lines
- Obtained seeds from 02 crosses.
- Evaluated 14 F_1 exotic hybrid varieties and handed over the results to the crop coordinator

Brinjal

- One "lenairi" F_1 hybrid showed promising characters, viz. high yielding ability (>30 t/ha), resistance to bacterial wilt and good fruit quality, under the NCVT at 05 locations during last 3 consecutive seasons. This variety also showed better adaptability under farmer conditions. Testing of its adaptability under different agro ecological regions is in progress.

Mae

- Out of 13 F_1 hybrids of yard long bean, 3 hybrids showed higher yields at major yield trial. All these hybrids showed resistance to collar rot disease.
- Nine OP yard long bean varieties, which showed high yields and resistant to collar rot disease, were advanced to major yield trial.
- NCVT is in progress in 4 locations
- VAT is in progress in 4 Districts
- Produced and handed over Breeder seeds of Matale green (9.95kg), Hawari mae (32.25kg) and Polon mae (37kg) to the Seed Division

Leafy Vegetable – *Amaranthus*

- Two high yielding *Amaranthus* accessions, Diyapalagoda and Pure green possess high antioxidant activity of 47.3 and 42.1 respectively. Diyapalagoda contains a high amount of carotenoids (0.38 mg/cm^2) while Pure green contains 0.2 mg/cm^2.

FRUITS AND TISSUE CULTURE DIVISION

Fruits

Banana

- Conducted adaptability evaluation studies of 37 varieties of Embun banana at 3 locations
- Nominated high yielding, good quality with Panama disease tolerant 'Seeni Kesel' accession and good quality, high yielding Embul accession for NCVT.

Papaya

- Established locally produced 6 hybrid varieties in 2 locations for yield and quality evaluation.
- Established 3rd generation of collected papaya germplasm in the field for inbred production.

Rambutan

- Rambutan was evaluated in RYP soil at Pasyala and in RBL soil at HORDI under the Integrated Plant Nutrient Management System (IPNS) Project. 100-fruit weight had some differences between some selected trees. Research will be continued during the next cropping season. Grafted Rambutan plants with irradiated buds are being evaluated for yield and quality characters

Jackfruit

- Continued the evaluation of new accessions to identify better varieties.

Mango

- Conducted germplasm evaluation to find out better varieties.
- Continued inter stock evaluation to find out best inter stock for dwarf plant stature

Durian

- Six superior accessions of durian are being evaluated
- Cross pollination studies were conducted to ascertain best combinations to obtain better quality and yields

Avocado

- Integrated Plant Nutrient Management System (IPNS) - Cut down of NPK fertilizers by 50% or 25% and incorporation of compost at 10t or 15t/ha showed increased stem girth and canopy diameter.

Under Utilized Fruits

- Introduction of good quality varieties of Durian, Uguressa, Mora, Masan and Jak fruits through germplasm collection, conservation and evaluation was continued.

TISSUE CULTURE

Plant regeneration Systems

Vegetables

- *Lycopersicon*

Callus were obtained from the anther culture of tomato (var. Thilina). Experiments are being continued on haploid plant regeneration from anther derived callus.

FRUITS

- BANANA

Development of nuclear stocks of Kolikuttu is in progress. Buds of variety Embon were established in the medium to produce pathogen-free foundation stocks by meristem culture.

Field evaluation

- Established the second batch of tissue cultured Nethrampalam in the HORDI field. Micro propagation is continued *in vitro*.

Established tissue cultured Pineapple (var. Mauritius and Kiwi) plants in the HORDI field for testing. However, problems arouse with the taste and quality of the fruits produced through the tissue cultured planting material.

Production of basic planting materials of banana & pineapple

Table 2.2.7: Current status of tissue cultured plants

Crop	Variety	No. of Plants distributed	To whom	No. in plant house	No. under *in vitro*
Banana	Ambun	170	ARS, Thelijjawila	305 (+7 mother stocks)	246
	Dwarf Embon				51
	Pulathisi	-	-	27	12
	Rathambala	-	-	46	39
	Seeni kesel	-	-	05 (mother plants)	-
	Nethrampalam	-	-	67	120
Pineapple	Mauritius	-	-	1086	1500
	Kew	-	-	242	220
Beli	Supun	10	Unit II	-	420

Extension

- One day training programmes & advisory services – (for 141 persons)
- Lectures – 02 lectures for university students.
- Advisory services –10 personnel
- Supervised projects – 03 completed (with university students)
- 2 months training for 1 NDA student.
- Participated in 3 exhibitions organized by the Ministry of Environment and AVC at Pannala, Hanguranketha and Kegalle.

ENTOMOLOGY DIVISION
Research and Development

- Further evaluation of the control package identified for Horse Gram Yellow Mosaic Virus (HGYM) on bean transmitted by white flies (*Bemisia tabaci*) resulted lower number of yellowed vines. However, the treatment (chemical package) identified during the previous season was superior to other treatments in reducing the number of yellowed vines. A significantly higher yield was also recorded in the identified package. Further confirmation of the results is in progress.

- Four Insecticides i.e. Carbosulfan 20% SC, Thiamethoxam 25%WG, Dinotefuran 20%WP, Imidacloprid 70% were found as effective in controlling bean fly.

- i.e.Carbosulfan20%SC, Evaluated imported hybrid varieties of luffa i.e. ANAMIKA, 041044, 038044, LER 533, and BONANZA with NAGA and LA 33 and Varieties 041044 and LER 533 performed better. However, yellow spots observed on pods of LER 533, the variety BONANZA was highly susceptible to virus diseases.

- An area wide-IPM programme to control melon flies was successfully carried out in a 10 acre yaya in Ovilla A.I. division, Matale with the participation of seven farmers growing cucurbit crops. The melon fly damage reduced to 2% and had obtained higher profits.
- Field research and demonstrations carried out during four consecutive growing seasons on Area-Wide management package for melonfly, *Bactrocera cucurbitae* were successful. In addition to the high profits, environmental pollution, insecticide residues in the harvested product and insecticide exposure of the farmers were minimized by this new technology package.
- Tested Acetamiprid 20% SP in a pilot scale trial and found effective in co*ntrolling leaf hopper*s in okra.
- Recommended Acephate 75%SP to control leaf hoppers in vegetable crops found to be ineffective, while causing resurgence in thrips after application on brinjal.
- A new pest damaging the stored product of medicinal plant, katuwelbatu, *Solanum xanthocarpum* was identified as Flat grain beetle, *Airaphilu*s spp. (Salvanidae: Cucujoidea). Control measures were recommended.
- Recommended a new neem seed extract based insecticide (LakGro Neem) subjected to fulfillment of registration requirements of Registrar of Pesticides, for the control of cabbage leaf eating caterpillar complex and capsicum leaf curl complex after pilot testing.
- Rynaxypyr (Coragen 18.5 SC) and Spinosad (Tracer 450 SC) followed by Lambda cyhalothrin (Karate Zeon) effectively controlled the shoot and pod borer in brinjal in field tests. The insecticide Tracer is already recommended and Coragen and Karate can be recommended after pilot scale tests.
- Bean pod borers were effectively controlled by the insecticide Rynaxypyr (Coragen 18.5 SC) in field tests. Further testing will be carried out to recommend the product.
- Tomato fruit borer damage was effectively controlled by a number of insecticides. Further studies will be conducted prior to recommending the products.
- Field screening tests carried out during the past three seasons indicated that an improved hollow cone nozzle in a knapsack sprayer reduced the spray volumes of foliar applications by 21-46%, maintaining a constant bio efficacy compared to the conventional nozzle. Therefore measures will be taken to introduce this new improved nozzle to the farmers to reduce pesticide wastage and environmental hazards.
- Spot application of the recently introduced protein bait (LakGro Bait) to be used in area-wide IPM of fruit fly pests should be mixed with spinosad as a toxicant to kill the attracted flies. Laboratory screening indicated that abamectin 1.8 EC also can be used as an alternative to be mixed with the bait.

- Identified two new fruit fly pest species from bur fruits; *Carpomya versuviana* and *Bactrocera pyrifoliae*, Citrus mussel scale; *Lepidosaphes beckii* from citrus crop in Gannoruwa. A leaf eating caterpillar; *Stictoptera grisea* was identified on mangoosteen in Kandy area.

New pest damages diagnosed

- Fruit piercing damage on tomato reported from Ilukkumbura area was identified as a damage caused by a moth, *Achaea janata* (Lepidoptera: Noctuidae) moth (1st report on tomato
- A sucking pest damage on *Idda pitchcha* reported from RARDC, Makandura was identified as damage caused by *Oncopeltus spp.* (*sangeuniolentus*; Hemiptera: Heteroptera: Lygaeidae). This is the first report of the pest.
- A scale insect, visually almost similar to papaya mealy bug (*Paracoccus marginatus*) that infested fruits of rambutan was identified as *Pulvinaria psidii* (Hemiptera: Coccidae)
- A fruit boring damage on pineapple, reported by RARDC, Makandura was identified for the first time in Sri Lanka as a damage caused by *Carpophilus humeralis* (Coleoptera: Nitidulidae).
- A pest damage reported by an Agricultural Officer of Mahaweli Authority in Thambuthegama area on 'Seeni kesel' was suspected as a damage caused by banana fruit spotting bug (*Amblypelta nitida*; Hemiptera: Coreidae). The damage symptoms were the appearance of black spots on fruits and premature ripening of affected fruits. The flesh of ripped fruit was hard and brown.
- Cause for the death of about forty vines of grapes in Agriculture Research Station, Kalpitiya, reported during Yala 2009 was due to a severe attack by thrips on leaves, leaf stalks and tender shoots. The species was identified as the *Selenothrips rubrocinctus* (red banded thrips;Thysanoptera:Thripidae) which is first reported in Sri Lanka.

PLANT PATHOLOGY, MICROBIOLOGY & MUSHROOM DIVISION

Screening of germplasm for resistance to bacterial wilt

Imported eight tomato, ten capsicum and three brinjal hybrids were screened for resistance to bacterial wilt and some of the varieties of them showed moderate resistance.

Disease diagnosis of crops and advisory service for disease management

Over 500 disease affected plant samples of fruit crops, vegetables, tubers, condiments, spices, ornamentals, other field crops and grasses received from farmers' fields and private farms were clinically tested for the identification of causal agents and control measures were made available.

Effect of chitosan (irradiated chitin) on growth and yield of tomato

Tested two chitosan compounds i.e. chitosan oligomer and chitosan fungicide under field condition. Chitosan oligomer has growth promoting and yield increasing ability while chitosan fungicide has disease controlling ability of tomato.

Effect of irradiated chitin (chitosan) on growth and conidia differentiation of pathogenic fungi

Growth reduction of mycelium and germination inhibition of conidia of fungal pathogens by different concentrations of eleven chitosan compounds was measured by *in vitro* bioassay test. Some chitosan compounds were able to inhibit the mycelium growth and conidia germination of the pathogenic fungi.

Identification of new viruses associated with yellowing syndrome of cucurbits

Viruses transmitted by whiteflies (*Bamisia tabaci*) were associated with yellowing syndrome of bitter gourd.

Inspection and laboratory testing of seed potato consignments

There were diseases such as black scurf caused by *Rhizoctonia solani*, silver scurf caused by *Helminthosporium solani*, and netted and common scabs caused by *Streptomyces* species in most of the seed lots. Out of 42 seed lots, only one (var. Granola) was rejected due to high incidence of *Erwinia* infection.

Virus indexing of fruits & vegetables by ELISA

Viruses associated with the cucurbits, papaya, banana, potato and some weeds in the field were identified. Severe virus infestation was observed in cucurbits in many parts of the country. Causal agents were identified and control measures were introduced to farmers.

Evaluation of bio-efficacy of new fungicide Dormark 40ME (Tetraconazole 40g/l) against powdery mildew of Okra

The new fungicide Dormark 40ME (Tetraconazole 40g/L) was effective in controlling powdery mildew of Okra.

Evaluation of bio-efficacy of fungicides against downy mildew of cucurbits

Out of four, two new fungicides Azoxystrobin and Cabrio top were effective in controlling downey mildew of cucurbits and can be recommended for pilot scale testing.

Evaluation of bio-efficacy of new fungicides against powdery mildew of cucurbits

Two new fungicides Dormark 40ME (Tetraconazole 40g/l) and Nativo 75 WG (Tebuconazole 50% + Trifloxystrobin 25%) were effective in controlling powdery mildew of cucurbits.

Screening of cucumber varieties against Zucchini Yellow Mosaic Virus (ZYMV)

One local ZYMV was isolated from Marassana area and maintained in host plants for resistance screening studies.

Technology for Milky mushroom cultivation

Technology has been developed for cultivation of milky mushroom using paddy straw substrate.

Liquid spawn

Liquid spawn also can be used for mushroom cultivation to reduce the time and cost in spawn production.

Value added products from dried mushroom

Mini drier can be used for production of dried mushroom at household level. Mushroom seeni sambol, moju, fried mushroom sambol and mushroom mixture can be prepared using dried mushroom to ensure higher consumer acceptability.

Technology for low cost method for spawn production

Low cost method has been developed for spawn production.

Training and education on mushroom cultivation

- Trained over one thousand personnel on oyster mushroom cultivation and 199 certificates were issued for registration as small scale mushroom producers.
- Trained over one hundred personnel on paddy straw mushroom cultivation while 32 personnel were trained on mushroom spawn production.
- Demonstrations on different ways of cooking mushroom were conducted for 117 personnel
- Provided Technical advices to 47 farmers by post, 1,024 through telephone conversations and verbally to 452 farmers who visited HORDI
- Disseminated mushroom cultivation technologies to 19 G.C.E. (AL) students for their individual projects
- Trained 2 university students on mushroom cultivation during their vacation training period.
- Provided training for 38 University students, 07 Agriculture Diploma students and 13 postgraduate students on mushroom cultivation and spawn production.
- Participated in 2 exhibitions

  Dayata Kerula- Pallekalle

  Wasantha Udanaya –N'Eliya
- Trained a total No. of 383 personnel through practical training workshops conducted with the involvement of different non government and government organizations.

Participatory technology dissemination activities via electronic media

Five radio programmes ("Aswenna") and two T.V. programmes ("Govi bimata arunalu") were conducted.

AGRICULTURAL CHEMISTRY DIVISION

Organic Farming

Nutrient management of organic vegetable crops

The effect in growing of green manures before growing the vegetable crops under organic farming was tested and found an improvement in growth and yield increase under organic vegetable production. This experiment will be continued with different vegetable crops for further confirmation.

Use of Partially Burnt Rice Husk for Vegetable cultivation

Yield obtained at 200 g burnt rice husk application was statistically higher than yield obtained with NPK only and compost only treatments. This experiment will be continued to monitor the long term effect of application of burnt rice husk on vegetable yields under organic farming.

Use of mulching material on organic vegetable yield

Straw, Polythene and burnt rice husk mulch could be effectively utilized for control of weeds and improving the yield under organic vegetable production.

Continuous Application of compost

Integrated use of compost and NPK fertilizer gave higher yields than compost only application.

Biological testing of compost quality

A study was conducted to determine biological assessment and evaluation of compost quality and found that laboratory chemical analysis together with biological testing is needed to assess the quality of compost.

Improving the solubility of Eppawela Rock Phosphate (ERP) through vermicomposting process

Vermicomposting process improved the solubility of Eppawela Rock Phosphate and shown significant yield increase and plant P uptake with the application of ERP enriched vermicompost.

Integrated Plant Nutrient Management

Reduction of chemical fertilizer usage

Application of 75% of the DOA recommended level of NPK with 10t/ha compost gave significantly similar cabbage and Mukunuwanna yield compared to recommended levels of NPK with 10t/ha of compost. However, further studies are needed to confirm the results.

Analytical Techniques

Evaluation of Anion Exchange Resin Strip method for soil phosphorous extraction

This study was conducted to examine the applicability of the method for soil P extraction by comparing the accuracy with the Olsen extraction method. Anion exchange resin strip method can be used successfully for routine soil P analysis by modifying the procedure and also the modified method is more economical in saving both time and electricity.

Comparison of nitrate – N content of organically and conventionally grown leafy vegetables

Comparison of nitrate nitrogen content of some leafy vegetable crops grown under organic farming systems compared to conventional open field system revealed that nitrate nitrogen contents of the organically grown Kang kung and Mukunuwenna were significantly lower than that of conventional system, while Gotukola recorded comparable levels. However, all levels were within accepted limits. Continuous monitoring and advising farmers accordingly on proper fertilizer management practices will help to maintain the nitrate-N levels in leafy vegetables within acceptable limits.

Water Quality in intensive vegetable growing areas

Study conducted showed the pollution of surface water as well as ground water due to agricultural inputs and contaminated with some plant nutrients in intensive vegetable cultivation areas of Nuwara Eliya (Sandatenna catchment).

Water quality in Mahaweli River

Throughout a period of two years (January 2008 - December 2009) water qualities (physico-chemical parameters) of Mahaweli River were tested for irrigation and drinking water purposes, at 3 locations in and around Peradeniya. It was found that pH, electrical conductivity, dissolved oxygen, turbidity, N, P, K, chloride, fluoride, ammonium, nitrate, manganese, zinc and copper contents were less than WHO stipulated values while calcium was slightly higher than WHO drinking water limit.

ROOT & TUBER CROPS, FLORICULTURE AND HOME GARDEN DIVISION

Root & Tuber

Sweet potato

- Selected HORDI C-05 as a variety having high yield and good quality with light yellow flesh and high farmer preference.
- Selected 3 salt tolerant lines CIP 440396, CIP 199043.4 and CIP 199062.1 from International Potato Centre (CIP) having high yield and good quality.

Cassava

VAT trials in cassava showed that the farmers preferred the new variety HORDI 6 due to its high yield, marketable qualities such as well developed root tuber with long stalk and attractive skin colours (brown outer skin and pinkish inner skin) and suitability for mixed cropping system.

Kiri ala

Intercropping of ‘Kiri ala’ with maize and soil treatment with *Trichoderma* microbial pesticide gave significantly high yields with good quality tubers while reducing leaf yellowing disease incidence.

Floriculture

Activities carried out during the year are given below.

- Collected and maintained 12 ornamentally potential wild flora.

- Five superior chrysanthemum varieties were introduced and cultivated at Gannoruwa to supply flowers to the local market.
- A growth medium developed using crushed pine leaves was successfully applied in rooted cutting production of foliage industry. This medium and technology for the export market was released in 2010.
- Caracterized and evaluated 8 crop accessions suitable for home gardens
- Maintained a model home garden at HORDI Gannoruwa.
- Established new home garden models in Pasyala and Walpita farms.
- Distributed 500 "Haritha" katurumurunga plants among growers.
- Conducted community participatory trainings with government and non government organizations at Trincomalee, Batticaloa, Kegalle and Gannoruwa.

EXTENSION, ECONOMICS AND DATA MANAGEMENT DIVISION

Research

Evaluation of Potentials for Commercial Cultivation of Wood-Apple (*Limonia acidissima L.*) in Sri Lanka

Potential area map for wood apple growth has been generated using geo-spatial analysis using tree locations recorded by Global Positioning System (GPS). Results showed Western part of Northern Dry Zone of North Western and Southern Provinces have high potential for growing wood apple while some parts of Polonnaruwa, Anuradhapura and Ampara showed moderate potential. Some of the constraints for wood apple growing were identified as certain tree characteristics, lack of quality planting materials and superior varieties and low price.

Forecasting Vegetable Extent and Production in Sri Lanka with ARIMA Model

Data analysis using Auto Regressive Integrated Moving Average (ARIMA) model for a period of 18 years (1981-2008) for the extent and production of different types of vegetables in Sri Lanka showed that all the up country vegetables under review showed an upward trend with an increasing rate while some low country vegetables showed a downward trend.

Spatial distribution of crop area and evaluation of cropping pattern through multi-temporal remote sensing data

The objective of this study was to evaluate the ability of time series satellite data for delineation of land under different crops and evaluation of cropping patterns. Downloading free data has been partly completed and the study will be continued.

Undergraduate Student's Research Projects

Two undergraduate students from the Wayamba University have completed their final year research projects on "Forecasting Vegetable Extent and Production in Sri Lanka with ARIMA Model" and "Evaluation of Potentials and Constrains for Wood-Apple (*Limonia acidissima L.*) cultivation in Sri Lanka".

Data Management and progress monitoring

Following activities were carried out during the year.

- Coordinating financial and physical progress monitoring and evaluation of special projects of the line Ministry & DOA under HORDI and allied Centers.
- Coordinating recurrent and capital allocation among stations and progress reporting
- Updating and maintaining human resource database of HORDI.
- Updating and maintaining planting material production data.
- Collection and compilation of CARP INFORM data.
- Updating and maintaining a database of farms under HORDI.

Technology Transfer

- A total of 93,290 visitors visited HORDI including 36,439 school children, 7,225 farmers, 75 school teachers, 119 Government officers, 193 higher education students and 208 other individuals
- No. of written answers for technical inquires – 422
- No. of farmer group training programmes – 3
- Coordination of group programmes for other institutions – 6
- No. of foreigners group awareness programmes - 3
- Dissemination of new technology by issuing 3,982 advisory leaflets.
- Technical advises for 828 telephone inquires
- 15 group trainings on Vegetable IPM including DOA, Mahaweli, and private sector.
- Vegetable - IPM farmers field demonstrations (Cucurbits, Okra, Brinjal, Tomato & Chili) in various locations in Sri Lanka – 254
- Compilation of a book on research highlights of HORDI
- Designing and preparation of technical bulletins & leaflets – 8
- Designing and preparation of posters (1 x 1 m^2) - 50
- Four radio and one television programme on Vegetable IPM.

Agricultural Museum

The Agricultural Museum is kept open from 8.30 am to 4.15 pm on every week day as well as on government holydays upon request. The exhibits include traditional agricultural equipment and models of traditional storage structures. A total of 1,300 leaflets on traditional Sinhala words used in rice cultivation process (Kamath Bashawa etc.) and terms used in traditional Sri Lankan agriculture were distributed during 2010.

Number of visitors who visited the Agricultural Museum are as follows.

School children	54,294
School teachers	4,194
Farmers	5,160
Government officers	665
University students	1,280
Foreigners	124
Other	7,060

CENTRAL LIBRARY

- During 2010, 95 new books were added to the collection and the total number of book collection is 10,805. More than 251 foreign periodicals were received thought the year on complimentary and exchange basis. The Library paid 5,000 Sterling Pounds as annual subscription to Commonwealth Agricultural Bureau International (CABI).
- More than 985 users visited the library. About 515 books were circulated among library members. Regular reader services and 26 Inter Library Loan Scheme was provided.
- Over 25 retrospective searches were made on request of the Research Officers. About 25 searches were done through the assistance of CARP.
- About 300 Research Officers obtained information using Internet facilities, and AGRIS CD-ROM System and WEBAGRIS database were updated with latest information on Annals of the Sri Lanka Department of Agriculture and the 'Tropical Agriculturist' Journal articles. In addition, agricultural data were provided to Agricultural National Bibliography in 2010.
- AGRINET Content Pages Service (SDCP) was continued and more than 148 Content Pages were distributed among 75 internal users.
- The 'Tropical Agriculturist' Journal was distributed among local and foreign institutions during 2010 (vol 156,157). More than 11,000 articles and 1,100 books have been included in the PURNA database.

DEVELOPMENT & TECHNOLOGY TRANSFER ACTIVITIES

Vegetables

- Model village programme – Contributed to the model village programmes at Marassana and Kambiliwewa through conducting demonstrations, supplying seeds of improved varieties, conducting adaptability trials and farmer training.
- Training - Contributed to 8 officer training programmes on vegetable production as resource persons. In-plant training was provided on vegetable research for 2 HNDE students in addition to demonstration of activities to many local and foreign visitors.
- Other communication related activities include demonstrations, inspection of farmer fields and advice on better cultural practices (150 beneficiaries), replying to farmer inquiries by letter or over the telephone (200), on TV and through radio programmes (2), newspaper articles (3) leaflets (1) and contributing to agricultural exhibitions (2). A large number of seed samples of newly released tomato and capsicum varieties have been distributed among farmers (100).
- Commenced 14 Permanent Crop Clinic Committee programmes (PCCC) in Hambantota and Kandy Districts

Fruits & Tissue Culture

- Produced planting materials of durian, rambutan, jak, goraka and some under-utilized fruit crops and supplied to farmers.
- Educated farmers and extension officers on fruit crops cultivation and instructions were provided to solve field problems faced by them in the process.

- Trained university students on fruit crop management and supervised university students on their projects.
- Produced, and distributed 9,000 Rambutan bud-grafted plants and 1,500 grafted Jak fruit plants for establishment of fruit villages at Pasyala and Eraminigolla farms.
- Produced and distributed 90 virus free Citrus grafted plants in the form of mother plants.

model villages were established at farmers' fields to increase awareness on newly improved varieties and production packages.

Entomology

- Following activities were conducted during the year.

Activity	Total
Laboratory diagnosis	65
Number of new pest problems identified	12
Special field diagnostic visits	06
Training classes for farmers	03
Training classes for officers	09
Number of plant clinics participated as resource personnel	20
Number of letters replied to address the problems	06
Number of telephone calls answered with regard to problems	54
Seminars on IPM	28
Bee keeping	
Number of letters replied	37
Number of bee colonies established	38
Number of workshops conducted	01
Number of farmers provided assistance to establish new bee colonies	45
Number of News paper articles and Leaflets published	02
Number of people who visited the Insect Zoo	29, 917

- Developed three villages (Dunukewala, Diyagama, Meevitiya) as model villages.
- Purchased laboratory equipments for mass scale planting material production using tissue culture techniques.

Root & Tuber crops, Floriculture

Under the 'Api Wawamu Rata Nagamu' programme, more than 45,000 planting materials of root and tuber crops were distributed. Over 10

Pathology & Mushroom

- No. of Plant clinics conducted -19 (No of beneficiaries – 1800), ISTI trainings 20 /950 Fields days - 25/2000, Field visits for disease inspections - 43/730, PTWG meetings - 18
- Established a mushroom spawn production unit at Polgahamula Sarvodaya Economic Enterprise Development Services (Guarantee) Ltd with the guidance of the mushroom unit at HORDI.

- Instructions given to uplift facilities at spawn production units of the ISTI Bindunuwewa, Agrarian Services Center Manampitiya, School of Agriculture Labuduwa and spawn production unit, Pothuhera
- Instructions given to construct a new spawn lab at Maha Illuppallama ISTI.
- Conducted five radio and two television programmes.

Soil fertility improvement programme

Soil fertility improvement and development of best management practices for farmers under SRICANSOL II project in rice-vegetable growing areas of Kolabissa and Marassana were provided. There are about 60 farmers who produce their requirement of compost from farm waste under the soil fertility improvement programme. In order to improve the availability of cattle manure, farmers are being encouraged to rear cattle and actions have been taken to obtain assistance of the Department of Animal Production and Health to distribute cattle on subsidiary rates.

Laboratory improvement

1Plant and fertilizer sample preparation unit was established in the laboratory for the purpose of improving the quality of analytical work.

Analytical Services

During the year 2010, about 689 soil samples, 05 water samples, 58 plant samples and 125 compost samples were analyzed and reports were submitted. The revenue collected in this regard during the year amounts to Rs. 186,165.

Students' projects

One undergraduate student from the University of Sabaragamuwa has completed her final year project on the topic "Effects of different fertilizer mixtures on growth and yield of hydroponic tomato".

Floriculture

Under the "Api Wawumu Rata Nagamu" programme more than 45,000 planting materials of root and tuber crops were distributed. Over 10 model villages were established.

PLAN FOR 2011

Vegetables

- Tomato and Capsicum varietal development via heterosis breeding
- Tomato varietal development via mutation breeding
- Evaluation of Tomato introductions
- Breeder seed production of Tomato, Mae (Matale green, Polon mae & Hawari mae), Winged bean (Krishna & SLS 44) and parental lines of released varieties
- Promotion of newly released varieties
- Purification and seed production of promising "Nye Miris" types
- Development of Luffa F_1 hybrid/OP varieties, Mae, Cucumber F_1 hybrids and Bitter gourd F_1 hybrid varieties
- Development of Bean varieties using conventional and biotech breeding tools
- Conduction of Permanent Crop Clinic Committees (PCCC) programme in Matara, Trincomalee and Badulla Districts
- Evaluation of exotic Bitter gourd F1 hybrids and Brinjal varieties

- Study on the effect of harvesting schedules on fruit quantity and quality of Cucumber
- Development of high yielding hybrid Brinjal varieties with bacterial wilt resistance and uniform fruit qualities
- Purification of farmer varieties of Brinjal
- Breeder seed production of parental lines of released varieties
- Development of high yielding, collar rot resistant Mae varieties with good consumer preference (OP and hybrid varieties)
- Quality seed and planting material production of various leafy vegetables

Fruit & Tissue Culture

- Exploration, conservation and propagation studies on 'Uguressa' in Sri Lanka
- Hybridization of Durian varieties to identify better combination of parents for high yield and quality
- Exploration, conservation and evaluation of Jack fruits for high yield and quality
- Exploration, conservation and evaluation of Embun banana for high yield and quality
- Hybridization and selection of Dragon fruit to develop quality high yielding varieties
- Evaluation of the effect of inter stock and rootstock variety on dwarfing of mango
- Development of papaw hybrids using available inbred lines and evaluation of hybrids for yield and other qualities
- Establishment of a model villages
- Development of two research farms and planting material production.
- Development of high yielding, good quality and disease resistant Banana and Rambutan varieties through induced mutation.
- Selection of high yielding, good quality and disease tolerant Banana germplasm.
- Development of high yielding, good quality Papaya varieties/ hybrids
- Development of a package of practices to improve yield and quality of Rambutan
- Study on the effect of seed size and growing medium of rootstock and grafted plants of Jak fruit variety 'Father long'.
- Establishment of four model villages.
- Development of four research farms and planting material production.

Root and tuber crops & Floriculture programme

- Continuation of varietal development programmes in Sweet potato and Manioc
- Varietal evaluation of high salt tolerant, high carotene and high dry matter containing CIP lines of Sweet potato.
- Basic planting material production of recommended Sweet potato, Cassava, Kiri ala, *Colocasia*, *Dioscorea* and Innala varieties and distribution among different targeted beneficiaries on request throughout the country
- Germplasm maintenance of all root and tuber crops
- Dissemination of newly improved varieties and production packages of root & tuber crops by establishing nucleus units, demonstration blocks, model villages and conduction of training programmes

Plant Pathology, microbiology and mushroom

- Screening of Binjal, Tomato and Capsicum germplasm for wilt and collar rot
- Development of control measures for *Fusarium* wilt
- Disease diagnosis and advisory services
- Effect of irradiated chitins on pest resistance of Tomato and Capsicum
- Management of powdery mildew of Rambutan by irradiated Chitosans
- Development of control measures for Ginger rhizome rot
- Biological control measures for nursery disease
- Studies on leaf curl problem of Cucurbits caused by viruses
- Testing of imported seeds and planting materials for disease diagnosis
- Screening of chitosan compounds against pathogenic fungal growth (*in vitro*)
- Studies on disease control of Grapes
- Identification of diseases of Pumpkin and development of an IPM package for their control
- Development of an IPM package for major diseases of citrus fruit crops
- Studies on stem bulging of Passion fruit
- Screening of Cucumber germplasm for Zucchini Yellow Mosaic virus
- Identification of diseases in dragon fruit cultivation
- Screening of fungicides against blight of Tomato
- Screening of fungicides against anthracnose of Capsicum
- Screening of fungicides against Sigatoka disease of banana
- Screening of fungicides against powdery and downey mildew of Cucurbits
- Protocol development for milky mushroom cultivation
- Testing of cultivation methods for two new varieties of Oyster mushroom
- Development of a low cost method for spawn production
- Evaluation of *Mycorrhiza* roots on vegetable and fruit crops

Soil Fertility Management

- Nutrient management of organic vegetable production
- Use of partially burnt Rice Husk for Vegetable cultivation
- Use of mulching material on organic vegetable yield
- Use of vermicomposting process to improve ERP solubility
- Composition (Nutrient) of farm based compost samples
- Long term effect of compost application on vegetable yield and soil quality
- Soil fertility assessment and improvement programme at Marassana vegetable growing soils.
- Formulation and evaluation of fertilizer mixtures for polytunnel crops
- Evaluation of fertilizer management practices for hybrid vegetables
- Reduction of chemical fertilizer usage by substituting compost
- Secondary and micro nutrient status of green manures
- Investigation on micro nutrient status of soils in different cropping systems in Sri Lanka

- Investigation on heavy metal status in phosphate fertilizers
- Micronutrient contents in organically and conventionally grown leafy vegetables
- Rapid plant tissue test for N, P, K analysis

Extension, Economics and Data Management

- Spatial distribution of crop area and evaluation of cropping pattern through multi-temporal remote sensing data.
- Updating and re-printing 200 technical bulletins.
- Preparation and printing of new technical bulletins.
- Coordination / conducting of awareness programmes and technology transfer activities.

STAFF LIST

Cadre Post	No.
Director (Actg.)	1
Additional Director (Actg.)	1
Deputy Director (Research)	1
Research Officer	25
Administrative Officer	2
Senior Librarian	1
Agriculture Monitoring Officer	2
Programme Assistant (Agriculture)	21
Public Management Assistant	119
Farm Clerk	9
Agricultural Instructor	49
Research Assistant	11
Research Sub Assistant	13
KKS	2
Driver	9
Tractor Operator	1
Storeman	3
Mechanist	2
Machine Operator	1
Carpenter	2
Mason	11
Welder	4
Electrician	2
Painter	1
Lawn Mover Operator/Grass Cutter	22
Land Mover Operator/Tractor	4
Water Pump Operator	1
Bee Demonstrator	1
Budder	7
Circuit Bungalow Keeper	1
Nurseryman	1
Sanitary Labourer	2
Unskilled Labourer	135
Watcher	23
Total	**360**

2.2.1 PLANT VIRUS INDEXING CENTRE (PVIC) - HOMAGAMA

The Plant Virus Indexing Centre, Homagama functions under the administration of Horticulture Crop Research & Development Institute (HORDI), Gannoruwa. The mandate of this center is application of currently used advanced technologies for plant virus and virus like organism detection, production of test kits for virus and other organism detection in the laboratory and field indexing, catering to quarantine needs, epidemiological investigations, evaluation of possible control methods, development of virus free basic foundation stocks, investigations on virus coat protein mediated resistance, and detection of other pathogenic organisms (Fungal, Bacterial, Nematodes, Viroids and Phytoplasma).

BUDGET

Allocations received and the expenditure incurred under different votes and projects are given in Table 2.2.1.1.

PROGRESS

Conventional Plant Virology

Conducted following studies during the year.

- Production of polyclonal antiserum for anthurium leaf blight caused by *Xanthomonas axonopodis pv diffenbachiae* (Xad). Sufficient antibodies have been developed during immunization of the rabb*it.*
- Development of *ELISA* protocol for locally produced Anthurium Blight *Xanthomonas axonopodis pv diffenbachae* (Xcd) antiserum. Samples received from nursery men were indexed. The test kit is highly *useful to identify diseased plants an*d production of healthy plants through vegetative means. The centre can offer this service to interested parties. Cost for sample indexing being Rs.300/=.

Table 2.2.1.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	2,907,616	2,842,508	98
Capital	1,151,518	823,842	72
Api Wawamu Rata Nagamu-Jak	225,000	80,797	36
CRI – Coconut Leaf Wilt Project	450,000	397,668	88
TOTAL	**4,734,134**	**4,144,815**	**88**

- Optimization the ELISA protocol to detect Weligama Coconut Leaf Wilt (WCLW) disease using locally produced polyclonal antiserum. This could be used for identification of diseased plants.
- Identified host range for Weligama Coconut Leaf Wilt (WCLW) phytoplasma by Enzyme Linked Immunosorbant Assey (ELISA)

  So far Heliconia, Alstonia, some palm species and Arecanut plants have shown positive results. Transportation of several plant species were restricted from affected area to other coconut growing areas based on the information.

This study will be continued.

- Detected Papaya Rings Spot Virus (PRSV) in cucurbits using locally produced PRSV antiserum. Locally produced PRSV antiserum can be used to detect PRSV in cucurbit varieties.
- Elimination of viruses in sugar cane through meristum culture. This study will be continued as a collaborative programme with the Sugarcane Research Institute, Udawalawe.
- Routine Indexing Programme by Serological methods and details of the samples tested are as follows.

Table 2.2.1.2: Samples tested under routine indexing programme

Crop	Disease	No. of samples tested
Anthurium	Leaf blight	140
Banana	Streak virus	50
	Bunchy top virus	180
Chilli	Cucumber mosaic virus	10
Coconut	Weligama coconut leaf wilt phytoplasma	360
Weed	Weligama coconut leaf wilt phytoplasma	190
Citrus	Citrus greening bacteria	12
	Tristeza virus	12
Cucurbit	Papaya ring spot virus	50
	Cucumber mosaic virus	20
Kiri ala	Dasheen mosaic virus	20
Papaya	Ring spot virus	260
Pineapple	Wilt mottle virus	135
Passion fruit	Passion fruit virus	06
Potato	Leaf roll virus	108
	Potato virus Y	85
	Potato virus X	248
Sugar cane	Mosaic virus	31
	Poty group & banana streak virus	31

Molecular Virology

Conducted following studies during the year.

- Detection of potato virus Y (PVY) by Reverse Transcription Polymerase Chain Reaction (RT-PCR).

  Detected Potato Virus Y in 19 out of 30 samples tested.
- Detection of potato leaf roll virus (PLRV) by Reverse Transcription Polymerase Chain Reaction (RT-PCR).

  Detected Leaf Roll virus was in several samples.
- Detection of potato virus X (PVX) by reverse transcription Polymerase chain reaction (RT-PCR).

  Collected samples with PVX disease symptoms from Badulla, Sita Eliya, Nuwara Eliya, Bandarawela and Welimada in Uva Province of Sri Lanka. Potato Virus X was not detected in any of the potato samples. The implementation of the condition optimization and system development is in progress.
- Host range study of coconut leaf wilt phytoplasma disease through Polymerase Chain Reaction (PCR) based methodology.

  PCR method could be successfully used for the detection of host range of coconut leaf wilt disease. This study will be continued by using specific primers for Weligama coconut wilt phytoplasma. Gene sequencing will be done for further confirmation.
- Routine Virus Indexing Programe by DNA based technology

  This technology could be used to promote virus free planting material production especially in private sector organizations and for quarantine purposes.

Tissue Culture Division

- Identification of suitable protocol for micro-propagation of banana variety 'Kolikuttu'

  Experiments will be repeated for confirmation of results.

  Propagation of mandarin variety " Indu"by shoot tip micro grafting

  A difficulty aroused in differentiating shoots emerging from the graft and the root stock. This study will be continued.
- Protocol development for anthurium through micro-propagation

  All cultures are still in the initiation medium for callus formation. This study will be continued.
- Marian Gold 3 (MG_3) Pineapple Micropropagation

  MG_3 cultivar could be successfully in-vitro cultured by using leaf parts. However, field evaluation need to be done to study its growth and yield performance. This study will be continued.
- Development of a suitable protocol for Papaya through micro propagation

  A possibility exists for the propagation mature papaya trees by using the tissue culture technique. This study will be continued.

- Production of banana varieties through micro-propagation

  Produced following banana varieties using standard tissue culture techniques and distributed.

Table 2.2.1.3: Production of banana varieties through micro-propagation

Variety	No. of plants produced	No. of plants distributed among farmers
Embon	1,200	558
Angaviyaru	400	285
Nethrampalam	380	160
Embul	78	58
Total	**2,058**	**1,055**

Virus Epidemiology

- Control of Papaya ring spot virus (PRSV) in papaya by mixed cropping with ginger and the application of neem oil.

  It was found that, 02 plants from neem oil application treatment, 01 plant from mixed cropping with ginger treatment and 02 plants from the control treatment were positive for PRSV. Visual observations confirmed the ELISA test results. As a possibility exists for papaya to be infected with PRSV from field planting to fruiting stage, observations and ELISA testing is being continued up to fruiting stage.

- Virus disease control in pumpkin using non chemical methods (collaborative study with RARC – Makandura)

  Pumpkin vines are still one month old and no visual symptoms were observed through any of the treatments. Observations will be continued during the next season.

- Field evaluation of heat treated pineapple

  All the plants were free from the virus up to a duration of 10 months after field planting.

- Monitoring virus titer and growth and yield performance of MG3 pineapple

  MG3 Kew cultivar is suitable for local conditions with regard to growth characters and fruit quality thuscan be successfully used for commercial cultivation.

Other Pathogenic Organisms

- Development of control measures to manage *Cercospora* leaf spot (*Cercospora spp)* in Thampala by using herbal extracts

  Out of three herbal extracts tested (turmeric, Garlic, chilli) Garlic was found to be the best through in-vitro tests. The plate test should be repeated to confirm the results. Field experiment will be done subsequently.

- Control of Antracnose (*Colletotrichum* spp) in Capsicum by using herbal extracts

  Out of four herbal extracts tested (turmeric, Garlic, Neem oil, Neem seed extract) turmeric was found to be the best through in-vitro tests. The plate test should be repeated to confirm the

- Development of a suitable control measure for Panama disease (*Fusariun oxysporum)* in banana

  Results revealed that *Trichoderma* is the most effective biological agent. Plate test should be repeated to confirm the results. Field trials will be conducted for both organic and inorganic materials.

- Testing of tree injectors for control of pest and disease in agriculture crops

  Chlorpyrifos injected to 'Ehela' tree infested with Shoot borer resulted in a significant control and Glyphosate responded effectively to remove unsuited Hora, Kottamba and Kaduru trees. Study will be repeated with Xylem mobile systemic fungicides.

- Routine Disease Diagnose Programme

  Diagnosed more than 168 disease samples and delivered effective IPM based solution to farmers.

Technology Transfer

- Training classes

  Conducted 10 farmer training classes (No. of beneficiaries - 143)

  Trained 36 A/L teachers in the subject of Agriculture (N.I.E).

- Conducted special training under 'Api wawamu Rata Nagamu' for the jak development programme in Kurunegala District
- Conducted 12 awareness programmes for 1,106 officers, 09 jak processing training programmes for 360 participants and 01 programme on the production of budded jak plants for 70 beneficiaries.

- Successfully completed the Agriculture Model Village and cluster demonstration programmes with a duration of 150 days. The community based seed and planting materials production programme is in progress.

- Conducted 6 demonstration classes on urban agriculture methods upon the request of Private Sector Organizations.

- Conducted 05 Farmer Crop Clinics at Padukka, Malabe, Kahathuduwa, Kosgama and Habarakada Agraraian Service Centers.

- Conducted a training course on plant virology to undergraduates of the Department of Microbiology, Department of Botany, University of Kelaniya and demonstrations were undertaken for students and undergraduate from the University of Ruhuna and University of Wayamba.

- Published 6 newspaper articles

Training

- Mrs. S. R. Amarasinghe, Programming Assistant was selected and followed a PhD programme on Irrigation under the open scholarship sponsored by Japanese government in 2008.

- Mr. L.D.K.Arachchige, Agriculture Instructor was selected to follow B.Sc. in Agriculture at University of Sabaragamuwa a scholarship granted from the Department 2009.

Collaborative studies

Initiated the collaborative research program with Coconut Research Institute, Lunuwila for the identification of alternative hosts of Coconut Leaf Wilt Disease and disease diagnosis and Sugar Cane Research Institute in Udawalawe.

Undergraduate research Projects

Center has offered four undergraduate projects to the Universities of Wayamba, Sri Jayawardenapura, Kelaniya. Completed 03 under graduates on Industrial Training.

PLAN FOR 2011

Conventional Plant Virology

- Detection of phytoplasma diseases in agricultural crops except for coconut using locally produced Weligama Coconut Leaf Wilt antiserum
- Production of polyclonal antiserum for Cucumber Green Mottle Mosaic Virus
- Host range study for Coconut Leaf Wilt Disease by Serological Methods
- Optimization the antigen source for early detection of Weligama Coconut Leaf Wilt disease
- Ascertain the efficacy of locally produced anthurium blight antiserum
- Routine virus indexing by serology

Molecular Virology

- Detection of Potato virus X (PVX), Potato virus Y(PVY) and Potato Leaf Roll Virus (PLRV) in cultivations by RT-PCR with specific primers.
- Testing of already detected viruses by PCR and confirmation by gene sequence.
- Study on range of host Coconut leaf wilt disease by PCR based methods
- Identification of virus and viroid diseases in papaya and develop sensitive detection techniques.
- Detection of virus and viroid diseases in citrus cultivars by Reverse Transcription Polymerase Chain Reaction (RT-PCR) and develop multiplex RT-PCR
- Routine virus indexing through PCR methodology.

Tissue Culture

- Production of tissue cultured banana and Pineapple.
- Multiplication of papaya using tissue culture methods
- Semi micro grafting of Mandarin Variety ”Indu”
- Field evaluation of tissue cultured MG3 pineapple for growth and yield performances
- Micro propagation of Anthurium

Virus Epidemiology

- Conformation of potential vectors of ‘Papaya Ring Spot’ Virus
- Field evaluation of heat treated tissue cultured pineapple and monitoring pineapple wilt virus diseases
- Continuation of heat treatment for the elimination of ‘dasheen mosaic’ virus in Kiriala and other aroids

- Management of 'Papaya Ring Spot' virus by Mix cropping with ginger and herbal spray treatments.
- Management of virus disease on pumpkin using non chemical methods (collaborative study with RARC- Makandura)
- Field evaluation of newly released papaya variety for virus diseases
- Management of cucurbit viruses by non chemical methods.

Other Pathogenic Organisms

- Control of *Anthracnose* in Capsicum and *Cercospora* in Thampala by using herbal extract
- Development of a suitable control measures for Panama disease in banana by using non chemical methods
- Testing tree injectors for the control of pest and diseases
- Identification of other pathogens in agricultural crops collected from farmers and providing instructions to control the pathogens.
- Testing of locally produced ELISA kit to detect Bacterial Wilt disease in Anthurium
- Testing of pathogenicity and conformation by Kock's postulate for selected fungal and bacterial diseases

Technology Transfer

- Awareness and training programmes to be conducted

  Training for officers - 12 classes

  Training for farmer and farmer organizations– 06

  Training for school students – 06

  Training for others - 04 classes

- Field visits (cultivations and home gardens) - 150
- Farmers' case handling in office - 300
- Newspaper articles to be published - 12
- Leaflets to be published – 06
- Urban Agriculture Model Programme -01
- Special programmes - Model Village Demonstration Programme

  - Community based seed and Planting Material Production Programme

STAFF LIST

Cadre Post	**No.**
Research Officer	03
Programme Assistant	09
Agricultural Monitoring Officer	05
Agricultural Instructor	10
Research Assistant	03
Public Management Assistant	03
Driver	02
Labourer	04
Labourer (Contract)	11
Storeman	01
Watcher	02
Total	**53**

2.2.2 FRUIT CROP RESEARCH & DEVELOPMENT CENTRE (FCRDC) – HORANA

The Fruit Crop Research and Development Centre (FCRDC) is located in the Low Country Wet Zone with the mandate to develop appropriate technology for enhancing the productivity of fruit crops in the country. The present research programmes of the centre focus a special emphasis on the crops grown in Low Country Wet Zone (LCWZ) and are intended on relevant aspects, particularly on the development of high yielding good quality fruit crop varieties, improved crop management practices, crop protection, plant nutrition, organic fruit culture and planting material production. The Centre also works on research and development activities on vegetables adaptable to Low Country Wet Zone in fulfilling the needs of the farmers in the region.

BUDGET

Annual allocation and expenditure under different votes are given in Table 2.2.2.1.

Table 2.2.2.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	1,610,000	1,648,596	102
Recurrent	6,924,234	5,985,118	86
Projects			89
SL-USDA Corporative Germplasm Development Programme	380,000	339,624	
Production & Usage of Organic Fertilizer	1,740,000	761,807	44
One Crop One Village Programme	391,000	104,876	27
Fruit Crop Leader Programme - Mangosteen	165,000	157,340	95
Papaya	162,000	91,502	56
Citrus	90,000	107,860	120
Jack	90,000	92,355	103
Banana	15,000	10,000	67
Total	**11,567,234**	**9,299,078**	**80**

PROGRESS

CROP IMPROVEMENT

Banana Germplasm Evaluation

Tested three identified accessions of Suwandel in farmers' fields in the region and HOSU3 was recommended as "Millewa Suwandel" for LCWZ based on yield, growth performance and consumer preference.

Varietal development in Passion fruit

Seven promising accessions selected from nine populations are being evaluated in replicated trial to develop a synthetic cultivar.

Development of hybrids of Papaya

Developed four hybrids of papaya using locally developed two inbred lines including the variety Rathna and further evaluation will be carried out to confirm the stability and adaptability.

Development of hybrids of Mango

Seven hybrids were produced in 2009 and established in the field with their parents for evaluation. Hybridization programme will be continued to develop more hybrids in the future.

Rambutan

Nine accessions selected from existing seedling population at farmer fields are being evaluated for growth and fruit characters. Most of them showed similar growth however, some differences were observed in leaf characters. According to the fruit characters, two accessions were found to be outstanding in taste compared to others. Planted 36 plants of 'Malwana special' at three different plant densities and two different branching heights. No significant difference has been observed with regard to plant characteristics and yield. Evaluation is being continued.

Conservation and varietal improvement of mango

Ten exotic mango varieties (Carrie, Early gold, Irwin, Joe Welch, Kent, Mulgoa, NamDoc Mai, Pope summer, Sensation, Zill) and local selections were established in cement pots since September 2004 for conservation. First generation plant in the 'field gene bank' collected from Divulapitiya was large in size with good quality. Poor yield of the rest of the cultivars is mainly due to the insufficient size of the cement pots and dense canopy of the plants. It is very important to shift the plants to an alternative location suitable.

Selection of Promising Varieties of Durian

A total of 48 durian (*Durio zebethinus*) accessions collected from different areas in Sri Lanka and two Thailand accessions are being evaluated and 4 most promising accessions among them have been identified.

Eight hundred F_1 Hybrids developed through crossing of selected accessions are being evaluated in FCRDC fields.

Variety Development of Citrus Spp.

At present 27 mandarin (*Citrus reticulata*) 11 heen naran (*Citrus crenatifolia*) and 09 pumelo (*Citrus grandis*) accessions are being evaluated. Three promising mandarin accessions (Hocr 19, Hocr 25 and Hocr 23) and eight exotic citrus varieties received from Japan in 2007, under Ehime/Sri Lanka Agricultural exchange programme were planted and being evaluated at eight locations representing different agro ecological zones for

appropriate consideration of the proposal made by Ehime.

A total of 350 grafted plants of variety Indu were produced and distributed among farmers. Fifteen mother plants were released to farms for planting material production.

Mutation breeding programme was started in 2007 with highly adaptable high yielding citrus spp viz. Nasnaran and HOCR 24 to improve fruit quality characters with nominal seeds. Six hundred bud woods and 300 seeds from each variety irradiated by gamma rays are being evaluated and a few desirable mutants were identified for further evaluation.

F_1 hybrids of mandarin are being evaluated at FCRDC.

Germplasm collection, Conservation, Characterization and Evaluation of under utilized fruit crops

Already 303 accessions have been established in the field gene bank in an area of 3.73 ha. since 2002 These gene banks comprises of 24 accessions of Beli, 47 accessions of citrus. 05 accessions of Lavulu, 04 accessions of Lovi, 32 accessions of Jak, 17 accessions of Weralu, 22 accessions of Uguressa, 33 accessions of Goraka, 13 accessions of Gaduguda, 35 accessions of Durian, 17 accessions of Sapota, 14 accessions of Anona, 26 accessions of Wax apple, 07 accessions of Strawberry guava, 07 accessions of Wild guava, Characterization and Evaluation is being continued to identify promising varieties for recommendation.

Sapodilla (*Manilkara zapota*)

Of 17 accessions planted . The plant growth is very slow and accession No.s HoS 6, HoS14, HoS15, HoS 16 and 18 HoS 19 have grown more vigorously than the others. HoS 2, HoS 12 and 13 showed superior qualities with respect to yield, quality, fruit size and shape. Significant variations were observed among the mother plants as well as in the first generation.

Weralu (*Elaeocarpus serratus*)

Accessions collected from Kalutara, Gampaha, Galle and Ratnapura Districts were grafted and three plants form each accession were established in the field gene bank and evaluation is in progress. The cultivar No.s HoW 3, 5, 7, 8, 9 and 13 are promising and recommended for release.

Jackfruit (*Artocarpus heterophylls*)

Collected and propagated promising germplasm of jackfruit established in the field gene bank with 8 plants of accessions. Out of 31 accessions, HoJ 2 HoJ 3 and HoJ 20 bear more fruits and observed significant variations in fruit size, shape and colour.

CROP PROTECTION

Investigations on root knot nematodes in guava (*Psidium guajava*)

The causal agent for the serious damage in guava observed at FCRDC Horana was identified as a root knot nematode, belonging to Genus *Meloidogyne*, which has been recorded as the most problematic and wide spread plant parasitic nematode among various crops in the world.

Introduction of bio-pesticides for controlling powdery mildew of rambutan

Bavistin and Bullet containing Carbendazim as the active ingredient controlled the disease during heavy rains. During dry weather Folicur, Eraser, Bavistin, Champian, Bullet, Mancozeb, Sulphur and Daconil fungicides controlled the powdery mildew and increased the number of healthy fruits. Plant extracts were ineffective in controlling powdery mildew as contact fungicides (Sulphur, Chlorothalonil, Copper and Mancozeb) during heavy rains, although Neem oil and Citronella oil moderately increased healthy fruit production. In dry weather, the application of Neem oil and Citronella oil produced the highest yield of healthy rambutan than that of the Sulphur treatment.

New diseases recorded in dragon fruit

Two fungal diseases, Anthracnose and powdery mildew caused by *Colletotrichum gloesporioides* and *Oidium spp.* were recorded in dragon fruit. Anthracnose was characterized with reddish brown lesions and chlorotic haloe symptoms on stem and fruit. Powdery mildew was characterized with whitish spots on phylloidy. Only one bacterial disease caused by *Xanthomonas campestris* was recorded.

SOIL NUTRIENT MANAGEMENT

Internal hardiness of citrus

Internal hardiness of citrus results in cork formation of the pulp and low juice content. This condition is suspected to be due to deficiency of boron. It was observed that only some varieties were susceptible to the problem. Foliar application of 0.25% borax solution once just before flowering and two times after flowering at one moth intervals could be used to minimize the hardiness of citrus.

Stem bulging of passion fruit

Stem bulging is the swelling and cracking of vines of passion fruit which causes weakening and the death of the vine beyond the affected area. Purple stemmed varieties tolerate the condition up to some extent and foliar spray of borax reduced the problem. Also, the affected fields were very low in calcium and studies are being continued.

CROP MANAGEMENT

Mangosteen - Evaluation of double root-stocked grafts for yield performance

Low expansion of mangosteen (*Garcinia mangostana*) crop is primarily due to its slow growth rate. Introduction of conventional vegetative propagation techniques using a single root-stock proved to be successful to some extent. Double root stocked grafts were carried out with the objective of enhancing the vegetative growth rate and thereby increasing productivity. The technique was successful and plants were well grown and produced fruits at the 3rd year with a mean yield of 96 fruits per graft at the age of 5 years.

Guava - Productivity improvement of guava varieties (Pubudu, Horana red, Horana white) (*Psidium guajava*) through pruning

Shoot pruning following harvest, resulted in early formation of increased flower buds with satisfactory fruit retention.

Significant varietal responses were shown in mean fruit weight of pruned trees with a

significant increase in fruit weight over the unpruned control in all three varieties. Out of three varieties evaluated, "Pubudu" responded well to canopy management, yielding 14 and 16 t/ha during 2nd and 3rd years respectively. As such, productivity of guava could be enhanced by shoot pruning of 15-30 cm from the apex following harvest.

Performance of Dragon fruit at Horana

The 4th harvest of Dragon fruit was recorded from May to September 2009 with peak harvests obtained in July. Average yield per plant was 12.07kg during this season. Number of fruits per plant varied from 06 to 50. Weight of harvested fruits ranged from 110g to 835g and the yield of vines ranged from 3kg to 20kg.

FRUIT DEVELOPMENT ACTIVITIES

Production of planting materials

The centre sold 14,139 budded plants, 1,344 grafted plants and 589 seedlings plants of rambutan, mango, durian, jak, avocado, star fruit, sapodilla, garcenia, lime, mangosteen, jambu, lovi, annona, guava, orange, beli, weralu, mandarin, passion fruit, strawberry guava etc. and earned Rs. 2,516,865.00 as gross profit.

Tissue Culture

Seeni kesel, Netrappalam, Embon and Kolikuttu banana planting material production programme through Tissue culture was initiated. Multiplication rate was high in Seeni kesel and Netrappalam while it was low in Kolikuttu. Totally, 563 plantlets were produced up to November 2010 and around 3000 plantlets are in multiplication stage.

Development and maintenance of established home garden

4359 farmers, school teachers, students and Agriculture extension officers visited the established home garden.

Training programmes

Following training programmes were conducted in 2010.

- 3759 school children & teachers from 41 schools visited the Centre.
- Conducted three training programmes for 145 university students & Lecturers.
- Conducted six special training programmes for 135 Navy/Army personnel
- Conducted 10 programmes on fruit cultivation & home garden for 320 trainees.
- Conducted 5 training programmes on high quality compost production & dstributed microorganism rich compost packets, mangosteen & banana plants in Dambara, Handupelpola, Kumbuka, Halapitiya & Godigamuwa (394 beneficiaries) under model village programme.
- Participated in 02 exhibitions at Polonnaruwa & Kalutara.
- 3986 advisory leaflets were distributed among farmers.

Farmer Advisory programmes

75 disease samples received from farmers and extension officers were examined and pathogens were cultured in the laboratory to Identify the diseases and recommendations were provided for their control.

- 95 field problems submitted by farmers pertaining to pests and diseases of dragon fruit, durian, rambutan, pineapple and vegetable cultivations were attended to during the year and control measures were given.

Mass Media

Officers participated in 05 TV Programmes (Mangosteen, Guava, Durian, Mandarin and Compost production) and 05 Radio programmes on fruit crop cultivation, pests & diseases. A total of 7 newspaper articles were published.

OTHER

Overseas/local training

- S. M. Nagahawatta – M.Sc. programme on Biotechnology (2008/2010) Allahabad Agricultural Institute, Allahabad, UP, India.
- C. K. D. Wellala – Planning & Promotion of Food & Agro Enterprises (2010/2011) National Institute of Micro Small & Medium Enterprises, India.
- U. N. de Silva – Training on Tissue Culture organized by the Postgraduate Institute of Science

PLAN FOR 2011

Crop Improvement

- Development of high yielding, good quality banana and avocado varieties through collection, evaluation and selection of germplasm
- Collection of mango germplasm in WZ and IZ and selection of good quality Gira amba and Petti amba for cultivation in LCWZ
- Development of high yielding good quality mango varieties through hybridization
- Evaluation of F_1 hybrids
- Development of high yielding, good quality passion fruit, orange and mandarin varieties through selection and hybridization
- Development of high yielding, good quality citrus (Orange, mandarin and pumello) varieties through selection
- Development of high yielding, good quality orange and nasnaran varieties through mutation breeding
- Germplasm collection, characterization and evaluation of Weralu, gaduguda, jak fruit and sapota
- Exploration, collection and establishment of beli
- Evaluation, characterization and selection of beli germplasm
- Exploration, of unexploited fruit crops
- Collection, conservation and evaluation of lavulu and lovi germplasm
- Germplasm collection, conservation and evaluation of wax apple, strawberry guava, annona spp. and wild guava
- Germplasm collection, conservation and evaluation of Goraka and Uguressa
- Selection of rambutan varieties from existing seedling population at farmer fields
- Characterization, evaluation and clustering of existing rambutan population FCRDC
- Selection of promising durian varieties for commercial cultivation
- Development of high yielding good quality durian F_1 hybrids
- Development of hybrid varieties of okra with desirable characters suitable to the LCWZ

- Development of Weraniya chili variety

Crop Management

- Micro propagation of recommended banana cultivars
- Control of stem bulging of passion fruit through vine management.
- Evaluation of exotic orange and mandarin varieties introduced from Japan
- Development of package for virus free citrus (Orange & mandarin mother plants)
- Testing of different crop establishment and tree management methods for citrus
- NCVT for citrus
- Growth enhancement in mangosteen grafts and seedlings through provision of additional root system
- Evaluation of compatible root-stock against nematode infestation in guava.
- Productivity improvement in sour-sop through development of a suitable training and pruning system
- Studies on various vegetative propagation methods for lovi
- Effect of the number of cuttings and cutting size on yield and quality of dragon fruit
- Effect of plant density and pruning height on growth and yield of rambutan
- Development of a crop management package for grafted durian cultivation
- Crop management studies on elabatu (Thelumbatu)

Plant Nutrition and Organic Fruit Production

- Integrated effect of chemical fertilizer with compost on yield and quality of pineapple, passion fruit, mangosteen and guava
- Use of nutrients other than NPK on stem bulging of passion fruit
- Effect of nutrients other than NPK on gumboge disorder of mangosteen
- Studies on bumpy fruit disorder of guava
- Quality improvement of fruit waste compost using saw dust and Eppawala Rock Phosphate (ERP)
- Testing of effect of different organic material for vermi composting and vermiculture
- Development of organic fertilizer package for passion fruit and dragon fruit
- Development of a soil management information system for rambutan/ pineapple cropping systems in the Gampaha District.

Plant Pathology

- Control of post harvest fungal diseases of banana and papaya
- Control of *Fusarium* wilt of passion fruit through fungicides and biological agents
- Management package to control citrus die-back disease
- Disease management package for Avocado cultivation

- Identification of disease causal agents of under-utilized fruit crops
- Management package to control nursery diseases of Rambutan
- Development of *Trichoderma* cultures to control root rot disease of durian

Entomology

- Evaluation of botanical extractions against sucking insects in pineapple
- Screening of chemicals against leaf miner
- Evaluation of plant parasitic nematodes in guava
- Identification of insects and their damage assessment in Uguressa, Weralu and Gaduguda

Tissue Culture

- Micro propagation of Banana
- Embryo rescue of Mango

Pre & Post-harvest

- Evaluation of pre and post harvest treatments on shelf-life of four varieties of guava

Socio Economics

- Preparation of INFORM Report -2011 for FCRDC
- Development of database on socio-economic information of fruit crops

Development Programme

- Development and maintenance of a home garden and training farmers and educating school children about home gardening

STAFF LIST

Cadre Post	No.
Additional Director (Act.)	01
Research Officer	11
Economic Assistant	01
Programme Assistant	06
Development Assistant	02
Agriculture Research & Productivity Officer	01
Research Assistant	08
Agricultural Instructor	15
Public Management Assistants' Service	07
Drivers	03
Storeman	01
Tractor Operator	01
Watcher	01
Budder	01
Permanent Labourers	03
Labourers (Contract)	63
TOTAL	**125**

2.2.3 FOOD RESEARCH UNIT (FRU) – GANNORUWA

The major tasks entrusted to this unit include research on post harvest technology, product development and quality evaluation of samples derived from crop improvement programmes and conducting technology transfer activities. The FRU also conducts collaborative programmes with other crop research institutes of the DOA, the Provincial agricultural system, other government and non government organizations and the private sector on technology development and transfer. In addition, the unit provides necessary facilities for and guidance for undergraduate and postgraduate students to conduct their research on diverse aspects of post harvest and processing technologies.

BUDGET

The annual allocation and expenditure under different votes are given in Table 2.2.3.1.

Table 2.2.3.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	218,200	108,954	50
Recurrent	1,585,364	1,268,307	80
Projects	250,000	210,599	84
Processing & preservation of root & tuber crops (AWRN)			
Crop leader - Mango (AWRN)	501,000	228,319	46
Processing of jak fruit (AWRN)	125,000	121,125	97
Processing of tomato (AWRN)	44,000	40,879	93
Establishment of a fruit processing factory to enhance farmer income	3,600,000	255,664	7
Bottling of Rambutan (AWRN)	45,000	44,486	99
TOTAL	**6,368,564**	**2,278,333**	**36**

PROGRESS

RESEARCH

- Post harvest diseases of papaya is a serious problem and post harvest chemical application is often practiced which results in high fungicide residues. Field sanitation together with post harvest fungicide application at monthly intervals and harvesting fruits (Red Lady) at 25 – 30 % peel yellow colour stage and transporting individually wrapped fruits in plastic crates significantly reduced fungal spoilage. This technology was transferred to papaya growers.
- Excellent quality bagging (bags imported from Thailand) was done for TomEJC mango. No physico-chemical parameters were changed with bagging.
- A healthy dessert was prepared using kithul flour and wood apple. The product had a shelf life of more than 14 days under refrigerated storage.
- Anti glycemic factor of bitter gourd was found to be reduced when they were boiled for softness and it was further reduced during deep frying. Hence, bitter gourd has to be consumed in raw form for maximum anti glycemic effect.
- A less bitter paste was developed by incorporating 40 % tomato paste with 60 % of bitter gourd paste to reduce bitterness of the product.
- Osmotically dehydrated pumpkin chips which could be utilized in bakery and confectionery industries were developed.
- Technology to remove bitterness development in stored jak fruit flour was perfected and released at the Technology Release Committee in 2010.
- Use of plastic crates to minimize physical damages during transportation and handling of Cassava and to optimize storage life.

DEVELOPMENT ACTIVITIES

- Project on ‘Improving farmer income through establishment of a processing factory’ funded by the Korean Government was initiated at Rajarata Farm, Galkiriyagama. A small scale processing plant for training purposes to be established at Kundasale.
- Produced 500 budded plants under the Crop Leader programme and 100 ac of mango orchards were rehabilitated.
- Extruded product named ‘Rasaposha’ was manufactured. Technology will be given to Ceylon Biscuits Ltd.
- Technology of soup mixture developed using the extruder will be given to Ruhunu Food Products
- Trained 11 undergraduates from the Universities of Peradeniya, Sabaragamuwa, Uva Wellassa and Jayawardenapura on completion of their 3-4 month assignments at FRU
- Three students from the Postgraduate Institute of Agriculture completed the research related to their thesis
- Trained 5 Diploma students from Agricultural Schools of Kundasale and Aquinas College.

TECHNOLOGY TRANSFER

- Small scale processing technologies for tomato, root & tuber crops and jak fruit were disseminated through training 124, 518 and 414 individuals respectively.
- About 50 individuals were trained on minimal processing of vegetables using the medium scale processor at Kinduri Products, Wattala.
- Technology for snack production with cheese, spices and sugar using medium scale coated peanut processor was introduced to Koke Snacks, Kalubowila, Dehiwala
- Facilities at FRU were provided to private sector for preparation of drum dried 'Kola kenda' mixtures.
- Technology for preparation of fruit juices, cordials and ready to serve beverages was given to Mist Fruit Products.
- Technology for preparation of rice based food products was given to Wijewardhana Bakers, Makola, Kiribathgoda
- Laboratory facilities were provided for quality analysis of several samples of ready-to-serve beverages, chutneys, cordials, jams, dehydrated vegetables, pastes, bites and French fries received from the private sector.
- Thirty five reports were circulated for fresh products on breeders' requests
- Fifty five reports were released for processed products
- Two training programmes sponsored by the Agricultural Entrepreneurship Development & Information Service (AGEDIS) on fruit and vegetable processing and rice based products were conducted with the private sector participation
- Training programmes on post harvest technology of fruits and vegetables were conducted for 32 private sector organizations, teachers, Agricultural Instructors, Diploma and University students
- 25 training programmes were conducted on rice based products and processing of fruits, vegetables and milk based products
- Leaflets were prepared on Processing of high quality treacle and jaggery and preservation of pumpkin through dehydration
- Five articles on Value addition of Cassava, Pumpkin based food products, Technology to remove bitterness development in stored jak fruit, products of mung bean sprouts and Nutrient enriched bakery products were published in 'Saubhagya', Agricultural News and 'Karmantha' magazines

PLAN FOR 2011

- Control of diseases of mango through improving Potassium level
- Control of post harvest diseases and improving quality of papaya through pre harvest management practices
- Determination of antioxidant activities of jak fruit and Weralu
- Product development of Chilli (Jalapeno)
- Development of ready to serve Mangosteen juice

- Development of cake mixture from rice flour
- Development of rice- wheat pre-mixed flour
- Preservation techniques of Ginger
- Improving quality of pineapple and reducing internal browning through balanced NPK application
- Development of pre-harvest management practices for tissue cultured banana to improve its post harvest quality

STAFF LIST

Cadre post	**No.**
Research Officer	03
Agricultural Monitoring Officer	03
Programme Assistant	01
Public Management Assistant	02
Agricultural Instructor	04
Research Assistant	02
Research Sub Assistant	02
Driver	02
Machine Operator	01
Electrician	01
Sanitary Labourer	01
Unskilled Labourer	04
Labourer(Contract)	06
Watcher	02
Total	**28**

2.2.4 REGIONAL AGRICULTURAL RESEARCH AND DEVELOPMENT CENTRE (RARDC) – BANDARAWELA

The RARDC, Bandarawela located 1400 above mean sea level, is the main centre responsible for development of appropriate technologies to enhance the yield and quality of agricultural commodities cultivated in the Uva region and Balangoda segment of Sabaragamuwa Province. It has two satellite stations at Rahangala and Maduruketiya and experimental farms at Bibile and Muthukandiya. Its mandated area covers agro ecological regions of IU_2, IM_2, IM_3, WM_3, IL_2, and WM_3. In addition to the research activities, the centre conducted many agricultural development programmes such as production and distribution of high quality planting materials of Pear, Citrus, Avocado, Mango and Potato. The main target of these programmes are to establish production zones for the relevant crops.

BUDGET

The annual financial allocation and expenditure under different votes are as follows.

Table 2.2.4.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	7,229,561	1,287,812	18
Recurrent	5,183,366	4,919,826	95
Projects			
Crop leader - Bean	500,000	428,614	86
Crop Leader - Potato	240,000	200,254	83
Crop Leader - Citrus	270,000	205,343	76
Organic Fertilizer	2,620,000	2,159,159	82
One crop-one village	590,000	479,912	81
Hybrid seed production	25,000	16,760	67
Total	**16,657,972**	**9,697,680**	**58**

PROGRESS

Research and development activities carried out were focused on vegetables (Bean, Carrot, Cabbage, Tomato), Potato, sub tropical and temperate fruit crops (Sweet orange, Mandarin, Apple, Pears, Peaches, Strawberry) and floricultural crops (Roses, Gerbera, Chrysanthemum, Anthurium, Aster, Madonna lily, Carnation, Super daisy) in five main disciplines such as Crop improvement, Agronomy, Plant protection, Horticulture and Tissue culture.

CROP IMPROVEMENT

- Seed producing carrot variety "Lanka carrot" was released for commercial cultivation.
- Bean varietal improvement programme was continued and out of 24 bean lines evaluated, 3 pole bean and 6 bush bean lines were selected for NCVT.
- NCVT for capsicum, brinjal, and tomato, were conducted.
- Local and Japanese orange and mandarin varieties were evaluated at RARDC, Bandarawela, ARS Moneragala and ARS Rahangala.
- Mother plants of temperate fruit crops viz; Apple, Peach, Pear, Chinese guava, Nectarine, Avocado and Carombola etc. are maintained at RARDC research field.

AGRONOMY

- Intercropping potato with maize produced a high seed potato yield. Establishing maize at the same time or two weeks before potato planting provides this advantage.
- The suitable spacing for cultivation of capsicum in UCIZ was identified as 10 x 30 cm.

PLANT PROTECTION

- A new fungicide recommendation has been developed for the control of late blight (*Phytophthora infestans*) in tomato. The new recommendation Fluazinam (Tizca®) showed better performances than recommended chemical Mancozeb.
- Two concentrations of Azoxystrobin were screened against *Uromyces appendiculatus*. The test product showed equal performances with recommended contact fungicide Chlorothalonil.
- Tested Tebuconazole EC and EW formulations significantly reduced severity of bean rust compared to farmer managed conditions and the recommended protective fungicide Chlorothalonil. Significant increase in yield was observed with both formulations.
- Imidachloprid (20% SL), Abamectin (1.8 g/l EC) and Fipronil (5% SL) are equally suitable for management of thrips in capsicum when used as a foliar spray at 14 days intervals. The efficacy of these products has no differences in pest management with regard to their country of origin.
- Nimbecidine 1% EC at the rate of 20 ml/10L provide similar results as Chlorfluazuron in pest control and yield gain. It was superior to neem seed kernel extract; since as a readymade product, farmers have no difficulty in using Nimbecidine.

  Bistrifluron 10% EC is successful against cabbage caterpillar complex. The chemical is capable of reducing the damage caused by three important cabbage caterpillars, ultimately increasing head weigh and final yield.

$CaCl_2$. Pressure infiltration (250 mmHg for 120 min) at the concentration of 4% to 6% delayed the ripening process of avocado.

TISSUE CULTURE

- MS medium supplemented with 0.5 mg/L BAP and 0.75 mg/L NAA is suitable for callus formation of leaf discs explants of strawberry variety Chandler. Maximum shoot regeneration of the same variety was observed in MS supplemented with 0.1 mg/L TDZ.

SPECIAL PROJECTS

Crop Leader Project

- Production of high quality seed potato through tissue culture techniques has been continued.

One crop-one village programme

- Budded pear (400) and orange (500) plants were produced under this programme in 2010. A pear orchard of 600 plants was established at RARDC, Bandarawela.

Production and use of organic fertilizer

- Development of IPNS package was initiated for citrus, tomato and bean. A ½ acre IPNS demonstration site was established for vegetables. Compost production was continued and 17.5 tonnes produced.

SERVICES

Breeder seed production

- Certified breeder seeds of Pole bean varieties Keppetipola nil (117 kg), Lanka butter (190 kg) and KWG (65 kg) and Bush bean varieties (14.5 kg) were produced.

Soil test based fertilizer recommendation programme

- More than one hundred and ninety soil samples were tested and site specific fertilizer recommendations were released accordingly.

TECHNOLOGY TRANSFER

Officers of the RARDC participated in 04 PTWG meetings held in Uva and Sabaragamuwa Provinces. They provided technical training to extension officers under pre-seasonal training programmes.

- Conducted several training programmes for farmers on cultivation of potato, pear and avocado. Some of the trainings were held at farmer fields.
- Provided advices for pests and diseases management to farmers cultivating vegetables, fruits, flower crops and potato.
- Conducted training programmes for 958 school students and 117 farmers.
- One University student completed her final year project and one Diploma holder completed her practical training project at RARDC, Bandarawela.
- Under the programme of development of home garden and promotion of agriculture production and utilization, more than 500 home gardens were visited and farmer awareness meetings and student awareness programmes with field days were held successfully.

Seminar programme

Officers of the RARDC conducted 05 seminars based on new research findings during the year.

PLAN FOR 2011

Vegetables

- NCVT of selected bush bean (11) and pole bean (3) lines.
- NCVT on Tomato, Capsicum and Brinjal.
- Studies on organically acceptable growth media for bell pepper in polytunnels.
- Effect of different foliar fertilizers on cultivation of cabbage under organic farming.
- Evaluation of different densities for cultivation of "Lanka carrot".

Seed Production

- Breeder seed production of bean (Keppetipola nil, Balangoda nil, Lanka Butter and Wade) and "Lanka carrot".

Potato

- Production of quality seeds through Rooted Stem Cuttings.
- NCVT & VAT trials in collaboration with ARS, Sita Eliya.
- Establishment and technology development for hydroponic seed potato production.

Horticulture

- Evaluation of local and Japanese varieties of Orange and Mandarin at ARS, Moneragala, ARS, Rahangala, and RARDC, Bandarawela.
- Maintenance of temperate fruit crop mother plants viz; Apple, Peach, Pear, Chinese guava, Nectarine, Avocado, Carombola etc.

Plant Protection

- Screening of fungicides and insecticides for diseases and pests of vegetables, fruits, potato, and flower crops.
- Evaluation of resistance/ tolerance of rose lines to grey mold (*Botrytis cinerea*).
- Laboratory and field evaluation of cabbage varieties against soft rot (*Erwinia carotovora*) disease.
- Efficacy evaluation of new chemicals to control citrus rust mites and scale insects.
- Screening of new insecticide Bistrifluron (IGR Formulation) against pod borer (*Helicoverpa armigera*) in tomato.
- Management of sucking pests (thrips) on capsicum in organic farming.
- Effect of row intercropping system on pest incidence in Cabbage.
- Pilot scale testing of Bristrifluron 10% EC (IGR formulation) for Cabbage caterpillar complex.

Floriculture

- Evaluation of soil based growing media for cut Gerbera.
- Effect of plant density on external characters and yield of Super daisy.
- Development of post harvest quality management package for cut Gerbera.
- Identification of optimum plant density for high quality cut flower production of Roses.
- Characterization of 20 Chrysanthemum accessions.

Tissue Culture

- Multiplication, hardening and evaluation of tissue cultured strawberry plants regenerated from leaf and runner tip explants.
- Dormancy breaking studies on potato seed tubers.
- Planting material production of Potato, Anthurium, Madonna lily, and Gerbera.

Soil Science

- Revision of N fertilizer recommendation for seed potato production.
- Development of fertilizer package for short age cauliflower varieties.
- Dormancy breaking studies on potato seed tubers.
- Planting material production of Potato, Anthurium, Madonna lily, and Gerbera.
- Multiplication, hardening and evaluation of tissue cultured strawberry plants regenerated from leaf and runner tip explants.
- Control of nutrient deficiency symptoms in citrus.
- IPNS for bean, tomato and citrus.
- Development of effective soil sterilization procedure to control soil borne disease in poly tunnels.
- Development of fertilizer package for Madonna lily.

STAFF LIST

Cadre post	No.
Deputy Director (Research)	01
Research Officer	10
Monitoring Officer	01
Programme Assistant	07
Research Assistant	03
Agriculture Instructor	13
Laboratory Sub Assistant	02
Public Management Assistant	10
KKS	03
Driver	06
Tractor Operator	02
Painter	01
Budder	02
Mason	01
Carpenter	01
Watcher	15
Circuit Bungalow Keeper	01
Permanent Labourer	104
Contract Labourer	81
Total	**263**

2.2.5 REGIONAL AGRICULTURAL RESEARCH AND DEVELOPMENT CENTRE (RARDC) – MAKANDURA

RARDC, Makandura functions under the administrative control of HORDI and the main objective of the centre is to strengthen agricultural research system within the North Western region. Its seven sub stations are located in different Agro-ecological Zones. The Centre administers Agricultural Research Stations at Kalpitiya (DL3) and Vanathavillu (DL3) and the Adaptive Research Units at Tabbowa (DL1), Inginimitiya (DL1), Wariyapola (IL3) and Walpita (WL3) as well as Horticultural Farm at Walpita (WL3). The main functions of the centre are;

- Generate, acquire and disseminate information
- Conduct coordinated agricultural research
- Arrange expeditious utilization of research results
- Trainings for high level scientific manpower in agriculture

BUDGET

Allocation received and expenditure incurred is given in Table 2.2.5.1.

Table 2.2.5.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	1,387,738	780,782	56
Recurrent	3,156,606	3,128,397	99
Projects			
Compost	17,600,000	11,516,887	65
One crop one village			
– Pineapple	160,000	132,371	83
- Mushroom	125,000	122,000	98
Api wawamu Ratanagamu			
– Pomegranate	440,000	436,300	99
- Pineapple	289,563	289,563	100
- Root and tubers	100,000	93,845	94
Total	**23,258,907**	**16,500,145**	**71**

PROGRESS

Fruits

- Nufarm Diuron 500SC is effective in controlling weeds in pineapple.
- In Pomegranate hybridization programme at ARS, Kalpitiya selected four parents and F_1 seeds were produced for further studies.
- Thirty five genotypes of banana were collected and maintained in the research field.

Soil management

- Tested 388 soil samples and fertilizer recommendations provided.
- Tested the quality of 182 compost samples.

Vegetables

- Selected local pumpkin variety and produced 200g of quality seeds.
- Produced 900g Breeder seeds of bitter gourd variety-Thinnewelli
- Produced 160g Breeder seeds of white snake gourd variety.
- Selected 13 promising Green chilli lines
- Produced 150g of pure Batalu miris seeds.
- Conducted NCVT –Cucumber. Exotic variety 'Master' showed better performance in Intermediate Zone.

Floriculture

Cut flower anthurium

Low cost improved raised bed or large pots (diameter 35 cm and height 28 cm) is favourable for intensive cultivation of *Anturium andreanum.*

- Poultry manure (layer litter) or gliricidia green manure has enhanced the marketable flower yield of anthurium.

Root and tuber crops

- A gain of 17% small size (market preferable) tubers was reported under hormone treatments in cassava cultivation

Pathology and Mushroom

- Saw dust spawn produces an encouraging mushroom yield with high benefit cost ratio compared to the existing method of using paddy seeds.
- The world famous medicinal mushroom Raishi (*Ganoderma lucidam)*, was successfully cultivated under local conditions. A cultivation package to be developed for farmers.

PLAN FOR 2011

Fruits

- Back cross breeding programme in pineapple
- Effect of moisture management on fruit yield of pineapple
- Testing of new weedicide for pineapple cultivation
- Evaluation of pineapple hybrids with parent pineapple.
- Hybridization and evaluation of pomegranate
- Maintenance of banana germplasm collection
- Evaluation of fertilizer management practices and mulch on dragon fruit
- Effect of plant density on dragon fruit
- Varietal evaluation of banana – Seeni kesel

- Effect of combined application of chemical fertilizer and compost on banana
- Anoda mutation programme

Soil management

- Effect of different levels of compost on dragon fruit under organic farming system
- Effect of different sources of organic manure with and without chemical fertilizer for dragon fruit
- Effect of integrated plant nutrient management systems on vegetable and tuber crops
- Evaluation of integrated plant nutrient management systems on cassava and pineapple

Vegetable

- Development of local pumpkin varieties.
- Development of green chilli varieties.
- Breeder seed production of bitter gourd and snake gourd
- Varietal evaluation of long bean (local mae varieties)
- Purification of "Betalu miris" and Makandura selection
- Evaluation of different methods to control yellow mosaic virus on pumpkin.
- NCVT – Cucumber, Brinjal and Amaranthus

Floriculture

- Evaluation of integrated plant nutrient management systems on anthurium
- Maintenance of germplasm collection and breeding programme for anthurium
- Improvement of low cost shade house for anthurium
- Maintenance of germplasm collection and breeding programme for Idda

Root and tuber crops

- Development of new crop management package for Cassava cultivation.
- Development of new fertilizer package for Sweet potato cultivation in the region.
- Development of hormone application techniques for cassava cultivation.
- Planting material production and varietal conservation of recommended root & tuber crop varieties.
- Germplasm conservation of cassava crop (90 accessions).

Pathology and Mushroom

- Development of cultivation package for Raishi mushroom (*Ganoderma lucidam)*
- Evaluation of new cultivation method for oyster mushroom using paddy straw
- Development of cultivation package for button mushroom (Coordinated experiment with HORDI)

Other

Following technologies have been submitted to the Technology Release Committee for recommendations.

- Appropriate shade for *Anthurium andranum* in intermediate zone
- Low cost drainage improved bed structure for *Anthurium andrianum*
- Impact of mulching on soil moisture, plant growth and yield of Mauritius pineapple
- New cultivation technology for paddy straw mushroom
- Low cost spawn (seed) production method for oyster mushroom

STAFF LIST

Designation	No.
Deputy Director (Research)	01
Research Officer	02
Agricultural Monitoring Officer	03
Programme Assistant	04
Agricultural Productivity Officer	01
Economist Assistant	02
Research Assistant	07
Agricultural Instructor	20
Research Sub Assistant	01
Management Assistants (supra)	01
Management Assistants	08
Farm Clerk	02
Driver	03
KKS	01
Skilled Labourers	05
Unskilled Labourers	29
Total	**90**

2.2.6 AGRICULTURAL RESEARCH STATION (ARS) - SITA ELIYA

Research and development activities of the station focus on productivity improvement of potato, up country vegetables, selected temperate fruits, floricultural crops and need based research for protected agriculture. This station is also responsible for producing initial planting materials of Potato, Strawberry and Gerbera to cater to the national requirement. In addition, it provides training and technical advice to government farms, farmers, extension staff and students of universities, technical colleges and schools.

BUDGET

Allocations received and the expenditure incurred under different votes and projects are given in Table 2.2.6.1.

PROGRESS

RESEARCH

Agronomy

- Evaluated 10 new commercial potato varieties imported in 2009 in Nuwara Eliya and Badulla districts and found that four varieties namely Rudolph, Zapira, Cal White and Ambition performed well under local conditions and accepted for commercial cultivation.
- Tested 4 potato cultivars for their potential of using in a hydroponic system and found that Granola was suitable and Hillstar was moderately suitable for the system. 99-06 and 99-02 have taken a longer period to produce mini tubers and are not economical.

Table 2.2.6.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	1,320,978	1,051,258	80
Recurrent	2,785,643	2,776,655	100
Potato G_0 Seed Production	3,000,000	2,761,916	92
Compost Production	1,570,000	866,516	55
One Crop One Village - Pears & Strawberry	80,000	32,357	40
One Crop One Village - Mushroom	100,000	35,000	35
TOTAL	**8,856,621**	**7,523,702**	**85**

- A study on impact of relative humidity and temperature during cold storage on quality of seed potato revealed that ,
    - When stored under ambient temperature (14-26 ^{0}C) and humidity (80%) lead to highest weight loss
    - Least weight loss percentage for G_0 mini tubers (2-4g) and 30 -55 g seeds was observed when stored under 5^{0}C and 90-95% RH
    - Minimum weight loss of 20-30 g seed group was observed when stored under 5^{0}C and 85-90% RH
    - Gradual cooling was essential for successful seed potato storage

Plant Breeding

- Released locally developed high yielding, late blight tolerant potato variety "Golden Star".
- Selected 10 locally developed potato lines for NCVT.
- Started clonal evaluation of 2200 plants of F_1 generation for high yield, late blight resistance and other desirable traits.
- Started seed multiplication for evaluation of 15 potato lines received from CIP.

Tissue Culture

- UV radiation with 30 minutes exposure and 5-10Gy of gamma can be used for irradiating calli of lily (*Lilium longiflorum)*. Medium supplemented with 0.5 mg/L ^{1} NAA and 0.6 mg/L BAP was found to be the best for shoot regeneration.
- *In-vitro* grown Baby's breath (*Gypsophila paniculata*) on solid MS+3 mg/L IBA for 6 weeks could be successfully acclimatized in glass house. Aeration of culture vessels has no effect on *in-vitro* rooting. Conventional propagation through shoot cuttings could be made in 1:1:1 mixture of compost: sub soil: cow dung inside a propagator.
- Yield and runner production performances of *in-vitro* plants and *in-vitro* derived propagules of strawberry variety Chandler were tested. Acclimatized tissue cultured plants produced the lowest yield and the maximum No. of runners/ plant while other tested propagules produced similar yield and No. of runners. Therefore, tissue cultured plants should only be used for the purpose of planting material production.
- Effect of age of *in-vitro* cultures and the media composition on the production of stem cuttings from *in-vitro* mother plants of potato was tested in net house for 2 seasons. Potting mixtures; half burnt paddy husk (HBPH): tea waste (1:1) and HBPH: coir dust: sand (1:1:1) were identified as suitable to obtain a larger No. of stem cuttings. The suitable age group of *in-vitro* plants was 5-6 weeks to collect a higher No. of stem cuttings.

Entomology

- Recommended Flubendiamide 480 SC @ 36 g ai/ha for bean pod borer, *Maruca vitrata*
- Recommended Flubendiamide 480 SC @ 36 g ai/ha and Flubendiamide 24 WG @ 36 g ai/ha for cut worms on potato.
- Identified the duration of the life cycle of *Cheilomenes sexmaculata* as 26 to 36 days under laboratory conditions when the maximum temperature ranged from 17 to 30 ^{o}C and minimum temperature ranged from 11 to 16 ^{o}C.
- Recommended Bristifluron 10% EC @ 1.5 ml/L for diamond back moth, *Plutella xylostella.*

Pathology

- Recommended fungicide Fluazinam (Tizca) – 0.5ml/L for the management of potato late blight.

- Among the commercial varieties screened Cal white, Aladin and Ambition were the least late blight susceptible varieties and variety 'Sapriya' and 'Marcy' were the higher yielding varieties

- In the breeding line screening against late blight resistance M 22, 01-09-05, 01-01-09, 01-09-06 were the best.

- The cabbage varieties Green cornet and K-3-122 were more susceptible to club root disease and KA cross, Avirang Worls, Ever green were highly tolerant against club root disease.

Soil Science

- Tested new liquid fertilizer formulation based on crop requirement for hydroponic system and found that NPK were not sufficient in new formulation.

Vegetable crops

- Among the evaluated cabbage varieties, five varieties, TSX 0578, Sammurai, Ninja, Sunny and Green glob performed well and accepted for commercial cultivation in UCWZ.

- A new carrot hybrid, 'Nantindo' performed well and recommended for commercial cultivation in UCWZ.

- New beet varieties, HT 1500 and HT 1505 performed well in terms of yield, tuber quality, early maturity and tolerance to pest and diseases and recommended for commercial cultivation.

DEVELOPMENT ACTIVITIES

Agronomy

- Potato planting material production – Produced pre basic seeds (G_0) as follows;

  Hydroponic system – 19,897 tubers

  Geoponic system - 226,508 tubers

  Aeroponic system - 100,000 tubers

- Issued 308,045 No. of pre basic seeds to farmers for polytunnel and open field multiplication.

- Provided technical support to establish 11 hydroponic seed production units in farmer fields of Uva province.

- Provided technical support to establish an aeroponic seed potato production unit at DD's office, Kappetipola of the Provincial Department of Agriculture, Uva Province.

- Trained 20 extension officers and 60 farmers on mini tuber production using hydroponic system and 05 officers and 12 farmers were trained on mini tuber production using hydroponic system.

- 03 undergraduate research projects were facilitated on;
  - Potential of mini tuber production of four potato cultivars in a hydroponic system.
  - Impact of relative humidity and temperature during cold storage on quality of seed potato

- Potato seed production under research and farmer management condition – A comparative analysis

Tissue culture

- Disease free potato *in-vitro* plant production

  Issued a total of 5689 *in-vitro* plants of potato variety Granola for formal seed potato production programme, 1663 plants of Granola, Desiree, and Hillstar for informal seed production programme, 708 plants for experimental purposes and 137 plants for multiplication in private laboratories and RARDC, Bandarawela.

- Conservation of potato germpl*a*sm

  Conserved 7 potato varieties (Granola, Desiree, Raja, Hillstar, Condor, Lyra and Kufri Giriraj),

  Conserved 2 promising lines (FLS-7 and LBR-15), 3 breeding lines (99-02, 99-05 and 99-06) and 15 No. of CIP lines in the laboratory for future use.

- Strawberry

  Issued 5885 No.s of *in-vitro* derived planting materials of variety Chandler for the growers under "One crop one village" programme.

  Issued a total of 677 *in-vitro* plants and 2189 No.s of *in-vitro* derived planting materials of strawberry variety Chandler to growers for planting material production and fruit production respectively.

  Used 600 No.s of plants for experimental purposes while 1625 No. of plants were established for runner production and fruit production purposes.

- Pears

  Issued 80 No.s of pear plants (Var. Rahangala selection) under the "One crop one village programme"

- Floricultural crops

  Produced and issued 1357 No.s of Baby's breath (*Gypsophila paniculata*), 42 No.s of *Lilium* spp. and 20 No.s of Gerbera to the growers in Nuwara Eliya.

- Facilitated 03 undergraduate research projects on;
  - In-vitro and ex-vitro rooting and acclimatization of Baby's breath (*Gypsophila paniculata* L.)
  - Induced mutation and development of media protocol for plant regeneration from mutated calli of Lily (*Lilium longiflorum* L.)
  - Study on in-vitro rooting and acclimatization of Baby's breath (*Lilium longiflorum* L.)

Pathology

- Tested 1760 soil samples for bacterial wilt.
- No. of diagnosis made on farmers complaints

  Potato – 13

  Vegetables - 23

  Flowers & fruits - 06

  Mushrooms - 04

Entomology

- Tested 1760 soil samples from Govt. seed potato farms.
- Undergraduate research project conducted on testing of newly formulated liquid fertilizer for seed potato under hydroponic.

Soil Science

- Soil analysis based on fertilizer recommendation: No. of samples analyzed are given below.

p^H	286
P	234
K	234

- Produced 60 tons of compost under the compost production project.

Workshops/ Presentations

- A paper presented on "Present status of land degradation in up country and measures adopted to control it" at First national symposium on land degradation in Sri Lanka conducted by the Ministry of Environment.
- Participated at a workshop on vegetable production in Dhaka, Bangladesh and presented a paper on Present status and improvement of strategy for vegetable crops through regional trials.
- One officer serves as resource person for research extension dialogue for the farmer beneficiaries of the FAO project of enhancing food security and nutrition among most families in Eastern – Sri Lanka.

Trainings

- One officer participated at a four week International course on seed potato technology, certification and supply systems at Wageningen UR Centre, Netherlands.
- One officer participated at a three day e-learning course on Good Agricultural Practices and GLOBALGAP for greater market access for agri food products organized by Asian Productivity Organization at Distance Learning Centre, Sri Lanka.

Technology dissemination

- 04 No.s of trainees who completed vocational training on Agriculture were given 6 months of training at the station.
- Four students from the Open University completed their industrial training.
- Conducted 3 training classes for 150 school students.
- Officers attended crop clinics as resource persons.
- Trained 20 Provincial DOA officers and 60 farmers on 'on-farm seed potato production' through 4 training classes.
- Officers participated as resource personnel in the farmer training programme organized by the Hatton National Bank.
- Trained DOA officers on pest and disease management under the training programme on Principles of Plant Protection organized by the ISTI, Gannoruwa.
- Organized a training class to train 28 No. of teachers on tissue culture and soil science.
- 60 university students, 202 Agriculture Diploma students, 310 school students, 38 Technical College students and 60 teacher trainees visited the station and were trained on various subjects.

- Seven B.Sc. undergraduate students completed their specialization projects during 2010.
- Participated in 04 plant clinic programmes organized by the DD's office, PDOA, Central Province.
- Trained 50 farmers on compost production and method of fertilizer application.
- Trained 28 farmers on mushroom production.

PLAN FOR 2011

RESEARCH

Agronomy

- Evaluation of twenty commercial varieties imported during 2010 & 2011.
- Formulation of a new fertilizer mixture for aeroponic system.
- Formulation of new nutrient composition for different potato varieties under hydroponic and geoponic systems.

Plant Breeding

- Evaluation of locally developed ten potato lines under NCVT in Nuwara Eliya and Badulla Districts.
- Evaluation of CIP germplasm for desirable traits.
- Clonal evaluation of locally produced potato lines.
- Evaluation of heat tolerant introductions from CIP.

Tissue culture

- Development of Bacterial wilt resistant potato line/s through induced mutation.
- Anther culture of potato: Identification of suitable media and culture conditions for anther culture of potato.
- Development of new types of *Lilium* spp. with induced mutation. Screening of plants regenerated from mutated calli will be undertaken.

Entomology / Nematology

- Method to mass rearing of black cut worm under laboratory conditions.
- Easy method to identify different larval stages of *Liriomyza huidobrensis*
- Chemical control of leaf miner *Liriomyza huidobrensis* using spinosad.
- Chemical control of sucking pest complex of potato using Diafenthiuron.

Pathology

- Evaluation and monitoring of bacterial wilt infection in government seed potato farms.
- Studies on biotic factors influencing carrot forking
- Screening of mutant potato germplasms against bacterial wilt resistance
- Screening of fungicides against potato late blight.

Soil Science

- Study the possibility of reducing chemical fertilizers for Carrot and Potato with the application of organic manure.
- Effect on N management on seed potato production.

Vegetable crops

- Identification and development of suitable agronomic practices for qualitative increase of carrot yield.
- Development of seed production technologies for carrot and beet.
- Evaluation of exotic vegetables.

Fruit crops

- Evaluation of performances of citrus varieties imported from Japan
- Evaluation of pear varieties

DEVELOPMENT ACTIVITIES

Agronomy

- Production of 5 million G_0 mini tubers to be distributed among farmers.
- Establishment of a new seed production unit at ARS, Sita Eliya
- Design and construction of 8 m x 50 m aeroponic unit in a polytunnel of SPMDC to increase production of pre basic seeds using aeroponic and hydroponic systems.

Tissue culture

- Disease free potato *in-vitro* plant production
- Conservation of potato germplasm
- Micropropagation and multiplication of strawberry variety Chandler.
- Micropropagation of *Gypsophila paniculata* (Baby's breath) and *Lilium* spp. and Gerbera.
- Planting material production of pear var. Rahangala selection.

Soil Science

- Production of 60 tons of compost.
- Introduction of compost production programmes in model villages.

STAFF LIST

Cadre post	**No.**
Research Officer In Charge	01
Research Officer	04
Programme Assistant	03
Agricultural Instructor	08
Research Assistant	04
Research Sub Assistant	02
Public Management Assistants' Service	03
Driver	02
Permanent Labourer	21
Contract Labourer	37
Total	**85**

2.2.7 AGRICULTURAL RESEARCH STATION (ARS) – TELIJJAWILA

Agricultural Research Station, Telijjawila is responsible for implementing research activities to address field problems in the Southern Province, particularly in Galle and Matara Districts. The major areas of research are agronomy and plant protection for fruits, vegetables and root & tuber crops. In addition, development programmes under "Api wawamu- Rata nagamu", one crop one village, production and popularization of organic manure, establishment of model farms, farmer based seed production (*Praja mulika beeja nishpadanaya*) and a special project on expansion of banana cultivation at Sevanagala area in the Uva Province were implemented. Priorities were given for the production of planting material, conducting demonstrations, development of sustainable technologies and dissemination of information among extension staff and farming community especially in the Southern region.

BUDGET

The budgetary allocations and expenditure incurred during 2010 are in Table 2.2.7.1.

Table 2.2.7.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	726,124	548,786	76
Recurrent	3,118,011	777,993	25
Projects			
• Production & use of organic fertilizer	665,000	549,756	83
• 'Api wawamu Rata nagamu' - Productivity enhancement of banana (Crop leader)	1,000,000	871,274	87
-Productivity enhancement of banana (Planting material)	1,000,000	666,677	67
– Fruit plants (Pineapple)	48,000	43,039	90
-Domestic food production campaign (Leafy vegetables)	100,000	87,732	88
• One crop one village			
- Pineapple	50,000	49,145	98
- Mango	55,000	48,835	89
- Mushroom	125,000	119,561	96
• Deyata Kirula	2,085,000	2,084,229	100
TOTAL	**8,972,135**	**5,847,027**	**65**

PROGRESS

SPECIAL PROJECTS

'Api wawamu rata nagamu'

Productivity enhancement of banana

- Completed the establishment of demonstrations on modern technologies of banana cultivation in 18 locations covering an extent of about 5 ha
- Established 6 mother cultivations with recommended banana varieties in North Western, Central, Uva, Southern and North Central Provinces. Planting material will be made available for farmers by the end of the year.
- Produced about 50,000 suckers using conventional propagation system exceeding the targeted No. of 30,000 banana suckers. Out of this, 25,000 plants were issued to Eastern Province

Productivity enhancement of pineapple

- Produced about 8000 suckers thus achieving the target.
- Released about 2500 suckers to Ambepussa farm.

One crop one village

Leafy vegetables

- Produced about 100 kg of basic planting material thus exceeding the target.

Mushroom

- Established 02 model villages.

Pineapple

- Produced about 1200 suckers.

Production of organic manure

- Conducted 15 training programmes.
- Produced 58 tonnes of compost.
- IPNS programme for pineapple, banana and guava is in progress

Expansion of banana cultivation in Sevanagala area of the Moneragala district

- Established 262 ac of banana.
- Provided 16 Kunthanies for each region to produce burnt paddy husk as an encouragement to apply them in banana cultivation.

RESEARCH

Identification of suitable cover crops for controlling weeds in pineapple cultivations

The difficulty of controlling weeds is one of the major constraints in expansion of pineapple cultivation in the Southern region. Identified growing cover crops of leafy vegetables as an effective and environmentally friendly weed controlling technique to address the problem. This technique will be applied in farmer fields after publishing the same in the Annual Symposium of the Department of Agriculture.

Development of a technique to improve bunch quality in leaf oriented banana cultivations

In leaf oriented banana cultivations where leaves are aimed at the primary harvest, plants produce poor quality bunches especially under adverse growing conditions. Therefore, development of appropriate techniques to improve bunch quality was identified as an important aspect.

The bell was trimmed leaving 4 hands before the completion of the hand differentiation stage (de-belling). This treatment reduced the bunch weight by 19% and the total yield by 18%. However, the mean hand weight was increased by 55%. The external appearance of fruits was better. Hence the "de-belling technique" was identified as a better practice to improve bunch quality under leaf oriented banana cultivations.

This research was presented at the Annual Symposium of DOA and awareness programmes were conducted for growers with practical demonstrations in farmer fields.

Development of appropriate tree management practices to obtain quality fruits in mango

Tested tree management practices to obtain better quality fruits in plants with shorter stature. In situ grafted, densely planted (10m × 5m) trees trained in Y shape leaving only two branches showed a successful growth of the bud wood with a 100% surviving ability. Evaluations are in progress at 6 locations in the Southern region. This technology will be submitted to the Technology Release Committee in 2011.

Feasibility of using spent mushroom substrate (SMS) as substrate enrichment for oyster mushroom cultivation

DOA formulation was compared with the SMS in different ratios. Results indicated a potential for re using mushroom substrate for mushroom cultivation. Further investigations are being carried out to confirm the results.

Preliminary observations for Ganoderma bag cultivation

Three different species of Ganoderma mushroom (purple, brown & orange) collected from Sri Lankan forest reserves were used for the study. The mycelia were tissue cultured on Potato Dextrose agar (PDA) and Malt Extract agar (MEA). Ganoderma mushroom species were prepared using mango saw dust mixed with rice bran, gypsum and sugar. Primordia development was observed only in purple strain. It takes a period of 22 days to develop a fully grown basidiocarp. Artificial cultivation techniques for a wild mushroom were successfully perfected. Further studies could not be continued due to lack of facilities for biochemical analysis of the mushroom extract.

Growth and fructification patterns of *P. ostreatus* on substrate supplemented with delayed release nutrients (DRN)

DOA formulation was compared with the treatment with denatured, crushed green gram instead of using powder. Results revealed that this treatment does not have a significant impact on growth and yield of oyster mushroom.

NCVT - Amaranthus

Red Amaranthus (Rathu thampala), Diyapalagoda, Pure green and DOA green were compared with for yield and pest damage. Diyapalagoda showed the highest resistance to beetle damage and fungal attack while Rathu thampala was susceptible. Diyapalagoda

showed the highest resistance to beetle damage and fungal attack while Rathu thampala was susceptible. Diyapalagoda produced the highest yield with a longer shelf life. Further studies are in progress.

OTHER SERVICES

- About 1200 personnel including farmers, school children and representatives from NGOs and private companies visited the station to obtain technical assistance and planting material.
- Conducted 17 practical training and awareness programmes for teachers, school children, farm women, investors, farmers and Samurdhi beneficiaries.
- Seven (7) radio programmes and 2 TV programmes were conducted. 16 newspaper articles on all mandated crops were released.

PLAN FOR 2011

- Continuation of ongoing research programmes on Banana, Pineapple, Mango, Kiriala, Citrus, Guava, underutilized fruit crops, mushroom and leafy vegetables.
- Cultivation of fruit crops in 1 ha of land
- Production of 100,000 pineapple and 5000 banana suckers for diversification in coconut lands affected with 'Weligama wilt'.
- Establishment of 5 model villages
- Completion of construction of the toilet system and garage.

STAFF LIST

Cadre post	**No.**
Research Officer	02
Programme Assistant	03
Agricultural Instructor	06
Research Assistant	04
Research Sub Assistant	01
Public Management Assistant	03
Driver	02
Watcher	04
Sanitary Labourer	01
Labourer	04
Contract Labourer	33
Total	**63**

2.2.8 AGRICULTURAL RESEARCH STATION (ARS) - GIRANDURUKOTTE

The Agriculture Research Station, Girandurukotte functioning under the administrative control of HORDI Gannoruwa, is responsible for research and development activities particularly for addressing the field problems pertaining to crop production in Mahaweli system "C". The station focused on research and development activities to improve the productivity of vegetables, fruits and root and tuber crops. Recently the ARS was given the responsibility of implementing important activities under the rice research and development programme and later on extended to produce hybrid seed paddy within an extent of 5 ha.

In addition to the research and production programme the ARS serves the farming community in Mahaweli system "C" by conducting regular training programmes for officers, farmers, school children and personnel of other organizations.

BUDGET

The allocation received and the expenditure incurred under different votes and projects during year 2010 are given in the Table 2.2.8.1.

Table 2.2.8.1: Annual budget - 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	742,300	619,985	84
Recurrent	2,388,787	1,587,302	66
Projects			
• Hybrid Maize project	375,000	320,821	86
• Organic Fertilizer Production and Promotion Project	951,800	572,559	60
• NCVT Vegetable	40,000	39,811	100
• One Crop One village	175,000	105,630	60
• Seed Paddy Production BG 250	700,000	606,050	87
• Banana Productivity Enhancement	200,000	151,619	76
• Papaya Seed Production Programme (Rathna)	150,000	136,280	91
TOTAL	5,722,887	4,140,057	72

PROGRESS

Seed Production Programme

Hybrid Maize Seed Production

Variety "Sampath" was cultivated in 01ha. and produced 249 kg of F_1 seed during the Maha and Yala seasons in 2010.

Seed Paddy Production

During 2010, 07 tonnes of Bg 300 and 16.3 tonnes of Bg 250 were produced and handed over to the Seed & Planting Material Development Centre.

Planting Material Production

Planting material produced in 2010 is given in Table 2.2.8.2.

- Established banana mother plants of Kolikuttu, Embul, Ash plantain and Seeni kesel.in 0.5 ha for planting material production.
- Established 0.5 ha banana nursery to produce 5000 suckers as planting material.

Research

Fruits

- Continuation of varietal evaluation of local and introduced citrus varieties.
- Local varieties – 07 (Arogya, Bibila sweet, MKD, Rahangala selection, HOCR 23, HOCR 25 and HOCR 29)
- Introduced varieties - 08 varieties from Japan (NCN, MYG, OTA, NAN, OUT, YSD, SRD, KYM)
- Effect of different organic and chemical fertilizer combinations on growth performance of papaya and pineapple.

Rice (NCRVT)

Varieties of 3 month, 3 ½ month and 4 ½ month age groups were tested in 2010.

Vegetables

National coordinated varietal trials for following vegetables were conducted.

Okra	- 09 varieties
Vegetable cowpea	- 04 varieties
Brinjal	- 05 varieties
Cucumber	- 08 varieties
Cowpea	- 04 varieties

Table 2.2.8.2: Planting material produced in 2010

Crop	Varieties	Production in 2010
Banana	Seeni kesel, Embul kesel, Kolikuttu, Ash plantain, Kandula and Other varieties	4682 suckers
Papaya	Rathna	1515 of potted plants
Pineapple	Mauritius	9806 of potted plants
Kiriala	Isuru	4700 plants
Cassava	Kirikawadi and Jaffna selection	8700 meters of stems
Sweet potato	Gannoruwa sudu, Ranabima, Ama and Dhawala	216 kg of cuttings
Mango	Karthakolomban, Villard	149 of potted plants
Dragon fruit		74 of potted plants

Compost production and Promotion Programme

- Produced 47 tonnes of compost and distributed 760 kg as inoculum (380 pkts of 2 kg)

Technology Dissemination

Following training programmes were conducted during the year.

- Compost production (03 programmes for 598 participants)
- Model village Programme (01 programme for 10 participants)

Also, more than 600 persons including school children, teachers, undergraduates, postgraduate students and farmers visited the station for training, collection of information and for other services.

Training

- Mr. A.W.A. Samarasinghe, Agricultural Instructor, Training on 'Diversified farming practices using participatory approaches for food security and safety" in Thailand International Co-operation Agency (TICA) in Thailand (From 3rd May to 24th May 2010)

PLAN FOR 2011

- Hybrid maize seed production of variety "Sampath"
- National coordinated varietal trails of selected vegetables.
- National coordinated rice variety trails.
- Organic fertilizer production and promotion programme.
- Basic and standard seed production of Papaya variety "Rathna"
- Seed paddy production of variety BG 250.
- IPNS programme.
- Production of seeds and planting materials of root and tuber crops, fruits and vegetables.
- Extension and training programmes for school children and farmers.

STAFF LIST

Cadre Post	No.
Research Officer	02
Agricultural Instructor	06
Research Assistant	02
Research Sub Assistant	02
Public Management Assistant	01
Tractor Operator	01
Storemen	01
Carpenter	01
Watcher	03
Unskilled Labourer (Grade III)	28
Labourer (Contract)	26
Total	**73**

2.3 RICE RESEARCH AND DEVELOPMENT INSTITUTE (RRDI) – BATALAGODA

The yield gap in high potential areas is around 2-3 tonnes/ha, while it is much greater in the moderately favourable and unfavourable environments. This situation existed despite the availability of highly subsidized fertilizer, and technological knowhow at farmer level. Use of quality seed paddy and appropriate agronomic management practices based on the ecosystem and pest, disease and weed management are still not at optimum level. Farmer level socio economic constraints may partly explain the non adherence to recommended technologies in the favorable ecosystem. However in the unfavorable ecosystems, the dearth of appropriate varieties and associated technologies may have increased the yield gap further.

With continuous attention to the favourable irrigated rice ecosystem towards further increasing yield ceiling, a new focus to increase productivity in rainfed ecosystem has been initiated. With the support from the International Network for Genetic Resources from the International Rice Research Institute (IRRI), Philippines, RRDI has initiated work on identifying rice varieties for water limited environments and flood prone / submerged situations.

Further, long term programmes to overcome the impact of climate change on rice production must be implemented as the rice plant may have to face different abiotic regimes such as water, temperature stresses and biotic regimes such as changes in pests and diseases pressure. Further, finding solutions to current and impending challenges such as degradation of soil environment, low fertilizer use efficiency and heavy dependency on weedicides with current plant types are a few important subject areas that need scientific investigation.

BUDGET

RRDI received its funding needs from annual budget, special projects and foreign funded projects as presented in Table 2.3.1.

Table 2.3.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	2,319,000	2,292,640	99
Recurrent	24,598,431	23,234,426	94
Foreign funded projects			
SLUSA (4)	500,000	356870	71
Green Super Rice	1,600,000	880,366	55
Projects (Local)			
Organic Manure	11,100,000	6,243,968	56
Api Wawamu Rata Nagamu	1,133,400	743,315	66
Infrastructure Development	110,000,000	69,220,455	63
Hybrid rice project	4,000,000	1,830,403	46
TOTAL	**155,250,831**	**104,802,443**	**68**

PROGRESS

Spread of rice varieties in Sri Lanka

Bg 352 continues to dominate in the list of rice varieties cultivated by farmers in Sri Lanka. This was followed by Bg 300 and Bg 358 (Table 2.3.2).

Rice variety	Type of the grain	Maha 2009/10		Yala 2010		Annual 2010	
		Extent, ha	%	Extent, ha	%	Extent, ha	%
2 ½ months							
Bg 250	White Nadu	1,635	0.25	1,449	0.35	3,084	0.29
Sub Total :		1,635	0.25	1,449	0.35	3,084	0.29
3 months							
Bg 300	White Nadu	109,475	16.9	58,320	13.9	167,795	15.8
At 307	White Nadu	7,467	1.2	7,146	1.7	14,614	1.4
Bg 305	White Nadu	7,736	1.2	5,932	1.4	13,669	1.3
At 303	Red Nadu	4,025	0.6	2,395	0.6	6,420	0.6
Bw 272-6/B	Red Nadu	3,034	0.5	2,084	0.5	5,118	0.5
Bg 304	White Nadu	1,237	0.2	1,200	0.3	2,438	0.2
At 308	White samba	985	0.6	1,252	0.3	2,237	0.2
Bg 34-8	White Nadu	598	0.09	597	0.1	1,195	0.1
Bg 301	Red Nadu	382	0.06	528	0.1	910	0.09
At 306	Basmathi Type	389	0.06	171	0.04	560	0.05
Sub Total :		135,328	21	79,625	19	214,956	20
3 ½ months							
Bg 352	White Nadu	118,154	18.3	78,053	18.6	196,207	18.4
Bg 358	White Samba	98,068	15.2	49,476	11.8	147,544	13.9
Bg 94-1	White Nadu	64,084	9.9	42,643	10.2	106,727	10
At 362	Red Nadu	36,841	5.7	32,316	7.7	69,158	6.5
Bg 359	White Nadu	31,087	4.8	24,516	5.9	55,603	5.2
Bg 357	White Nadu	18,747	2.9	22,612	5.4	41,359	3.9
At 353	Red Nadu	23,240	3.6	14,682	3.5	37,921	3.6

Rice variety	Type of the grain	Maha 2009/10 Extent, ha	%	Yala 2010 Extent, ha	%	Annual 2010 Extent, ha	%
		3 ½ months					
Bg 360	White Samba	15,446	2.4	9,951	2.4	25,397	2.4
Ld 356	Red Samba	12,840	2.0	9,827	2.3	22,667	2.1
Bg 350	Red Nadu	8,826	1.4	5,199	1.2	14,025	1.3
At 354	White Nadu	2,882	0.5	5,125	1.2	8,006	0.8
Bw 361	Red Nadu	4,567	0.7	2,516	0.6	7,082	0.7
Bw 351	Red Nadu	4,060	0.6	2,007	0.5	6,067	0.6
Bw 363	White Nadu	1,838	0.3	3,315	0.8	5,153	0.5
Ld 355	White Samba	2,165	0.3	1,546	0.4	3,712	0.4
Bw 364	Red Nadu	1,561	0.2	1,284	0.3	2,844	0.3
Bw 267-3	White Nadu	911	0.1	1,030	0.3	1,941	0.2
Ld 365	Red Samba	177	0.03	141	0.03	317	0.03
Bg 94-2	White Nadu	133	0.02	128	0.03	261	0.02
Sub Total :		445,627	69	306,367	73	751,991	71
		4 - 4 ½ months					
Bg 379-2	White Nadu	14,394	2.23	9,526	2.27	23,920	2.25
Pokurusamba**	White Samba	13,317	2.06	7,645	1.82	20,962	1.97
Bg 403	White Nadu	9,569	1.48	3,891	0.93	13,461	1.26
Bg 450	White Samba	4,321	0.67	1,262	0.30	5,584	0.52
At 402	Red Nadu	3,195	0.49	232	0.06	3,426	0.32
Bg 454	White Nadu	2,803	0.43	333	0.08	3,136	0.29
Bg 400-1	White Nadu	1,388	0.21	379	0.09	1,767	0.17
H - 4	Red Nadu	1,541	0.24	188	0.04	1,729	0.16
Bg 406	Red Nadu	1,487	0.23	173	0.04	1,660	0.16
At 401	Red Nadu	311	0.05	6	<0.001	317	0.03
Bg 380	White Nadu	34	0.01	24	0.01	58	0.01
Bg 407H	White Nadu	32	<0.001	0	<0.001	32	<0.001
Bw 400	Red Nadu	20	<0.001	0	<0.001	20	<0.001
Sub Total :		52,412	8	23,659	6	76,072	7

Rice variety	Type of the grain	Maha 2009/10		Yala 2010		Annual 2010	
		Extent, ha	%	Extent, ha	%	Extent, ha	%
				5 - 6 months			
Bg 38	White Samba	304	0.05	41	0.01	344	0.03
Bg 745	White Samba	142	0.02	19	<0.001	161	0.02
Bg 3-5	White Nadu	53	0.01	14	<0.001	68	0.01
Bg 407	White Nadu	35	0.01	12	<0.001	47	<0.001
Sub Total:		534	0.08	86	0.02	620	0.06
Other NIV		7,232	0.12	7,171	0.03	14,403	0.08
Traditional rice varieties		937	0.15	699	0.17	1,637	0.15
Grand Total :		**646,037**	**100.0**	**419,244**	**100.0**	**1,065.281**	**100.0**

****** Not recommended by the Department of Agriculture for cultivation

NIV – Newly improved varieties

Although Bg 352 is grouped into 3 ½ month age class, it matures around 100 days. Bg 300 and Bg 358 also mature around 96 and 102 days in the Dry Zone. This suggests that for majority of rice ecosystems in Sri Lanka, farmers prefer rice varieties maturing in around 100 days.

VARIETY IMPROVEMENT

RRDI and its satellite stations continued its rice variety improvement activities through conventional and heterosis breeding. Substantial gains have been achieved by developing rice varieties and new elite lines with a wider genetic base for resistance to many biotic factors. Identified rice lines with tolerance to water and salinity stress for further testing.

Newly Recommended Rice Varieties

Bg 366, a white, intermediate bold grain rice variety bred at RRDI, Batalagoda, that matures in 100 days in the Dry and Intermediate Zone was released for island wide cultivation by Department of Agriculture. This variety has a realizable yield potential of over 9 t/ha and possesses resistance to Gall Midge, Brown Plant Hopper, Blast and Bacterial Leaf Blight.

Ld 408, a red, intermediate bold grain type variety bred at RRS, Labuduwa, that matures in 110 days in the Dry and Intermediate Zones was released for island wide cultivation. This new variety with a realizable yield potential of over 7 t/ha is resistant to Gall Midge, Brown Plant Hopper and Blast.

Conventional Rice Breeding Programme - 4 - 4 ½ month age class

The 4 - 4 ½ m rice breeding programme was focused to increase yield potential with improved grain quality (eating and cooking) characteristics while incorporating pest and disease resistance and adaptability to diverse eco systems.

In the year 2010, 58 different combinations of crosses were made and established 49 F_1 populations in the field for evaluation. Selected 30 F_1 populations among them for further advancement. During the year, established 26 F_2, 13 F_3 and 10 F_4 bulk populations in the field for evaluation and selection. From the F_5 generation onwards, established 1035 progenies of 30 advanced populations in the field for further evaluation and selection during both seasons. Evaluated 18 elite lines in the Priliminary Yield Trials (PYT) and Major Yield Trials (MYT) for grain yield potential and grain quality characteristics using Bg 379-2 as the standard. Identified following promising lines for further evaluation during the next season.

Table 2.3.3: Promising lines identified for evaluation

Line No.	Pedigree
07-1597	Bg 2949-1/ 06-1214
08-1909	IR 74052-72-1-3/ Bg 380
08-301	IR 74052-72-1-3/ Bg 380
09-2641	Ld 99-12-38/ Bg 1816

Required amounts of genetically purified breeder's seeds of Bg403, Bg379-2, Bg450, Bg454 Bg406 and varieties promoted to NCRVT, VAT and LSVAT were produced following SCS standards of the DOA.

Conventional Breeding Programme - 3 ½ months age class

Major emphasis in the RRDI breeding programme was vested on this age class and continued to identify high yielding better quality rice lines with resistance for BPH, RGM, BLB and BL.

In the year 2010, thirty six crosses were made and established 29 F_1 generations in the field. Eight F_2, three F_3 and twelve F_4 of early segregating populations were identified. By using modified bulk method, selected 74 progenies from 10 crosses for generation advancement.

Evaluated 8 elite lines in PYT and MYT for yield potential and grain quality characters using Bg 357 and Bg 358 as standard varieties. Among lines tested Bg 08-2398 was nominated to CRVT programme.

Required amounts of genetically and physically purified breeder seeds of Bg 94-1, Bg 352, Bg 357, Bg 358, Bg 359, Bg 360 and Bg 366 were produced according to the standards of SCS of the Department of Agriculture.

Conventional Breeding Programme - 3 months age class

Despite the reduction in growth duration by 10-15 days, this group of varieties also record a comparable grain yield to that of 3 ½ month age class. Therefore the second priority of the breeding programme at RRDI is given to this age class to identify high yielding better quality rice lines with durable resistance for BPH, RGM, BLB and BL.

Advancement of breeding populations

Made 56 crosses with the objectives of increasing yield potential, incorporation of resistance to major pest (BPH, GM) and diseases (Blast and BLB), improvement of grain quality and increase the ability to withstand diverse environments., Established 54 F_1 populations in the field out of 56

crosses made and selected 22 populations for generation advancement. Established 28 bulk populations and selected 22 crosses., Evaluated 836 progenies from F_5 generation onwards for pest and diseases resistance and grain yield.

Tested 9 elite lines in PYT and MYT with standard variety; Bg300 for their yield potential and grain quality. Identified lines Bg09-1888, Bg07-2947, Bg 09-1871, Bg07-1412, Bg07-2787, Bg09-1851 and Bg09-1873 as the most promising lines. Produced genetically purified seed materials of Bg06-985, Bg02-465, 06-2270, At 405 (red) ,Bg 360 BC4,06-2112,Bg 304, Bg 305, 07-2828, 07-1950. for multi location VAT. Nominated Bg06-985 and Bg 02-465 for the CRVT programme.

Produced required amounts of genetically purified breeder seeds of Bg300 ccording to the SCS standard of the DOA.

Conventional breeding programme - 2 ½ months age class

The programme to develop ultra short age varieties at RRDI was continued with objectives of increasing grain yield potential with multiple resistances to BPH, GM, BLB, Rice Blast and Thrips. Evaluated 20 rice accessions, introduced from the IRRI to broaden the gene pool and selected 4 accessions as parental material. Ten bulk populations and 233 progenies were advanced further. Conducted preliminary yield trials using 04 lines with short round grains (2 white pericarp and 2 red pericarp) using Bg 250 and At 308 as standards. Used 4 accessions introduced from IRRI, 03 accessions from Green super rice project and 3 traditional cultivars (suduru samba, hetthapasda wee, Hetadawee) as parents for the 2 ½ months breeding programme.

Produced seeds of Bg 250 according to the Seed Certification Service (SCS) standards.

Improvement of traditional varieties through mutation

Objective of the project is to develop varieties with lodging resistance and good eating quality from traditional cultivars, Suduru samba (SSR) and Suwanda samba (SW) using mutation techniques and selection. Purified t03 advanced lines; Sw 25, SSR 08 and SSR 26 and multiplied for further testing in CRVT.

Wide hybridization studies of wild rice (*O. nivara*) with *O. sativa*

Continued the programme to incorporate BPH resistant gene from wild rice *O. nivara* (WR AC 04) to Bg 380, which is susceptible to BPH. Conducted preliminary yield trial using 06 selected advanced lines having BPH resistance from *O. nivara* background.

Germplasm multiplication, characterization and conservation –Continuation

Conserved 1500 rice accessions including traditional cultivars, introductions and improved lines at RRDI short term conservation unit. Multiplied 1140 accessions during the year 2010. Seed samples provided as and when needed for a few farmers, school children, NGOs and other interested groups.

Breeder seed production of "Maawee"

Produced Breeder seeds of long aged Bg 38, Bg 745, Bg 3-5 and Bg 407 to supplement the provincial seed paddy programme of this age class.

HYBRID RICE

To suit the majority of rice growing ecosystems where early maturing lines with 3½ month maturity duration are required, Bg HR-8, a 3½ month high yielding rice line with a yield potential of about 10 t/ha with promising characters was developed. Seed production programme is in progress.

Developed 10 early maturing new hybrid combinations and identified 4 combinations with higher grain yield and other favourable characters for further testing.

Developed 3 new restores (6R, 7R and 8R) and one new CMS line, Bg CMS 5A with an out-crossing rate of about 45% . These parental lines will be used to develop new hybrid combinations with high level of heterosis.

Evaluated 8 Indian hybrid combinations with local hybrids for their adaptability and yield performance. Variety CRH 501 has shown equal performance with available local hybrids. Evaluated 35 hybrid combinations received through the Green Super Rice Project to identify their adaptability and selected GSRH0156, GSRH0161 and GSRH0113 lines with 100-105 days maturity period for further testing in farmers fields.

The "Hybrid Rice Saruketha Yaya Programme" was launched in collaboration with the Extension and Training center to popularize hybrid rice among farmers. Produced and distributed 200 kg of F_1 seeds of Bg 407H among selected farmers. Further, produced 365 kg of Bg CMS IA which is the cytoplasmic male sterile (CMS) line of Bg 407H and 25kg of Bg CMS 4A, which is the CMS line of BgHR 8.

Studies done at RRDI and RARDC, Makandura to increase the F_1 and CMS seed yield revealed that application of GA_3 at the rate of 75g/ha bears a significant positive impact on the yield of F_1 and CMS seed setting of Bg 407H.

Experiment conducted at RRDI and RARDC, Makadura during Yala 2010 revealed that leaf clipping followed by application of GA_3 had a significant positive effect on F_1 seed yield of Bg407H. Leaf clipping alone also had a significant positive effect on F_1 seed yield. Application of GA_3 at 5-10% flowering stage is found to be better than application at initial flowering.

DISEASE MANAGEMENT

Variety resistance to grain discoloration

Grain discoloration of rice which is caused by a complex of fungal species (*Bipolaris oryzae*, *Curvularia* sp., *Magnaporthe grisea*., *Sarocladium oryzae*, *Phoma* sp., *Alternaria* sp., *Microdochium* sp., *Nigrospora* sp., and *Fusarium* sp.) is an increasingly important field problem in Sri Lanka. The presence of discoloration reduces rice grain quality, germination % and seed weight. Studied the response of nineteen cultivated rice varieties to grain discoloration and most common pathogens that are responsible for rice grain discoloration. Fungi were isolated from discolored seeds of selected varieties on PDA and through blotter method. At 307, Bw 361, Bw 267-3, Bg 357 & At 353 had significantly lower level of grain discoloration. Fungi such as *Curvularia* sp., *Fusarium* sp., *Sarocladium oryzae, Alternaria sp. & Bipolaris oryzae* were isolated as causal organisms of grain discoloration. However *Curvularia* sp., *Fusarium* sp., *Sarocladium oryzae* were found to be the most common pathogens

responsible for grain discoloration of above varieties.

Screening for resistance to rice blast

Rice blast caused by *Magnarporthe grisea* is a disastrous fungal disease on rice. It attacks all aerial parts at every stage of the crop and could cause a considerable yield loss. , Screened 1697 entries and 2010 Yala, 1414 entries comprising advanced progenies, all yield trials, CRVT and VAT entries against blast disease. In 2009/2010 Maha. Among the lines screened, 1015 entries in 2009/2010 Maha and 1094 entries in 2010 Yala were identified as fully resistant or moderately resistant to rice leaf blast.

Screening for bacterial blight resistance

Bacterial leaf blight (BLB) caused by *Xanthomonas campestries* pv *oryzae* is the only economically adverse bacterial disease on rice in Sri Lanka. Chemical control is still not possible. Breeding for BLB resistance is the most economical, effective and environment friendly option. In 2009/2010 Maha, screened 106 lines and in 2010 Yala, 90 lines comprising all yield trials and CRVT against BLB disease. Among the lines screened, 16 lines in 2009/2010 Maha and 15 lines in 2010 Yala were categorized as fully resistant or moderately resistant.

Fungicides to control rice sheath blight disease

Sheath blight caused by *Rhizoctonia solani* is a frequently reported rice disease that occurs island wide. Genetic resistance for sheath

blight is not available. Sheath blight disease must be controlled with an integrated effort using proper agronomic management and use of fungicide. For an effective integrated disease control programme, fungicides with a safer formulation are preferred. Hexaconazole, EC formulation is already recommended for rice sheath blight disease. However, soluble concentration (SC) formulations are safer than EC formulation. Pilot scale fungicide testing showed Hexaconazole 5% SC (Emzole 20mL/10 L) was comparable to standard Hexaconazole 5% EC (Eraser 20mL/10 L) during 2010 Yala season suggesting a possibility of replacing Hexaconazole 5% EC (Eraser) by Hexaconazole 5% SC (Emzole 20ml/10 l).

Study of the effect of oligochitosan on Rice leaf blast disease

The oligochitosan (irradiated chitosan) has antimicrobial activity (biotic elicitor), growth promotion activity and can act as a water super absorbent. We studied the impact of oligochitosan on control of rice blast disease. Spraying oligochitosan did not satisfactory control rice blast disease.

PEST MANAGEMENT

Screening for resistance to major pests

Cultivation of resistant varieties is the most economical and environment friendly method to control pest incidences. Brown Plant Hopper (*Nilaparvata lugens*) (BPH) and Gall Midge (*Orseolia oryzae*) (GM) are serious pests in rice cultivation in Sri Lanka. Any rice variety to be released in Sri Lanka must therefore possess resistance to Brown Plant Hopper **(**BPH) and Gall Midge.

Rice Brown Plant Hopper resistance

Screened 1453 entries in 2009/2010 Maha and 1824 entries in 2010 Yala, identified from advanced progenies, yield trials, INGER, CRVT and VAT against BPH and identified 922 entries in 2009/2010 Maha and 889 entries in 2010 Yala,as resistant or moderately resistant to BPH.

Rice Gall Midge resistance

Screened 1453 entries in 2009/2010 Maha, and 1824 entries in 2010 Yala from advanced progenies, yield trials, CRVT and VAT against

GM and identified 210 entries in 2009/2010 Maha and 235 entries in 2010 Yala as resistant or moderately resistant.

New insecticide for rice leaf folder

Rice Leaf Folder (*Cnaphalocrosis medinalis*) is a dangerous rice pest during vegetative and reproductive stages which could decrease grain yield by about 20% with severe infestation. No resistant line/variety has so far been identified against Rice Leaf Folder. Therefore, it must be controlled by cultural, agronomic and chemical means. There is a need to identify a new insecticide with different mode of action to control rice leaf folder but with minimum damage to natural enemies and the environment. Acephate 97DF (460g/ha) was effective in controlling rice leaf folder, but the chemical cannot be recommended due to its adverse effects on natural enemies.

Biological product screening against rice pests

Brown Plant Hopper and Rice thrips are serious pest in rice cultivation. Even though,

chemical pesticides are available for control of these pests, it is very important to identify environment friendly biological products to control BPH and Thrips such as Oligochitosan which could act as a biotic elicitor. Oligochitosan treated rice plants were evaluated for BPH and Thrips infestation. Oligochitosan treated plants with a concentration of 50 ppm provided satisfactory level of Thrips and BPH control.

WEED MANAGEMENT

National coordinated herbicide screening for wet seeded rice

Conducted the National Coordinated Herbicide Testing Programme in five locations in Dry, Intermediate and Wet Zones and tested 6 new herbicides with two recommended herbicides to ascertain weed control efficacy. Among the herbicides, two grass killers, Fenoxaprop –p- ethyl 69/1 EC and Metamifop 10%EC and three grass, broad leaf and sedge killer herbicides, Bispyribac sodium 20%WP, Oxadiazone EC and Bentazone 48 % SL were selected for further testing under the pilot scale testing programme.

Long term effect of zero tillage technique on weeds and yield of rice

In sustainable cropping system, there is a tendency to reduce tillage intensity in order to reduce cost of cultivation. Land preparation in rice farming is important for better rhizosphere environment, weed control and to arrest seepage losses. We have earlier reported that method of land preparation did not have a significant effect on the growth and grain yield of rice up to three seasons under weeded condition, but recorded reduction in grain yield by 10% and 18% in the 4^{th} and 5^{th} seasons respectively. On the 6^{th} year, there was a seasonal effect on the weed community. Size of the perennial weed seed bank decreased and the annual weeds especially broadleaf weeds and sedges in the pre-plant herbicides + zero tillage treatment increased.

Weed suppression ability of cultivated rice

For sustainable rice farming, weed suppression ability of varieties are considered to be important. Tested At362, Ld356 and At353 for the above character and found lower weed biomass in plots grown with At362, Ld356 and At353 and also recorded significantly greater grain yield (around 2 t/ha) than Bg352, Bg357, Bg358, Bg359 and Bg360(around 0.5 t/ha). .

Weedy rice in Manapaha yaya / Kurunegala District

Field observations revealed that there is a greater morphological variation of around ten distinct types of weedy rice based on grain characters. Most common types of weedy rice were Intermediate size grain, straw colour lemma and palea, white colour endosperm and absence of awn

and there was a significant reduction in yield due to weedy rice.

Morphological diversity of weedy rice in Sri Lanka

About 2,500 morphologically diverse weedy rice accessions were collected randomly from different rice ecosystems during 2004 to 2009 period. Weedy rice fell into 112 groups based on panicle and grain characteristics. The selected weedy rice samples were planted in pots (@ 10 seedlings) with 3 replicates for characterization and identified about 1300 morphologically different accessions. About 90% of them were 90 to 165cm tall had 6-21 panicles/hill and flag leaf length ranged from 24 - 68cm with different leaf angles ranging from erect to droopy leaves.

Management of weedy rice

Implemented the technology package, developed at RRDI to control weedy rice in paddy fields with the participation of extension officers and farmers, and demonstrated effective control measures of weedy rice.

SOIL SCIENCE

Tested 2 new salt tolerant rice varieties in Puttalam and Polonnaruwa districts for their adaptability in salt affected paddy tracks, but reclaimed using a package of practices such as cleaning drainage canal, application of organic manure, maintain water at 2 cm level up to flowering stage. With improved soil conditions, the yield of salt susceptible rice variety Bg 352 gave 4 t/ha yield while new salt tolerant rice lines Bg 11-139 and Bg 5-110 recorded 7 t/ha yield.

Twenty recommended rice varieties from different age groups were screened in a rice field which was not treated with any fertilizer or rice straw except irrigation water for the last 30 years. Soil P, K, Zn and OM content of these plots were 2.5 mg/kg, 25 mg/kg 0.3 mg/kg and 1% respectively. Bg 352, Bg 358, Bg 305, At 353, At 354, At 462, Murungakayan and Suduheenati recorded a yield of about 2.5 to 3 t /ha under such condition.

P fertilizer application in alternative seasons was compared with the P application at every season and no P application for 4 consecutive seasons. After four seasons, soil P levels without addition of P fertilizer decreased from 10 mg/kg to 3.5 mg/kg while plots treated with P fertilizer for every season and in alternative seasons had soil P levels at 7 mg/kg and 8 mg/kg respectively. Though there were differences in soil P after four seasons, there was no significant difference in grain yield with and without P fertilizer for four seasons. This suggests that the critical soil Olsen's P level for rice could be much below the suggested level, 10mg/kg.

Studied the most suitable rate of K application to obtain optimum rice yields without depleting soil K and found soil K levels increased until 4 weeks after 1st ploughing and decreased thereafter irrespective of straw or fertilizer K application. K removal of rice crop was around 100 kg /ha per season. In the first season of the study, there was no response of rice to application of K fertilizer even with a grain yield of 5t/ha.

Tested elite breeding lines, Bg 14-360, Bg 997, Bg 1350 with Bg 379-2 for their response to N fertilizer. Bg 14-360 and Bg 1350 showed similar response pattern with Bg 379-2 while Bg 997 performed well under low nitrogen conditions.

Studied the N fertilizer requirement with the addition of organic manure to quantify the fertilizer saving without affecting grain yield. Application of organic manure significantly

increased soil fertility, efficiency of chemical fertilizer and grain yield. Incorporation of sufficient amounts of organic manure could reduce the fertilizer N requirement by 25% without affecting the rice grain yield.

In a farmer participatory research study in two paddy tracks at Ambanganga and KalingaEla in Polonnaruwa District, soil fertility constrains in intensive paddy growing areas and management options needed to overcome those constrains were studied. Low levels of soil P, K, organic matter and Zn were identified as major soil fertility constrains in rice–rice system in the Polnnaruwa District. Application of Zn, organic manure and chemical fertilizers based on target yield during four consecutive seasons increased rice yields from 4 to 8 t/ha. In the lower part of the catena, high level of EC, pH, Ca, Mg and Na were major constrains. Cleaning of drainage canals decreased EC, pH, Mg and Na concentrations and as a result productivity of such fields increased. Introduction of salinity tolerant rice varieties helps to increase yield levels in saline affected paddy fields from 4 t/ha to 7 t/ha.

WATER MANAGEMENT AND GIS

Water balance of irrigated rice

Studied the water balance of irrigated paddy fields at Ambanganga and Polonnaruwa to monitor the water use and water distribution pattern using evapo-transpiration (ET), seepage (S), percolation (P), runoff (RO), rainfall (RF) and infiltration (I). Prepared maps results revealed that a significant quantity of water is wasted (50%) during land preparation as runoff. Scheduled irrigation interval of 10 days did not match with the water need of the rice crop, especially at the reproductive stage. Seepage and percolation losses were high due to sandy nature (75% sand) of the soil. Maps showed that the amount of water distributed in one rotation of irrigation is not sufficient for the paddy fields located in the lower end.

Studied the effect of water stress on grain yield of Bg 359 with different fertilizer treatments (NPK, NPK+straw, NP+straw, NP only) at 3 moisture stress regimes. No significant difference was observed in grain yield during the first and the second season without water stress. However under stressed conditions, straw treated plots produced a significantly higher yield (6.9 t/ha) than that with N,P and K (5.8 t/ha) and N and P (4.3 t/ha) alone.

AGRONOMY

Variety screening for moisture limited environments

Water for rice cultivation in most rain fed and irrigated ecosystems are becoming a scarce resource. The difference in cultivated rice land extent between Maha and Yala and the difference in cultivated and harvested extent is mostly due to lower rate of availability of water. Therefore, continued the program on selection of suitable rice lines for water limited ecosystems. Evaluated the rice lines received from IRRI through International Network for Genetic Evaluation of Rice (INGER) and Green Super Rice (GSR) and local germplasm under semi aerobic and drought environments. Out of 31 lines received in 2009 and 38 lines received in 2010 through the INGER aerobic nursery, selected 15 and 12 lines respectively for further testing. Received a total of 95 lines through the GSR programme for drought tolerance, and 17 lines were advanced to the next season. Based on the performance of these lines in 2009/10 Maha, 2010 Yala and 2010/11 Maha season, lines will be selected for yield evaluation under both aerobic and drought environments.

Earlier selected 2 drought tolerant lines, CNI 9024 and CNI 9028 tested in farmer fields in the

Intermediate Zone for their adaptability and farmer acceptability.

Use of eradiated Oligo Chitosan

Eradiated oligo chitosan identified as growth elicitor by the Atomic Energy Authority, Sri Lanka were field tested at RRDI. Among the preparations tested, spraying of chitosan1 @ 300 ppm and chitosan3 @ 50ppm at tillering, panicle initiation and late booting significantly increased rice leaf N status and grain yield than the untreated rice crop.

Canopy temperature of rice during flowering

Increase or decrease air temperature above or below critical level at anthesis could increase rice grain sterility. Studied the canopy temperature and humidity from late booting till physiological maturity using "Mincer", an instrument which can automatically record temperature and humidity at a given time interval. Air temperature inside the rice canopy was 1-2 ^{0}C lower than the external air temperature. This suggests that if the panicle is located lower in the canopy and the flag leaf is shading/covering the panicle, the direct impact of solar radiation on panicle could be minimized and could prevent heating of the spikelet. Therefore the negative impacts of high air temperature during anthesis could be minimized.

Lowering the panicle position also increases lodging resistance. Therefore this canopy architecture could be used to identify future rice varieties to overcome climate change impacts as well as to develop non lodging rice varieties for mechanized harvesting.

Validation of crop growth model

Started collecting phonological and physiological data to develop variety coefficients for the validation of crop models, ORYZA 2000 and DSAT4.5. Initial observations revealed a greater accuracy in fitting the phonological observations with the model forecasting. Further studies are in progress.

National Coordinated Rice Variety testing programme (NCRVT)

During 2010, NCRVT program continued with 3, 3 ½ and 4 month maturity classes. Tested 3 new rice lines of 3 month, 6 new lines of 3 ½ months and 4 new lines of 4 month duration with standard check varieties in 8 location in 2009 Yala and 2009/2010 Maha seasons under complete researcher management conditions.

Selected following lines for further testing in farmer fields under the VAT programme.

At 07-800 - 3 month line with an intermediate bold grain type

At 06-631 – 3 ½ month line with a very small grain like suduru samba

Bw 05-1621 – 3 ½ month line tolerant to iron toxicity

Variety Adaptability Programme (VAT)

Conducted the variety adaptability program of 3 month and 3 ½ month age classes in 75 locations in the Dry, Intermediate and Wet zones and tested 5 new elite lines of different age of both samba and non samba rice lines for their adaptability. Also, tested 2 lines of 3 month age class, 3 lines of 3½ month age class with standard check varieties in both 2009/2010 maha and 2010 yala seasons. Among the lines tested, At 6-486 (3 month white samba), At 06-650 (3½ month red samba) and Ld 3-6-12 (3½ month white samba) were superior to the standard check varieties and nominated for the LSVAT program.

Large Scale VAT program (LSVAT)

Tested, 6 new elite lines, At 632 (3 ½ month red samba), Bg 3171(3 ½ month white non samba - intermediate bold), Bw 4-992 (3 ½ month white

samba), Ld 3-12-50 (3 ½ month red samba), Bg 2-465 (3 month white non samba – intermediate bold) and At 6-676 (3 month white non samba – intermediate bold) in 2010 in farmers field large plots to understand the farmers acceptability. At 632, Bg 3171 and Bw 4-992 showed promising. However, as the recently released varieties are still getting popular among farmers it was decided to further popularize these lines among farmers by distributing small seed packs and obtaining their response before considering for national release.

SEED PRODUCTION

Continued the breeder seed production of recommended varieties for all maturity classes, 2 ½ month, 3 month, 3 ½ month, 4 – 4 ½ month and the 5-6 month photoperiod sensitive foundation seeds for the long age "Mawee" program as planned (Table 2.3.4).

Table 2.3.4: Breeder seed produced (kg) during 2009/2010 Maha and 2010 Yala

Variety/ maturity in days	Breeder seed (kg)	
	Maha 2009/10	**Yala 2010**
150 - 180 days (photoperiod sensitive)		
Bg 3-5	20 (foundation)	not cultivated (photoperiod sensitive)
Bg 745	20	-do-
Bg 38	20	-do-
4 months		
Bg 379-2	20	100
Bg 450	20	50
Bg 403	20	20
Bg 454	20	20
Bg 406	01	40
3 ½ months		
Bg 94-1	100	80
Bg 352	180	180
Bg 357	20	20
Bg 358	200	220 (foundation)
Bg 359	120	160
Bg 360	20	40
Bg 366	-	20
3 months		
Bg 300	160	240
Bg 304	20	120
Bg 305	20 (foundation)	-
80 Days		
Bg 250	40	40

National Rice Congress 2010

RRDI revisited its mission by organizing the National Rice Congress which is held once in 10 years. The two day event, held on 2nd – 3rd December 2010 was attended by the Hon Minister of Agriculture, the Secretary to the Ministry of

Agriculture, the Deputy Director General, IRRI, Scientists from the Peoples Republic of China, India, Philippines and over 300 Sri Lankan policy makers, scientists and other government and private sector officials. It was revealed that the targets set by the "*Gannoruwa Decleration*" in 2000 had been fully achieved.

Thirty nine review papers and 38 posters to recapitulate the progress of policy, research and development activities and to formulate future strategies for the rice sector were presented at the National Rice Congress 2010.

TECHNOLOGY DISSEMINATION

With the formal inception of the training center, we continued to disseminate proven technologies to relevant stake holders. Conducted 141 full day training programs for over 4898 field extension staff, farmers, agriculture teachers, university students and school children during 2010. In addition, conducted 12 Research–Extension dialogues with the participation of 346 officers, nine school teacher training programs, 19 farmer representative training programs and several seasonal meetings with the participation of extension staff of DOA and officials of other Departments and Ministries etc Further, long term training programs of 3 to 6 month duration were also conducted for over 20 University and Technical College students for the completion of their degrees or diplomas. A field day during 2010 Yala to demonstrate research and development activities of RRDI was organized with the participation of the Hon minister of Agriculture, other related officials and farmers.

RICE RESEARCH STATION, AMBALANTOTA

Objectives of the Rice Research Station, Ambalantota are the development of new red pericarped varieties, development of salinity tolerant varieties and development of high yielding short age varieties which are resistant to pests and diseases with acceptable grain quality and to develop associated technologies to solve field problems in the region.

Varietal Improvement

Made about 80 crosses during the year 2010 to achieve the above objectives. Evaluated 116 bulk populations and selected 97 for further testing. From F5 generation onwards established 1564 advanced progenies and selected 238 for further evaluation as progenies and in yield trials. Tested 47 lines in preliminary yield trials (PYT) and selected 23 lines for testing in major yield trials (MYT).

Selected 01 new promising line, At 06-650 from VAT for further evaluation in Large Scale Variety Adaptability program. Selected 02 newly developed lines, At 07-800 and At 06-631 from NCRVT for further evaluation in VAT.

Nominated new promising lines of 3 to 3 ½ month maturity duration, At 08-413, At 08-593, At 08-617, At 08-648, At 09-854, At 09-861 and At 09-1078 to the CRVT program in 2010. Conducted VAT at 11 locations in Matara and Hambantota Districts.

Evaluation of introduced germplasm

Evaluated 02 INGER nurseries (IIRON and IRSSTN) received from IRRI, Philippines and identified 06 promising lines for further evaluation and to be used in breeding programmes.

Breeder Seed Production

Produced required quantities of breeder seeds of At 303, At 306, At 307, At 308, At 353, At 354, At 362, and At 402 and supplied to government farms for the National Seed Paddy programme.

Reducing cooking time and electricity need by pre-soaking of rice

Investigated pre-soaking time of rice to reduce electricity usage and saving of time of 04 popular rice varieties, Bg 300, Bg 352, Bg 358 and At 306. Soaking of rice for 8 hrs reduced cooking time by 17.4%. Rice without pre soaking had taken 17.5 minutes while rice soaked for 8- hr has taken only 14.5 minutes to be cooked rice in a mini rice cooker. Mean values of cooking time of different rice varieties soaked for 8hrs were 15.02, 16.32, 15.4 and 14.47 minutes for Bg 300, Bg 352, Bg 358 and At 306 respectively. This suggests that 8hr soaking could reduce electricity consumption by 17.4% which could be considered as a significant saving of electricity towards the national economy.

Paddy storage using hermetic storage bags

Grain quality attributes were evaluated comparing hermetic storage with common poly-sack storage using six promising varieties, Bg 352, Bg 300, Bg 358, Bg 360, At 405 and At 306. The hermetic storage could sustain most of the favorable rice grain quality attributes. However, hermetic storage is not an acceptable alternative to preserve seeds for panting purposes and also to maintain whiteness of rice grain. The whiteness values after 9 month storage were lower in hermetically stored grains than those in poly-sacks.

Dissemination of Technology

During 2010, many on farm training programmes for field extension staff, farmers, agriculture teachers, university and technical college students and school children were conducted.

RICE RESEARCH STATION, SAMMANTHURAI

Rice Research Station, Sammanthurai was established to cater to the needs of rice farming in the eastern region of Sri Lanka with the objective of identifying knowledge gaps encountered in rice cultivation in the Eastern Province, especially in Ampara District and to develop suitable remedial measures.

This Research Station is also responsible for the selection of suitable promising elite rice cultivars and development of suitable agronomic packages with the available resources to maximize rice yields in the region. During the year 2010, the National Coordinated Rice Variety Trials (NCRVTs) for all age classes, rice Variety Adaptability Trials (VAT) and Large Scale VAT (LSVAT) were conducted in the Research Station as well as in farmers' fields.

Dissemination of technologies related to rice cultivation to all stake holders in the region is considered as an important activity in this Research Station. Three awareness training programs were conducted with the participation of paddy farmers, Technical College students and private sector officials. Two undergraduates from Wayamba University completed their final year project requirement in 2010. Under the organic compost production program a large quantity of compost culture were produced and distributed among farmers who participated the training programs. Eleven training programmers on organic compost production and usage were conducted with the participation of 820 farmers. An awareness program on weedy rice problems was conducted for farmers in the region.

Nearly 70% of the construction works of the new main administrative and laboratory buildings were completed at the Research Station premises.

PLAN FOR 2011

RRDI and its satellite stations will continue to develop production and protection technologies to meet the increasing demand for rice due to change in consumer food habits, use of rice for rice based products including the production of alcoholic beverages, increased influx of tourist and global market uncertainties pertaining to other food commodities. However, challenges in achieving these targets are very much diverse and they change over time. Rice cultivation in the island will face both excesses and shortages of water, new pest and diseases complexes, high and low temperature stress, depleted soil nutrient supplying capacity and threats from weeds and weedy rice.

Therefore, there is an urgent continuous need to identify new varieties and different plant types with high resource use efficiencies which yields better under both biotic and abiotic stress conditions. The seed paddy programme is becoming more vulnerable to changes in the environment and heavy out crossing has been frequently reported. Therefore in order to overcome such challenges, continuous supply of good quality seed is considered as an essential need to frequently replenish farmers' seed requirement. With the establishment of the residential facilities for trainees, these technologies developed by RRDI and satellite stations could be effectively disseminated. New short and long term rice cultivation training programs will be further upgraded and strengthened in terms of the current needs.

STAFF LIST

Cadre post	No.
Director	01
Deputy Director (Research)	01
Assistant Director	01
Research Officer	13
Agricultural Officer	02
Agricultural Economist	01
Economist Assistant	01
Agricultural Monitoring Officer	06
Programme Assistant	09
Agricultural Instructor	31
Research Assistant	17
Management Assistants' Service	13
Driver	09
Carpenter	01
Mason	01
Circuit Bungalow Keeper	01
Watcher	12
Sanitary Labourer	02
Unskilled Labourer	225
Total	**347**

2.3.1 REGIONAL AGRICULTURAL RESEARCH AND DEVELOPMENT CENTER (RARDC) - BOMBUWELA

The Regional Agricultural Research and Development Center (RARDC) is located in the Low Country Wet Zone and it has two sub stations, Agricultural Research Stations (ARS), at Bentota and Labuduwa. The research and development programme of the centre is designed to increase rice productivity in the five administrative districts of Kalutara, Colombo, Gampaha and part of Galle and Ratnapura in the Low Country Wet Zone (LCWZ). The RARDC Bombuwela endeavors to develop high yielding both red and white rice varieties particularly tolerant to iron toxicity whereas the ARS, Labuduwa is focussed to develop mainly red pericarped samba type rice varieties which are in high demand in the southern region of LCWZ. The ARS, Bentota focussed its programme to develop rice varieties and related technologies for the flood prone and saline areas in the region by conducting programmes in the station and farmer-fields in the form of farmer participatory programmes.

BUDGET

Annual budget during 2010 and expenditure under capital and recurrent votes and projects are given below.

Table 2.3.1.1.: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	3,821,434	3,821,434	100
Recurrent	9,563,500	8,930,570	93
Projects			
Promotion of Production and Usage of organic manure	1,855,000	1,721,437	93
TOTAL	**15,239,934**	**14,473,441**	**95**

PROGRESS

RICE BREEDING

Varietal Improvement

NCRVT and VATT Programmes

NCRVT, VAT and LSVAT Program was continued and a total of 26 nominations were evaluated. Bw 05 – 1621 (red pericarped, intermediate bold, 3 ½ m) line was selected for the VAT while Bw 04-992 (white samba, 3 ½ m) was selected for the LSVAT. Five promising lines were tested in the Colombo, Gampaha, Kalutara and Ratnapura Districts

Breeder seed production

Following quantities of breeder seed of Bw 363 and Bw 364 were produced and Bw 351, Bw 361 along with Bw 272-6b were multiplied to supply seeds for regional needs.

Table 2.3.1.2: Seed produced in 2010 (kg)

Variety	Breeder Seed	Commercial Seed
Bw 272-6b	82.5	59.5
Bw 351	41.0	98.0
Bw 361	61.5	447.0
Bw 363	41.0	213.0
Bw 364	41.0	47.0

Rice Varieties for Organic Farming

About 100 kg of seeds of 07 traditional varieties were produced for organic farming. Some improved rice varieties, Bg 359, Bw 272—6b, Bw 363, Bw 361, Bw 361 and Bw 364 have shown high yields (3.0-3.3t/ha) when they are grown organically

AGRONOMY

Direct sowing of Hybrid rice

Direct sowing of Hybrid rice seed @ 30kg/ha under LCWZ conditions is now being tested in the farmers' fields prior to being recommended for release as a new technology.

WEED SCIENCE

Chemical weed management

Several new herbicides were screened for wet-seeded rice. Bispiribac Sodium 20% WP and Oxadiazon 25% EC were effective to control all types of weeds. Matamifop 10% EC and Fenoxa prop-p-ethyl 69g/la were effective in controlling grasses while Bentazone 48% SL was effective on broad leaf and sedges.

ENTOMOLOGY

Screening for Insect Resistance

Fifteen resistant lines to rice gall midge, seventeen resistant lines to brown plant hopper and twelve resistant lines to thrips were identified under the screening programme.

Found three plant species viz., *Sacciolepis interrupta, Echinocloa curs-gali and Leptochloa chinensis* to be substituted as alternative hosts for rice sheath mite.

In identification of effective botanicals against rice stored pests programme, papaw leaves were very effective in controlling *Sitotroga cerealell* followed by lime and 'nika' leaves. However, they were found to be effective in controlling *Sytophilus oryzae.*

PATHOLOGY

Varietal screening for rice blast

- A total of 230 rice lines from Bombuwela, Ambalantota and Labuduwa rice improvement programmes were screened and 40 lines were identified as blast resistant.
- The most effective concentration of chitosan for rice blast (*Pyricularia grisea)* and rice sheath blight (*Rhyzoctonia solani*), was found to be 400 mg/L.

Promotion of production and usage of organic manure

- Over 35 tonnes of compost was produced. Thirteen training classes were conducted for 500 stakeholders under this project.

Model Village Programme and Community Based Seed Production Programme

- The field activities of the projects were initiated during the latter part of the year in two villages in the Kalutara District.

TECHNOLOGY TRANSFER

- A total of 235 DOA officers were trained in pre-seasonal training classes and in plant clinics were held in the Kalutara District while 70 more farmers and officers were trained on *in situ* in Kegalle. In addition to these, active participation in 07 exhibitions were arranged by the research staff.
- Four TV programs were telecast on new technologies developed by the research staff at the RARDC, Bombuwela. At the monthly Seminar programme of the RARDC, Bombuwela, 45 topics covering a range of subjects were presented by the staff.

RICE RESEARCH STATION, LABUDUWA

The Rice Research Station, Labuduwa is responsible for developing varieties and technologies for high potential rice lands in the southern region of the LCWZ.

Rice Breeding

Ld 408, a 110 day red rice variety was recommended and released for island wide cultivation.

NCRVT, VATT and LS VATT Programmes

Ld 3-6-12, Ld 1-5-15 (3 ½ month white samba varieties) and Ld 3-12-50 (3 ½ month red samba) were tested in the LS VAT. Ld 8-6-7 (3 ½ month red samba) variety was nominated to the NCRVT.

Breeder Seed Production

Following quantities of breeder seed were produced;

Table 2.3.1.3: Breeder seed produced in 2010 (kg)

Variety	Quantity (kg)
Ld 365	100
Ld 356	40

Other Projects

The Promotion of Production and Usage of Organic Manure was initiated for the first season and produced 10 tonnes of compost.

AGRICULTURAL RESEARCH STATION, BENTOTA

Four IRRI selected lines (IR 119, sub 1 Samba Mashuri, sub 1 IR 64, Swarna sub 1) were tested for flood resistance with local lines Bg 96-741 and Bg 5R under particular farming situations in 07 districts.

The NCRVT and VAT programme were also continued in representative field conditions in farmer fields.

Organic manure production and promotion programme

5000 kg of compost were prepared. Three hundred and eighty nine compost starter packets (972 kg) were distributed among farmers. 1600 sticks of upland green manure plants (Gliricidia and 'Kaduru') were planted.

A total of 389 trainees (DOA officers, teachers and students) were trained on compost production and usage at the ARS, Bentota

Trainings, Conferences & Workshops

- A.P. Bentota (RO). 3rd International Rice Research Congress. Hanoi, Vietnam (08-12th November, 2010).
- A.P. Bentota (RO). International Symposium2010. Faculty of Agriculture, University of Ruhuna, 16th November, 2010.
- A.P. Bentota (RO). 5th Asian Biotechnology Conference, 2010. Amaya Hill, Kandy. 15-17th December, 2010.
- J.D.K.M. Jayawardane (RO). 3rd International Rice Research Congress. Hanoi, Vietnam (08-12th November, 2010).
- Y.J.P.K. Mithrasena (RO). 3rd International Rice Research Congress. Hanoi, Vietnam (08-12th November, 2010).
- Y.J.P.K. Mithrasena (RO). 5th Asian Biotechnology Conference, 2010. Amaya Hill, Kandy. 15-17th December, 2010.
- A.S. Pushpakumari (RO). Training Course and demonstration on up sealing of Radiation modification of polymers for agricultural applications in Ho Chi Ming City, Vietnam. 12th-17th July, 2010.
- A.S. Pushpakumari (RO). 3rd International Rice Research Congress. Hanoi, Vietnam (08-12th November, 2010).
- J.B.D.S. Kahandawela (RO). International Conference on 'Blooming of Organic Agriculture in Sri Lanka'. Lakshman Kadiragamar Institute of International Relations and Strategic Studies, Colombo 7.-08th January, 2010.

STAFF LIST

Cadre post	No.
Deputy Director	01
Research Officer	13
Agricultural Officer	01
Agricultural Monitoring Officer	04
Programme Assistant	09
Agricultural Instructor	15
Research Assistant	12
Management Assistants' Service	07
Circuit Bungalow Keeper	01
Driver	01
Sanitary Labourer	01
Watcher	02
Labourer	17
Total	**84**

2.4 FARM MECHANIZATION RESEARCH CENTER (FMRC) - MAHAILLUPPALLAMA

Farm Mechanization Research Center (FMRC) is located within the Maha Iluppallama agricultural complex, to promote appropriate farm mechanization in Sri Lanka by introducing farm mechanization technology and equipment to reduce cost of production, improve quality, enhance productivity & increase the volume of agricultural product.

The major objectives of FMRC is to introduce effective agricultural mechanization technologies compatible to the socio economic and field conditions prevalent in different parts of Sri Lanka. The major activities of FMRC are described as follow.

- Identifying mechanization needs according to priorities & constraints in different farming systems
- Selection & testing of promising machinery & implements with regard to their constitution, functions, safety, economy & sociological factors.
- Development, modification & adaptation of agricultural machinery & implements to suit local conditions at different levels.
- Prepare technical drawings, test reports & guidelines for selected implements
- Transfer of technology to local manufactures & enhance their capabilities to produce appropriate agricultural machinery & implements.
- Helping agricultural extension & other related agencies to popularize agricultural mechanization, technologies among farmers & other users.

The center has 4 sections.

1. Research & development section
2. Testing & evaluation section
3. Agricultural & industrial extension section
4. Vehicle maintaining & repairing section

BUDGET

The allocation and expenditure under different votes for 2010 are given in Table 2.4.1.

Table 2.4.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure
Capital	6,999,125	6,447,942
Recurrent	4,090,000	3,459,531
Total	**11,089,125**	**9,907,473**

PROGRESS

RESEARCH & DEVELOPMENT

Maize Thresher

Improvement of maize thresher to reduce seed damage up to less than 1% and increased capacity to more than 2000kg /h.

Motorized Drum Seeder

Conversion of existing manual drum seeder in to a motorized drum seeder to save seed paddy and man power requirements to facilitate conditions for mechanized weeding is in progress.

Seed Paddy Cleaner

Existing paddy cleaner was improved by introducing a new oscillating system. New bruising system has been coupled to the machine to produce high quality seed paddy at a lower cost.

Improvements of Highland Seeder

Development of the existing clutch system of tractor coupled box seeder to maintain correct hill distance at seeding with a good soil cover in order to reduce seed damage.

Improvement of Lowland Power Weeder

Modification of the power transmission system of existing machines to increase the rear mulch wheel efficiency.

Highland Power Weeder

Introduction of a new power operated weeder to increase efficiency of weeding and to reduce drudgery associated with manual and mechanical methods for operation. The highland power weeder is designed for controlling weeds in maize and many legume crop cultivations.

Testing & Evaluation

Following machines were tested and evaluated to confirm manufacture's specifications and to ascertain their adaptability.

Table 2.4.2: Testing of machines

Type of machine	Country of origin	Total No. of machines tested
Four wheel tractors	India	4
Two wheel tractors	China	8
Mammoty	Sri Lanka/ India/China	9
Brush Cutter	Italy	1
Tine Tiller	India	1
Sprayers	Malaysia/ India/ Thaiwan	5
Water Pumps	Sri Lanka	8

Agricultural & Industrial Extension

Undergraduates, farmers, teachers, school students, Technical College students and staff visited the Institute. Field demonstrations and trainings for farmers and other clients were held at Bata-Atha (during Govi Sathiya), Trincomalee (Trinco Openings its Doors), Kundasale ('Deyata Kirula' 2010) and Kahatagasdigiliya. A project was launched to provide machinery packages for paddy & maize to all categories of extension offices.

Vehicle Maintenance & Repairing

Vehicle maintenance & repair section of FMRC provides recommendations and estimations to all institutes of the DOA regarding vehicle repairs, maintenance and purchasing of spare parts.

Table 2.4.4: Repairing of vehicles

	Motor Bikes	Light Vehicles	Heavy Vehicles	Total
Recommendations	0	96	23	129
Repairs	4	26	18	59

Other Activities

- Technical evaluation reports were issued with technical committee approval to purchase suitable equipment and machinery for Government Departments and NGO's. Around 25 Technical Evaluation Reports were issued to external institutes in 2010.
- Repairing of FMRC office buildings, quarters and their hostel.

PLAN FOR 2011

- Modifications of the hydro tiller for use in damp/boggy lands and to increase the land availability for agriculture
- Improvement of reliability of axial flow water pump (Increase the output of the Head). Introducing high capacity reliable water pump to reduce crop damages based on irrigation issues
- Completion of design & fabrication of lowland power weeder.
- Completion of design and fabrication of engine powered weederfor highland crops
- Further Improvements of highland seeder by developing the soil covering plate clutch system and seed hopper
- Completion of motorizing the existing Drum Seeder
- Improvement of maize thresher to increase the capacity
- Designing of 4W tractor coupled Injector Planter for maize cultivation
- Completion of modificating the existing Paddy Cleaner
- Designing of 4W tractor coupled Injector Plant for maize cultivation
- Comparison of yield in respect of the seedling methods and preparation of a comparison report on different seedling methods to be used as a guideline for extension workers.

STAFF LIST

Cadre post	No.
Engineer (Mechanical)	04
Agricultural Instructor	02
Farm machinery Instructor	02
Foreman (Engineering)	01
Draughtsman	01
Management Assistants' Service	02
Driver	02
Machinist	02
Mechanic	03
Storeman	01
Fitter	01
Welder	02
Blacksmith	01
Machine House Attendant	02
Machine Operator	01
Watcher	01
Sanitary Labourer	01
Unskilled Labourer	06
Labourer (Casual)	11
Total	**47**

3.1 SEED CERTIFICATION AND PLANT PROTECTION CENTER (SCPPC) - GANNORUWA

Seed Certification and Plant Protection Centre (SCPPC) is mandated to ensure national plant protection and seed quality, and conservation of plant genetic resources in Sri Lanka. SCPPC is the core management institution for Seed Certification Service (SCS), Plant Protection Service (PPS), National Plant Quarantine Service (NPQS), Registrar of Pesticides (ROP) and the Plant Genetic Resources Center (PGRC). SCPPC is responsible for providing services of vital importance to farmers on maintaining and producing high quality seeds and planting materials, plant protection, control on the use of pesticides and plant quarantine activities. It is also responsible for the conservation of Plant Genetic Resources of food crops. SCPPC bears responsibility for the implementation of regulatory functions pertaining to the following Acts.

- Plant Protection Act. No 35 of 1999
- Control of Pesticide Act No.33 of 1980
- Seed Act. No. 22 of 2003

SCPPC also serves as the National Plant Protection Organization (NPPO) and controls the entry points for phytosanitary related activities in Sri Lanka.

BUDGET

Allocation received and expenditure incurred during 2010 is given below.

Table 3.1.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	1,729,000	844,365	49
Recurrent	3,202,480	2,620,583	82
TOTAL	**4,931,480**	**3,464,948**	**70**

Issued 2548 import permits as indicated below during the year 2010.

Table 3.1.2: Import permits issued during 2010

Permit type	Number
Vegetable seeds	907
Fresh fruits	566
Plants and Planting material	725
Plant Products	260
Seed Potato	30
Animal feed	9
Cut flowers for religious functions	11
Products for human consumption	40
Biological agents	0
Total	**2,548**

Seed Potato Imports

Details of seed potato imported and tested in 2010 are given below.

Table 3.1.3: Seed potato imports

Countries of export	Imported quantity (t)	Released quantity (t)	Lab Tests/ lots
Netherlands	676	676	43
USA	122	122	3
France	37	37	9
Germany	75	75	2
Total	**911**	**911**	**57**

Carried out 14 entry point inspections on imported seed potato consignments and no rejections reported.

Amendment of Entry Conditions

Permitted virus levels revised in seed potato under permit conditions to facilitate the importation of seed potato (Class G_3) from USA.

Amending of Permit Conditions

EU Countries have phased out the use of Methyl Bromide with effect from March 2010. Accordingly, phytosanitary measures pertaining to permit conditions were amended to cater to the current needs.

Post Quarantine Inspections

Fifteen post entry quarantine inspections were carried out to verify the fulfillment of permit conditions inclusive of the requirement for bulk wheat processing facilities in respect to animal feed.

Export Certification

Inspected factory premises facilities and the process of plants and plant products of exporting companies to facilitate certification of consignments envisaged for export.

Field Inspections

Carried out field inspections to detect quarantine pests in potato fields at Nuwara Eliya area. Based on this data pest surveillance programme will be initiated in the future.

Encouraging Local Grain Production

Limitation / restriction of the quantities of importation of maize and sorghum seeds to encourage local production of maize and sorghum.

Export Interceptions

Thirteen interceptions for not fulfilling the mandatory phytosanitary measures were reported from destined countries in 2010. This is a 44% reduction of export interceptions in comparison to that of 2009. The exporters were duly informed to act in conformity toquarantine regulations when exporting consignments in the future.

Live Insects Found in Two Consignments

On a request made to the Ministry of Agriculture by the Australian Quarantine Inspection Service (AQIS), a comprehensive investigation was carried out to provide technical recommendations and other measurements that are required to prevent the occurrence of such instances in future.

Australia Fumigation Accreditation Scheme

Action was taken to initiate the implementation of cooperative bio security incentives in collaboration with AQIS.

Plant Quarantine Clearance of Sri Lanka Fruits

On a request made by the Indian Agricultural Authorities information was provided on pests on mango and rambutan prevalent in Sri Lanka and the risk mitigation measures practiced to control them.

Seminars / Awareness Programs / Trainings on Plant Quarantine

Conducted awareness programmes on plant quarantine for 180 students of the School of Agriculture, Kundasale.

Conducted a training programme on plant quarantine for customs officers to enhance the mutual understanding between the quarantine officers and custom officers in performing related duties.

Arranged a study tour to identify the probable diseases in imported seed potato varieties for quarantine officers working at SCPPC, NPQS and two entry points at the seaport and airport. The groups visited several farmer fields as well as

some contract growers at Ambewela. The objective of this

tour was to expose the officers who participate in the visual inspections of seed potatoes before consignments are released to other aspects of the production system of potatoes from the establishment to harvesting. It also provided them with experience criteria to be looked into when selecting seed potato varieties for the region.

PLAN FOR 2011

- Implementing relevant regulations to facilitate safe imports and exports of plant and plant products

- Formulation of appropriate plans and policy decisions related to the production of high quality seeds and plant materials
    - Development of seed enterprises in the country
    - Strengthening phytosanitory capabilities at national level
    - Upgrading technical capabilities
    - Harmonization of regulatory measures
    - Promotion of most effective and safe pest control strategies
- Implementation of Australian Accreditation Scheme (AFAS) in Sri Lanka.Implementation plan

  January 2011 – AQIS to conduct a scoping visit.

  February 2011 – Creating awareness on the implementation of the Sri Lanka fumigation industry.

  March 2011 - AQIS to conduct a fumigation training course.

  April 2011 - AQIS to conduct audit training and training of trainers course.

STAFF LIST

Cadre post	**No.**
Director	01
Research Officer	01
Agriculture Officer	01
Programme Assistant	03
Agricultural Instructor	01
Administrative Officer	01
Management Assistant	12
Store Keeper	01
KKS	02
Driver	03
Labourer (Casual)	02
Labourer (Contract)	02
Total	**30**

3.1.1 SEED CERTIFICATION SERVICE (SCS) - GANNORUWA

The Seed Certification Service (SCS) performs regulatory functions pertaining to ensure the quality of seeds and planting materials being made available to farmers. Other responsibilities of the institute are given below.

- Implementation of the provisions in the Seed Act and training and creating awareness among seed growers, nurserymen, seeds men and officers on quality seeds and planting material production.
- Certification of the quality of basic and commercial seeds and planting materials of Rice, Vegetables, Other Field Crops (OFC) and Potatoes.
- Fruit plant certification and fruit nursery registration.
- Mother plant selection in government and private nurseries.
- Post control grow-out trials for imported and locally produced seeds.
- Conducting tests on Distinctness, Uniformity and Stability (DUS), prior to release of new crop varieties
- Conducting seed health testing and applied seed research programmes.
- Quality assurance of imported vegetable seed
- Seed development and quality promotion activities.
- Database management and monitoring.
- Publishing fruit nurserymen directory and seed producers' directory.

BUDGET

Allocations received and expenditure incurred under different votes and projects are given in Table 3.1.1.1.

PROGRESS

- Inspected 5,204 ha of rice, 521 ha of OFC, 197 ha of vegetables and 52 ha of potato fields cultivated for seed production.
- Tested 8,950 seed samples representing 11,121 mt of seed paddy, 267 mt of OFC seeds, 70 mt of vegetable seeds and 709 mt of seed potatoes.
- The registered extent of rice, OFC and vegetables were increased by 27%, 51% and 45% respectively in 2010 compared to related statistics in 2009.
- Registered and inspected 222 horticulture nurseries producing certified planting materials and quality certified by labeling 202,276 grafted fruit plants.

Table 3.1.1.1: Annual budget - 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure%
Recurrent	14,010,000	14,010,000	100
Capital	8,980,000	6,800,000	76
Projects - Api Wawamu Rata Nagamu	3,500,000	3,400,000	97
Seed Act	15,000,000	11,590,000	77
Total	**41,490,000**	**35,800,000**	**86**

- Evaluated 9 rice, 7 OFC, 15 vegetable and 1 root and tuber varieties under DUS testing programme.
- Tested 445 post control samples of rice, OFC, vegetable and potato.
- Registered 777 seed handlers under the Seed Act.
- Trained 2284 Government officers and seed handlers.
- Introduced a new label scheme for seed certification of rice, OFC and vegetables.

Seed Paddy Certification

Registered individual farmers, several government (such as DOA farms), Cooperative Societies, Provincial Councils, 'Govi Jana Kendra', Irrigation Department, Mahaweli Authority, Farmer Organizations and private sector Companies, NGOs for the certified seed paddy production programme.

Total extent of land registered to produce seed paddy was 5,204 ha of which the share of private sector was 74%. Extents registered for certified seed paddy production under different sources and seed classes are given in Table 3.1.1.2. Observed an increase of 27% in the year 2010 in the extent registered for rice seed production compared to 2009, due to the increased participation of all sources in seed production.

During 2010, a total of 11,121 tons of seed paddy was produced out of which the quality standards of 8,789 tons of seed paddy were accepted through laboratory tests (Table 3.1.1.3). DOA farms under contract grower programme produced 3,845 mt (44%) and private growers 4,944 tons (56%).

Table 3.1.1.2: Extents under seed paddy production in 2010

Source	Seed class	Extent registered (ha)	Extent inspected (ha)	Accepted %
Research stations	Breeder	5.2	5.2	100
Govt. farms	Foundation	53	42	100
	Registered	459	431	100
	Certified I	132	106	98
	Certified II	3.5	3.5	100
Contract growers	Registered	12	12	100
	Certified I	598	551	95
	Certified II	74	67	92
Private growers	Registered	29	27	98
	Certified I	3,416	2,974	90
	Certified II	422	371	90
Total		**5,204**	**4,590**	**88**

Table 3.1.1.3: Quantities of seed paddy tested and % accepted in 2010

Source	Quantity tested (t)	Accepted %
Research stations		
Breeder seed	3.7	79
Govt. farms	2,672	92
Contract growers	1,476	95
Private growers	6,969	71
Total	**11,122**	

Certification of Other Field Crop (OFC) seeds

The total extent registered under OFC seed production was 521 ha of which contract growers accounted for 84%. Maize, Mung bean, ground nut, sesame, cowpea, finger millet, black gram, soybean and pigeon pea were included in the OFC seed production programme. Extents registered for seed production under different sources and classes are given in Table 3.1.1.4. There was a 50% increase in registered extent for OFC seed production compared to 2009.

Source	Seed class	2009		2010		
		Extent registered (ha)	Extent inspected (ha)	Extent registered (ha)	Extent inspected (ha)	Accepted %
Research stations	Breeder	2.7	2.5	2.8	2.7	100
Govt. farms	Foundation	24.0	23.0	33.2	30.0	100
	Registered	18.0	16.0	17.0	14.6	97
	Certified I	18.0	13.0	7.9	7.9	100
Contract growers	Foundation	0.9	0.9	0.9	0.9	55
	Registered	41.0	37.0	58.0	53.8	98
	Certified I	205.0	177.0	328.0	306.0	97
	Certified II	32.0	30.0	49.8	46.0	98
Private growers	Foundation	0.4	0.4	2.0	2.0	80
	Certified I	2.4	2.4	21.0	20.4	80
	Certified II			0.8	0.8	100
Total		**344.4**	**302.2**	**521.4**	**485.1**	

Certified 94% of the 267 tonnes of total OFC seed production. Quantities tested and percentages accepted from different sources are given in Table 3.1.1.5.

Table 3.1.1.5: Quantities of OFC seed tested in 2009 and 2010

Source	2009		2010	
	Quantity tested (mt)	Accepted (%)	Quantity tested (mt)	Accepted (%)
Research stations	1.4	95	1.9	98
Govt. farms	28.0	93	22.1	78
Contract growers	104.0	95	236.9	96
Private growers	2.0	75	6.6	85
Total	**135.4**		**267.5**	

Certification of vegetable seeds

Registered extent for vegetable seed production was 197 ha. of which private growers accounted for 45%. Registered land extents under different sources and seed classes are given in Table 3.1.1.6. Tomato, Okra, Chillie Snake gourd, Bean, Brinjal, Bitter gourd, Radish, Luffa, Capsicum, Yard long bean, Cucumber, Pumpkin, Amaranthus, Vegetable cowpea, Winged bean and Water melon were included in the seed production programme. The registered extent of vegetable seed production was increased by 45% and produced quantities have doubled in 2010 compared to 2009.

Table 3.1.1.6: Summary of Vegetable seed production extents (ha) by class and source in 2009 & 2010

Source	Seed class	2009		2010		
		Extent registered (ha)	Extent inspected (ha)	Extent registered (ha)	Extent inspected (ha)	Accepted (%)
Research stations	Breeders	1.5	1.3	1.4	1.3	100
Govt. farms	Basic	10.7	10.7	23.5	21.3	100
	Standard	29.0	29.0	27.1	22.3	100
Contract growers	Basic	0.3	0.3	2.8	1.7	95
	Standard	35.7	33.0	53.9	49.4	96
Private growers	Standard	58.7	49.0	88.5	74.2	99
Total		**135.9**	**123.3**	**197.2**	**170.2**	

During the year, certified 54 tons of vegetable and fruit seed of the total of 70 tons. Quantities tested and percent accepted from different sources are given in table 3.1.1.7.

Table 3.1.1.7: Quantities of Vegetable seed production in 2009 and 2010

Source	2009		2010	
	Quantity tested (t)	**Accepted (%)**	**Quantity tested (t)**	**Accepted (%)**
Research stations	0.6	100	0.4	82
Govt. farms	6.0	95	9.4	99
Contract growers	12.8	94	24.2	84
Private growers	13.7	85	36.2	68
Total	**33.1**		**70.2**	

Seed Potato Certification

Cultivated extents for different seed potato classes are given in the Table 3.1.1.8. The total extent under seed potato was 52 ha and certified. A total of 709 tons of seed potato of 2 popular potato varieties (Desiree, Granola). Also, certified 445,609 mini tubers produced under the special seed potato program in polytunnels.

Table 3.1.1.8: Extents under seed potato production in 2009 and 2010

Source	Class	2009		2010	
		Extent Registered (ha)	**Extent accepted (ha)**	**Extent Registered (ha)**	**Extent accepted (ha)**
Govt. farms	Pre-basic	0.38	0.38	0.10	0.10
	Basic	48.93	38.13	13.28	12.28
	Certifid	0.92	0	25.87	24.01
Private growes	Certifid	64.00	54.00	13.00	12.90
	Total	**114.23**	**92.51**	**52.25**	**49.29**

Seed Testing

Tested a total of 8950 seed samples for quality in the DOA seed testing laboratories at Peradeniya, Mahailluppallama, Aluttarama and Batata.

Certification of Planting Materials

Certified and labeled a total of 202,276 fruit plants produced in government nurseries and private nurseries (Table 3.1.1.9).

Table 3.1.1.9: Number of grafted fruit plants certified in 2009 and 2010

Species	No. of plants certified	
	2009	**2010**
Mango-grafted	124,884	99,565
Rambutan-grafted	92,683	63,960
Orange-grafted	60,753	30,572
Manderin	3,072	6,854
Avacado	907	580
Durian	370	304
Jak	80	441
Total	**282,749**	**202,276**

Registration of nurseries

Registered 222 nurseries during 2010.

Mother plant certification

Selected and registered 697 Mango, Rambutan, Orange, Mandarin, Pear, Durian and Jak mother plants.

Table 3.1.1.10: Number of mother plants registered in 2010

Species	No of Plants Registered
Mango-grafted	42
Rambutan-grafted	346
Orange-grafted	163
Mandarin	61
Pears	77
Durian	1
Jak	7
Total	**697**

Post Control Testing

Conducted post control tests to evaluate 445 seed samples which include DOA-certified seed samples and imported seeds of different crop varieties. Number of post control tests conducted, under different crop categories are given in Table 3.1.1.11.

Table 3.1.1.11: Number of post control samples tested

Crop group	No. of lots tested
Rice	152
OFC	178
Vegetables	108
Fruit	7
Total	**445**

Distinctness, Uniformity, and Stability (DUS) Testing

Tested 9 rice varieties for DUS at post control field at Gannoruwa and 15 vegetable varieties, 7 OFC varieties and 1 root and tuber crop variety were also tested. DUS testing of 2 rice, 5 vegetable, 1 root and tuber and 1 OFC varieties were completed during the year.

Table 3.1.1.12: Number of DUS Tests conducted

Crop group	NO. OF TESTS CONDUCTED	NO. OF TESTS COMPLETED
Rice	9	2
OFC	7	1
Vegetables	15	5
Root and Tuber	1	1
Total	**32**	**9**

Implementation of Seed Act

Seed Act No. 22 of 2003 has been implemented since the year 2008 with the objective of safeguarding the farmer as well as the seed handler from malpractices that would harm the seed industry of this country which is a vital sector of the country's agriculture. In order to strengthen the existing legislative provisions and to finalize proposed amendments to the Seed Act, a three day workshop was held with the participation of legal advisors and it was finally decided to repeal the existing Seed Act. A repealed draft of the Seed Act was prepared and handed over to the relevant officers of external agencies for their comments and suggestions.

Registered 777 seed handlers under the Seed Act during the year. Inquired into 5 complains and taken necessary action taken against violators. Published 3 paper articles (Lankadeepa-2, Sirikatha-1), broadcasted 8 radio programs (Rajarata-2, Kandurata-2, Rangiri Dambulu-4) and conducted 25 awareness programmes to issue the registration certificates and to create awareness among the seed handlers all over the country about provisions of the Seed Act. Purchased a fourteen seat van and eight motor bicycles for the regional units to strengthen the Seed Act implementation activities throughout the island.

Research and Development

Carried out preliminary work to initiate following studies,

- Expiry date for packed vegetables.
- Scientific solutions for day to day field problems in fruit plant certification programme.
- Risk associated with imported seed lots.
- Moisture vapour transmission of different packaging materials.

Training Programmes

SCS continued to conduct training programmes to enhance the knowledge of officers and seed handlers on production of quality seeds and planting materials.

Table 3.1.1.13: Number of trainers trained

Training programs	No. of Trainers
Seed farmers/ Nurserymen	1,098
Private Sector	40
Govt. Officers	554
Dealers	588
Total	**2,280**

SCS Information System

Continued the development of the database on Seed Certification by linking 22 Seed Certification Service regional stations, 4 seed testing laboratories and 4 post control stations, through out the country to facilitate data retrieval and analysis on information management. Furthermore, completed designing a new database system on personal data of the staff members of all categories serving in the headquarters, regional units, laboratories and post control stations. Maintained a data base of registered seed handlers under the Seed Act for necessary references.

PLAN FOR 2011

- Empowering Seed Certification Service to achieve the 31% of the national seed paddy requirement by certified seeds.
- Improvement of seed health testing unit to enhance seed hygiene by identifying seed borne pathogens.
- Improvement of seed research unit to conduct seed research pertaining to the post harvest problems encountered by seed handlers especially on seed packaging, storing and expiry dates.
- Establishment of a weed science unit to identify weed seed contaminants, for risk assessment of new plant invasions and studying the invasive and noxious weeds specially to prevent entry of the invasive weed species through imported seeds.
- Improvement of the computer network system. Linking SCS headquarters with regional units, seed laboratories and post control units to form a network to maximize the efficiency of seed certification programme.
- Introduction of software to expedite seed lab reports with network system.
- Introduction of new computer generated carbonized seed lab report.
- Designing SCS website for public awareness, to improve information dissemination on seed certification programme and to facilitate easy access to our service.
- Software development to improve SCS database management, Seed Act database and seed testing results reports.
- Seed Act implementation to regulate the seed production process among state and private sector seed handlers to make available high quality seeds and planting materials in the country while avoiding malpractices in the seed industry.
- Preparing guidelines on quality seed and planting material production or distribution among all seed handlers registered under the Seed Act.
- Preparation and distribution of seed producers' directory and planting material producers' directory in each growing season.
- Introduction of a new fruit plant label.
- Establishment of seed production villages in 20 regional units under "Api Wawamu Rata Nagamu" programme.
- Productivity improvement and office management improvement at Head Quarters and regional units.
- Identifying "Maintaining activities of the Head Quarters attractively to increase productivity and to provide a better service to the farming community of the country" as the theme for the year 2011 for SCS.
- Publishing crop guidelines for seed handlers.
- Finalizing the newly amended seed Act and regulations

STAFF LIST

Designation	No.
Deputy Director	01
Research Officer	02
Agricultural Officer	05
Agricultural Monitoring Officer	06
Programme Assistant	04
Agricultural Instructor	106
Research Assistant	02
Research Sub Assistant	05
Govt. Management Assistant	11
Driver	15
Electrician	1
Watcher	15
Labourer	50
Seed Technician	13
Seedman	1
KKS	1
Total	**238**

3.1.2 PLANT PROTECTION SERVICE (PPS) - GANNORUWA

Plant Protection Service is entrusted with the responsibility of promoting pest control methods that are environmentally sound, economically viable and practically feasible under farmer conditions. These broad objectives are expected to be reached through implementation, monitoring and evaluation of field level integrated pest management (IPM) programs while upgrading the existing pest management techniques.

Control of pest and disease outbreaks, seed and soil fumigation and management of some noxious invasive weeds including alien invasive species in agricultural and aquatic habitats are mandatory functions assigned to PPS.

Providing advisory services on pest control on specific pests are also undertaken by the Plant Protection Service. These activities encompass a major sector of the mandate of the Plant Protection Act No: 35 of 1999.

Plant Protection Service also plays a supplementary role in implementing the Pesticide Act of 1981 through evaluation of new herbicides at pilot scale in farmer fields.

BUDGET

The annual budget for the year 2010 is given in the table below.

Table 3.1.2.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure
Recurrent	1,888,500	1,637,088
Capital	3,205,000	2,564,604
Projects:		
FAO/IPVM	160,000	92,985
Total	**5,253,500**	**4,294,677**

PROGRESS

Promotion of Integrated Pest Management (IPM)

Integrated Pest Management in Rice

The objective of the programme was to provide technical support for sustainable rice production in the major rice growing areas through adoption of low cost and environmentally sound pest management strategies while minimizing the use of synthetic pesticides.

Completed following activities in year 2010.

- Conducted training programme at ISTI, Angunakolapelessa for 27 Farm Managers of the DOA on IPM practices used in rice culture.
- TOT programme for 18 selected extension officers from Ampara district.
- Trained 56 extension officers of Mahaweli Authority System C
- Trained 60 private sector officers from "Agstar Company" on rice and vegetable IPM.

Integrated Pest Management in Vegetables

Conducted a Farmer Field School programme at Rikillagaskada area for bean growers in collaboration with the extension officers of the area.

Conducted 10 training sessions with FFS approach to train about 20 farmers during the season on integrated pest management practices for the control of yellowing problem

in beans. In addition, trained 22 officers of Mahaweli Authority System H on chilli IPM practices.

Integrated Pest Management on leafy vegetables

Further explored the expansion of IPM on leafy vegetable.and extended technical support to the leafy vegetable growers in Colombo district.

Trained 17 newly recruited Agriculture Instructors of the Western Province on IPM practices for leafy vegetables.

Pilot Scale Testing of Pesticides

Evaluated following new herbicides in farmers' field for their bio-efficacy. These herbicides have the added advantages over recommended herbicides to the extent that they are more target specific and applied at relatively lower rates.

Herbicides for weed control in rice

- Recommended Pyribenzoxim 3% EC as an alternative to the already recommended formulation of Pyribenzoxim 5% (Pyanchor) for the control of grasses, sedges and broad leaves in rice cultivation.

- Recommended Bispyribac sodium 20% WP as an alternative to the already recommended Bispyribac sodium (Nominee) for the control of grasses, sedges and broad leaves in rice cultivation. This is a new formulation and its strength is also new to the country.

Herbicides for weed control in maize

- Recommended Topramazone as a post emergent herbicide for control of annual weeds in maize cultivation. The effective application rate is 100 mL/ha of the formulated product and the period of application is around 15 days after seeding of the crop.

Control of Invasive species

Biological control of Salvinia

Maintained a culture of the biological control agent *Cyrtobagous salviniae* and also introduced the insect to salvinia infested water bodies throughout the island with successful results.

Conducted awareness programmes for farmer organizations and introduced the bio control agent *Cyrtobagous salviniae* into 14 tanks in Monaragala, Kandy, Matale, Kurunegala, Anuradhapura, and Gampaha Districts Some farmer organizations reported back that the insect has successfully controlled the weed within a few months.

Biological control of Water hyacinth

Maintained cultures of two bio control agents *Neochetina bruchi* and *Neochetina eichorniae and* insects introduced into 12 tanks infested with water hyacinth in Matale, Anuradhapura, Kurunegala, Monaragala, Hambantota and Kandy Districts.

Training programme on the implementation of regulations of the Plant Protection Act No: 35, 1999 for the Authorized Officers

Conducted a one day workshop for the authorized officers appointed under the Plant Protection Act No 35 of 1999, on current developments in pest outbreaks with special reference to the control of Guava root knot nematode (*Meloidogyne spp.).*

Chemical control of Alligator weed (*Alternanthera philoxeroides*)

Controled a large population of Alligator weed found in Barrack Plane, a low-lying valley area within the city limits of Nuwara Eliya. Carried out a chemical control programme in collaboration with the Irrigation Department and successfully controlled 15 ha of the infested area with herbicide.

Seed Fumigation

Fumigated following quantities of seed materials in Government farms at, Kundasale, Pelwehera, Polonnaruwa, Rikillagaskada and Aluththarama for protection from stored pests.

Seed paddy	328 tonnes
Paddy for consumption	20 tonnes
Seeds of other field crops (maize, cowpea etc)	320 tonnes
Vegetable seeds	31 tonnes

Also fumigated following quantitiess of food items belonging to Government food stores of the District Secretary, Puttlam.

Rice	47 tonnes
Dhal	13 tonnes
Flour	6 tonnes

Termite Control

Taken actions to control termite infestations in several office buildings of the Department of Agriculture at Peradeniya, Gannoruwa and Research Stations such as Gabadawatta, Maduruketiya and Labuduwa.

Necessary steps also were taken to control termite infestations in Botanical Gardens at Peradeniya and Gampaha on the request of the Department of Botanical Gardens.

Rodent control

Conducted a training programme on control of field rats for the extension officers and farmers in Kegalle District. This was a major problem in several farming areas in the district and 350 farmers and officers participated.

In addition, conducted a field demonstration on rat control at Galigamuwa area in Kegalle District.

Conducted a special rodent management programme at Madu area in Vavuniya District as requested by Epidemiology Unit of the Department of Health.

Root knot Nematode in Guava (*Meloidogyne spp.*)

During 2010, the incidence of root knot nematode problem in Guava reached epidemic levels in Puttlam, Anuradhapura and Kalutara Districts.

Plant Protection Service conducted a number of awareness programmes in collaboration with the Tea Research Institute, Agric. Research Station, Sita Eliya and Provincial DOA staff of the above Districts, for the officers, and

public, and solicit their cooperation to implement control activities.

Prepared a leaflet and a poster in both Sinhala and Tamil languages to be used in awareness programmes for the Guava growers. In addition prepared and distributed another leaflet among nursery owners of each district through the extension service.

In addition, organized a training programme in collaboration with the Seed Certification Service for 250 registered private nursery owners to make them aware of the problem and to introduce control measures at nursery level.

Conducted a one day awareness programme for selected Subject Matter Specialists of the In service Institutes and Lecturers from the Schools of Agriculture on identification and management of the problem with the help of Nematologists from the Research Station, Sita Eliya and the Tea Research Institute, Talawakele.

Other Activities (Recently Identified Insect Pests)

Banana Mealy Bug

A new type of mealy bug was reported from banana cultivations during 2009 in North Central Province identified as *Dysmicoccus neobrevipes.* Prepared a leaflet on identification and control of the pest and conducted training programmes for all categories of government officers in the area and solicited their cooperation to implement control activities.

In addition, conducted several awareness programmes during 2010, for the banana growers and nursery owners of the infested areas.

Mealy Bugs and Guava fruit boring insect

Also detected the spreading of other types of mealy bugs in various plants in some parts of the country with the help of Entomologists of HORDI and action taken to suppress the incidences.

Pests and diseases on sacred "Bo" trees

Actions taken to treat a number of "bo" trees belonging to several historic temples on their request.

Agricultural exhibitions

Plant Protection Service played an active role in agricultural exhibition held at Government Farm, Bata atha (Govi Sathiya) during 2010 by preparing and providing exhibits and posters on various pests and plant protection activities through organizing a stall.

Preparation of Posters and Leaflets

Prepared, printed and distributed following leaflets and posters among extension officers and the public during 2010.

- Biological control of Salvinia
- Biological control of Water hyacinth
- Management of Nematode problem in Guava

PLAN FOR 2011

- Strengthen the programmes for the implementation of the Plant Protection Act
- Implementation of Integrated Pest Management (IPM) Programme for rice
- Implementation of Integrated Pest Management Programme (IPM) for vegetables
- Implementation of Integrated Pest Management Programme (IPM) for leafy vegetables
- Adoption of chemical and biological control methods to eradicate/control invasive alien weeds in agricultural and aquatic habitats.
- Awareness programmes for target groups

- Evaluation of new herbicides for bio efficacy at pilot scale in farmer field conditions.
- Fumigation of seed stores in government farms.
- Domestic pest control activities in government buildings.
- Management of pest epidemic situations.
- Preparation of relevant media materials.
- Infrastructure development

- Improvement of the biological control

  rearing unit

- Construction of a fence

- Improvement of the stores

STAFF LIST

Cadre post	**No.**
Deputy Director	01
Research Officer	01
Agricultural Officer	03
Agricultural Monitoring Officer	01
Programme Assistant	01
Agricultural Instructor	09
Research Assistant	01
Public Management Assistants' Service	05
Driver	04
Watcher	02
Lorry Cleaner	01
Special Store Labourer	01
Labourer	05
Total	**35**

3.1.3 NATIONAL PLANT QUARANTINE SERVICE (NPQS) – KATUNAYAKE

The mandate of the National Plant Quarantine Service of Sri Lanka is to regulate pest that are coming/leaving the country through plants and plant products. To achieve this, the centre implement the National Plant Quarantine Act and emphasis given to both research and service oriented quarantine activities.

The major activities of NPQS are Phytosanitary certification, inspection and treatment of import and export plants and plant products, testing of detained samples, dissemination of knowledge on all of plant quarantine through training and awareness programmes. Furthermore, NPQS collaborates frequently in its functions with national research institutes, universities and other institutes and centers of the DOA.

BUDGET

Allocation provided and expenditure incurred under recurrent, capital and projects are given in Table 3.1.3.1.

PROGRESS

Plant Quarantine Operations

Activities carried out during the year 2010 and achievements are shown in Table 3.1.3.2.

Table 3.1.3.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	4,921,100	2,874,328	58
Recurrent	5,354,060	4,217,015	79
Total	**10,275,160**	**7,091,343**	**69**

Table 3.1.3.2: Activities carried out and progress during 2010

Activity	Progress (No.)
Registration of interceptions	177
Number of interception reports sent	176
Registration of inspections	565
Number of inspection reports sent to entry points	549
Registration of coir products for testing	162
Reports for tested coir products	156
Registration of submitted samples for testing	20
Number of training programs conducted	08
Issue of Phytosanitary certificates	03
Number of questionable consignments destroyed	647

Entomology

Activities carried out during 2010 are as follows.

- Testing of foliage and plant samples

Table 3.1.3.3: Testing of export foliage samples for insect pests, mites and plant parasitic nematodes

Description	No. of samples tested	No. of samples contaminated
Export foliage samples for plant nematodes	8,625	1,176 - rejected 64 - rejected
Export foliage samples for insects and mites	1,005	10 – insects 01 - mites
Export strawberry samples	40	Free
Export coir samples for insect pests, mites and plant nematodes	61	11 – Soil 01 - insects

Table 3.1.3.4: Testing of imported plant samples for insect pest, mites, and plant parasitic nematodes

Item	No. of samples	Country	Detections
Foliage plants	52	Netherlands, India, Japan, Taiwan, Israel, Papua new guinea, Thailand, U.S.A.	Free
Fruit plants	27	Thailand	Aphids & mealy bugs
Dried fruits	03	U.S.A.	Free
Seeds potato	67	Germany, U.S.A., India, Netherlands	Free
Seeds			
• Cashew	02	India	*Sitophilus* spp. & *Carphophillus* spp.
• Maize	152	India, Thailand, South Africa, Australia	*Tribolium* spp. Mites *Sitophillus* spp *Cryptolestus* spp
• Ground nut	52	India	Free
• Fiber	02	Mexico	Free

- Ten export foliage nurseries were inspected to promote production of pest free export foliage products
- Monitoring of plant parasitic nematode status in export foliage nurseries.

  Number of nurseries inspected – 15

  Number of soil samples inspected – 692

  Number of contaminated soil samples - 191

Information on contaminations was provided to nursery managers to eradicate plant parasitic nematodes.

- **Research activities**
- 'Wara' leaf extract Fresh garlic extract, Neem oil ,Citronella oil, and 'Ardothoda' fresh leaf extraction effectively controled mealy bugs of export Chrysanthemum.
- Completed an island wide survey of export

potential pineapple fields to detect the pest & disease status to fulfill the import requirements of Australia

- **Trainings and awareness programmes**
- Conducted two training and awareness programmes to upgrade the pest identification and management knowledge of export foliage nursery staff
- Conducted four training programmes funded by the Export Development Board (EDB) in North Western Province for export Anthurium growers, Agricultural Instructors and foliage sub growers.
- Trained 36 Diploma & undergraduate students on Entomology and Nematology related to plant quarantine.
- Tested 32 samples submitted for insect pests, mites and plant nematodes.

Pathology

Activities carried out during 2010 are as follows.

Table 3.1.3.5: Number of intercepted plant samples tested and pathogens associated

Type of the sample	No. of samples/ consignments/plants	Findings
Potato	20 consignments – Netherlands France Germany	Common scab - *Streptomyces scabies* Silver scurf - *Helminthosporium solani* Dry rot - *Fusarium* sp. Soft rot - *Erwinia* sp. Black scurf - *Rhizoctonia solani* Netted scab - *Streptomyces reticuliscabies*
Maize	161 samples- Thailand, South Africa, Australia, India	Fungi: *Aspergillus* spp. *Mucor* spp. *Fusarium* spp. *Penicillium* spp. *Colletotrichum spp., Rhizopus* spp. *Curvularia* spp.
Ground Nut	95 samples- India, China	Fungi: *Aspergillus* sp., *Penicillium* spp., *Mucor* spp., *Rhizopus* spp., *Colletotrichum* spp.
Cashew nut	01 sample – Ivory Coast	*Rhizopus* spp., *Penicillium* spp., *Mucor* spp., *Aspergillus* spp.
Coco bean	14 samples – India, UK, Ghana	Fungus: *Rhizopus* spp., *Aspergillus* spp.
Black gram	01sample - India	Fungus: *Aspergillus* spp., *Alternaria spp.*
Green gram	01 sample- Thailand	Fungus: *Colletotrichum* spp., *Fusarium* spp., *Mucor* spp.
Button mushroom spawn	01 sample - Australia	-
Palmyrah fiber	02 samples – Belgium	-
Trampico fiber	02 samples- USA	-
Onion seed	01 sample – India	*Aspergillus* spp.
Baltic peat moss	01 sample – Netherlands	*Fusarium* spp.
Gladiolus bulb	01 sample – Netherlands	

Table 3.1.3.6: Samples checked for phytosanitary test reports with additional declaration

Material	No. of samples	Checked for	Country of destination
Coir	34	Fungi & Bacteria	Egypt, France, New Zealand, Turkey, Doha Qatar
Coir	12	Free of soil and other contaminations	New Zealand
Aquatic plants	130		France
Foliage	50	Harmful fungi, bacteria, pests, soil organisms	Korea, Japan, Holland, Netherlands, Germany, Switzerland, Singapore
Foliage	15	*Synchetrium endobiotricum*, *Clavibacter michiganensis, Xylellafastidiosa, Corynebacterium sepedonicus*	Greece, Holland
Foliage	1640	Without additional declaration	Netherlands, Sudan, South Korea, Japan
Tissue cultured plants in agar media	1140	Free of media Contaminations	Denmark, USA, Australia
Tissue cultured plants in agar media	50	Without additional declaration	Netherlands
Coco bean	1	Black pod, chestnut downey mildew	India
Strawberry	07	Bacteria and fungi	South Africa

Table 3.1.3.7: Number of other samples tested for pathogens

SAMPLE	NO.	FUNGUS	BACTERIA
GRASS	02	*HELMINTHOSPORIUM* SPP. *CURVULARIA* SPP.	
NEPENTHUS SPP.	13	*COLLETOTRICHUM* SPP. *PHYTOPHTHORA* SPP, *NIGROSPORA* SPP.	
LIVISTONIA SPP.	12	*COLLETOTRICHUM* SPP, *ALTERNARIA* SPP.,	UNKNOWN BACTERIA
ANTHURIUM	03		*XANTHOMONAS CAMPESTRIS* PV *DIFFENBACHIAE*
FICUS	03	*CURVULARIA* SPP.	UNKNOWN BACTERIA

NEEM	05	-	UNKNOWN BACTERIA
BAMBU STEM	03	-	
FOLIAGE PLANTS	07	*FUSARIUM* SPP.,	UNKNOWN BACTERIA

OTHER ACTIVITIES

- CONTRIBUTION TO THE EXHIBITIONS AND WORLD

Science Day in Gampaha District

Three (03) awareness programs were conducted for Anthurium growers to manage the diseases in their nurseries.

Weed Science

- Tested One hundred and seventeen (117) imported consignments for weed seeds and 04 consignments were found to be contaminated with weed seeds.
- Two hundred and thirty eight (238) export coco peat consignments were tested and 44 were contaminated with viable seeds.
- Twelve (12) species of new weeds belong to 04 genera and 02 plant families were collected, identified and preserved on herbarium sheets.
- Collected nine species of new weed seeds belong to the 05 genera and 02 plant families, and preserved in vials.
- The viabi**l**ity of seeds in coco peat can be destroyed within 20 minutes when treated with water vapour at $100^{O}C$

Fumigation

- **Commercial fumigations**

Fumigated a total of 190 consignments of plants and plant products, using methyl bromide.

Intercepted Eight (08) consignments of assorted flowers imported from India and fumigated before releasing to the importer. Fumigation details are given in Table 3.1.3.8.

Table 3.1.3.8: Commercial fumigations conducted at NPQS Katunayake during 2010

Commodity type	No. of fumigations
Foliage plants	06
Cut flowers	08
Wood/wooden items	34
Coir products	126
Cerebra	08
Powdered herbs	08
Total	**190**

- **Supervision of Quarantine Treatments**

Thirty four (34) fumigations for wood packaging materials conducted by private fumigators upon requests of exporters were supervised by the officers of Treatment Technology Division for certification purpose.

PLAN FOR 2011

- Testing of export samples
- Testing of intercepted samples
- Entry port inspection of seed potato consignments
- Testing of seed potato samples

- Collection of soil samples to study the Plant Parasitic Nematode status in export foliage nurseries
- Control of Plant Parasitic Nematodes of export foliage nurseries using environment friendly methods
- Development of γ-radiation treatments to eradicate local fruit fly species in export potential fruits (Mango, Papaya, Rambutan)

- Field visit for the insect reference collection
- Study on identification of thrips in ornamental plants
- Study the repellent effect of some botanicals for scale insects
- Identification of pathogens in samples submitted to NPQS
- Preparation of permanent slides for fungi
- Maintenance of pure cultures of plant pathogen
- Improving laboratory manuals to identify plant pathogens (Photocopying of books, Photographs and print-outs)
- Maintaining seed potato samples for future use
- Identification of viruses/bacteria adopting ELISA procedure

  (200 potato samples for viruses, 200 potato samples for bacteria, 400 maize samples for bacteria, 200 other samples)
- Identification of important diseases on export of coir products for quarantine purposes
- Identification of diseases in aquatic plants in export oriented nurseries in Sri Lanka
- A study on present status and management strategies for Anthurium leaf blight
- Maintenance of weed herbarium (No. of weed species expected to be collected)
- Maintenance of weed seed reference collection
- Maintenance of live aquatic plant collection
- Detection and identification of weed seed in export and import consignments.
- Commercial fumigations at NPQS
- Fumigation supervisions
- Visits to fumigation companies for inspection and auditing
- Development of treatment standards
- Reports on export foliage plants and coir products
- Reports on intercepted samples
- Post entry quarantine aspects
- Training of undergraduates and diploma students
- Training and awareness programs for the stake holders
- Participation at seminars, workshops, conferences and meetings
- Preparation of leaflets and posters
- Pest Risk Analysis (PRA)
- Issue of Phytosanitary Certificates
- Testing of submitted samples
- Destruction of commodities imported violating Plant Protection Act

STAFF LIST

Cadre Post	No.
Deputy Director	01
Research Officer	06
Agricultural Monitoring Officer	05
Programme Assistant	06
Agricultural Instructor	11
Research Assistant	05
Public Management Assistants' Service	07
Driver	04
Electrician	01

3.1.4 OFFICE OF THE REGISTRAR OF PESTICIDES (ROP) – PERADENIYA

The mandate of the Office of the Registrar of Pesticides is to execute statutory provisions of the Control of Pesticides Act No. 33 of 1980. The pesticides registration is the key provision in the course of life cycle management of pesticides in the country from importation through marketing of crops treated with pesticides.

BUDGET

The annual allocation and expenditure under different votes are given in Table 3.1.4.1.

Table 3.1.4.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %	Income
Capital	1,691,000	1,234,548	73	
Recurrent	2,091,480	1,961,641	94	
Registration & Re-Registration fees				2,467,500
Dealer Certification Fees				583,605
TOTAL	**3,782,480**	**3,196,189**	**84**	**3,051,105**

PROGRESS

Registration of Pesticides

In this process, relevant information and documents are evaluated upon submission by the Registrant. If the outcome of assessment is satisfactory, registration is granted with the approved label and containers. The registration fee is charged in order to issue the Certificate of Registration with a registration number. During the year, the total revenue collected through this activity was Rs. 2,467,500.

Re-Registration of Pesticides

The registration of a product is valid only for 3 years after which the product status is reassessed based on prevalent standards, findings and safety issues. During the year, 141 applications were processed under this category. Total revenue realized under this category was Rs. 705,000.

Product Assessment and Registration of New Molecules

Identified and promoted safer and environmental friendly pesticides during pre-evaluation of products for local trials, which facilitate the phase-

out of hazardous products available in the market. Steps were taken to introduce a seminar type approach in evaluation of pesticides registration dossiers in order to have efficient and expeditious evaluation of documents. One of the advantages obtained over these approaches was to share the knowledge among diverse disciplines for effective assessment of pesticides. Evaluated more than 67 formulations and following four were registered during the year.

- Indoxacarb 15.8 %
- Propyleneglycol Monolaurate
- Thiocyclam Hydrogen Oxalate
- Fluazinam

Carried out thorough and comprehensive assessment of registration dossiers for efficacy, quality and safety aspects on general use of pesticides and further streamlined with respect to data requirements by improved guidelines. Registered Thirty (30) pesticides product including commodity active ingredients and household pesticides during the year.

Import approvals

This process ensures that products are imported from the correct source of supply conforming to the required quality standards and prevents importation of excess volumes. During the year, 906 Quality Certificates submitted by the importers were assessed for this purpose prior to the issue of import approvals.

Screening of Labels and Advertising Materials

Label approval procedure enables dissemination of proper information to the end user. To facilitate this process, label templates for all categories of agricultural pesticides were developed to improve the quality of label contents. More than 445 labels and more than 85 advertising materials have been screened during the year. The number of corrective attempts placed on label approval was doubled during the year due to the recent upgrade of the pesticide recommendations. Accordingly more user-friendly directions on the "dosage section" were introduced to pesticide labels.

Field enforcement

As an on going programme, the office of the ROP continued to coordinate with the field enforcement staff of the Provincial, Inter Provincial and Mahaweli Authority to implement the Pesticide Dealer Certification Scheme. Total of 23 one day training classes were conducted for pesticide dealers on certification of sales outlets under the law. Pesticide dealer certificates are valid for one year unless cancelled for specific reasons. A fee is charged as a part of the regulator requirements for issuing a certificate. Total revenue realized under this category was Rs. 583,605.

Training and Awareness Programmes

Several training classes were held during the year for dealers (23) and officers (06). About 654 training certificates and 936 dealer certificates were issued in 2010.

Laboratory Activities

- **Pesticide Formulation Analysis**

  Quality of pesticide is a major factor, determining the efficacy and the impact on the environment and human health. All

registered pesticides should conform to the physico-chemical standards set out by International Agencies such as FAO and WHO. Accordingly each consignment is cleared for marketing if the local tests are conformed. In the year 2010, 1833 formulation analysis have been conducted on 796 batches and thereby making it possible to clear a total of 815,467 kg and 4,530,941 liters for marketing.

Special Activities

- **National Organic Standards and Certification Project**

  Expansion of Laboratory facilities of the ROP office was completed and further analytical work are about to commence within its premises.

- **Pesticide Recommendation**

  Selection of a suitable pesticide, its formulations and methods of use is ensured through the pesticide recommendation booklet published by the DOA. With the collaborative effort of other relevant DOA institutions, the current pesticides recommendations booklet has been reviewed and published in year 2010.

- **Regulation under the Section 26 of COP Act**

  New regulations have been instituted under the COP Act. No 33 of 1980, on pest control service providers with effect from May 25, 2010 (Gazette extra ordinary No. 1655 / 7 dated 25th May 2010). During the year, the total revenue collected through this activity was Rs. 120,000.

  A new set of regulations with regard to the recruitment of pesticide Sales Assistants and Technical Assistants for pesticide sales outlets were proposed to the authorities in order to provide a more efficient service for farmers.

Other activities

Table 3.4.1.2: Progress of other activities conducted during 2010

Sub Activity	Total Annual Physical Target	Achievement up to End of the Year
• Acceptance of applications for registration after screening & allocation of application numbers	150	179
• Evaluation of original Registration applications	60	67
• Evaluation of third- party Registration applications	140	94
• Evaluation of Re-registration applications	140	141
• Evaluation of data for local trials	30	52
• Issue of import approvals	1000	1357
• Evaluation of Pesticides Quality Certificates	1000	906
• Screening of labels for approval	600	447
• Screening of advertising material for approval	175	88
• Inspection of factories	12	06
• Inspection of approved repacking facilities and stores	02	04
• Inspection and certification of premises for fumigation and household pest control operators.	12	10
• Approval of obtaining ethylene bromide for quarantine & pre- shipment treatment on accountable basis	50	49
• Issue of approvals to authorized institutes for purchasing restricted pesticides	100	63
• Dispatch of samples to MRI & ITI for obtaining test reports on suitability for acceptance of applications	25	26
• Issue of packing clearance as per the quality analysis of samples on consignment basis	700	796
• Inspection of sales outlets	100	39
• Officer Training Classes	05	06
• Dealer training classes	26	23
• Issue of dealer Training Certificates	1000	654

• Issue of dealer certificates	2000	936
• Field Complaints	10	10
• Legal Prosecutions	04	01
• Technical Advisory Committee Meeting	06	01

Sub Activity	Total Annual Physical Target	Achievement up to End of the Year
• Formulation analysis	600	1833
• Residue analysis	200	76
• Sample collection by ROP office for quality assurance	12	6
• Service or participation as technical Expertise/ Members/resource persons for intra and inter Departmental organization meetings.	04	01
• Participation as resource personal for invitations from other institutes	10	19
• Collection & compilation, dissemination of import statistics (Central Bank, Universities, Researches, Govt. Institutes etc.)	40	28
• Other activities such as field surveys	04	02

PLAN FOR 2011

- Acceptance of applications for registration after screening & allocation of application numbers
- Evaluation of original registration applications
- Evaluation of third-party registration application
- Evaluation of re-registration applications
- Evaluation of data for local trials
- Issue of import approvals
- Evaluation of pesticide quality certificates
- Screening of labels for approval
- Screening of advertising material for approval
- Inspection of factories
- Inspection of approved repacking facilities and stores
- Inspection and certification of premises for fumigation and house hold pest control operators
- Approval of obtaining ethylene bromide for quarantine & pre- shipment treatment on accountable basis
- Issue of approvals to authorized institutes for purchasing restricted pesticides
- Inspection of sales outlets
- Dispatch of samples to MRI & ITI for obtaining test reports on suitability for acceptance of applications
- Issue of packing clearance as per the quality analysis of samples on consignment basis

- Publishing of Newsletter
- Conducting officer training classes
- Conducting seminars for school children
- Conducting dealer training classes
- Issue of dealer training certificates
- Formulation analysis
- Residue analysis
- Sample collection by ROP office for quality assurance
- Disposal of obsolete stocks
- Participation as technical expertise/ members/ resource personnel for intra and inter Departmental organization meetings
- Participation as resource personnel for invitations from other institutes
- Collection & compilation dissemination of import statistics (Central Bank, Universities, Researches, Govt. Institutes etc.)
- Issue of dealer certificates
- Field complaints & legal prosecutions
- Conducting Technical Advisory Committee meetings

STAFF LIST

Cadre post	**No.**
Research Officer	04
Agricultural Instructor	07
Research Assistant	04
Agriculture Monitoring Officer	02
Programme Assistant (Agriculture)	02
Research Sub Assistant	01
Public Management Assistants' Service	05
Driver	03
Watcher	02
Labourer	02
KKS	01
Contract Labourer	01
TOTAL	**34**

3.1.5 PLANT GENETIC RESOURCES CENTRE (PGRC) – GANNORUWA

The main objectives of the Plant Genetic Resources Centre are to ensure the conservation of the country's Plant Genetic Resources (PGR) and to promote their utilization for the benefit of present and future generations. To achieve this, the PGRC explores, collects, introduces, conserves, evaluates and documents the genetic diversity of food crops and their related species. The biotechnology facilities of the centre are mainly used to undertake advanced research in PGR evaluation and enhancement.

BUDGET

The annual budget for the year 2010 is given in Table 3.1.5.1.

Table 3.1.5.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	9,921,400	8,569,794	86
Capital	3,095,000	2,813,506	91
Projects			
Sri Lanka- USA cooperative germplasm development project	5,930,000	4,110,000	69
FAO – NISM-GPA project	819,360	306,971	37
TOTAL	**19,765,760**	**15,800,271**	**80**

PROGRESS

Exploration and Collection of Plant Genetic Resources (PGR)

During the year , a total of 82 samples were collected. These included 12 introductions, 31 accessions received from other institutes and 39 sub samples selected by the evaluation unit from past field collections.

Seed Conservation

Conservation of seed materials

Conserved 129 new accessions in the gene bank during the year and a total of 104 multiplied samples were also conserved. The total number of gene bank holdings up to the end of the year 2010 is 12,778.

Importation of germplasm from foreign countries

Imported twelve accessions of cowpea (*Vigna unguiculata* L.) on the request made by the Grain Legume and Oil Crop Research and Development Centre exclusively for research purposes.

Table 3.1.5.2: Gene bank holdings as at 31st December 2010

Crop Group	Number of Accessions
Rice and related spp.	4,518
Other cereals and related spp.	1,629
Grain Legumes and related spp.	1,969
Vegetable Legumes	1,295
Solanaceous vegetables & Condiments related spp.	1,201
Cucurbit vegetables	764
Brassicaceae vegetables	31
Alliums	20
Other vegetables	371
Leafy vegetables	166
Roots and Tubers	09
Mustard and related spp.	124
Oil Crops	425
Fibre crops	66
Medicinal plants	27
Fruits	163
Total	**12,778**

Distribution of germplasm

Distributed 446 accessions of different crop varieties to local research institutes, NGOO, farmers and Universities on their request.

Research on seed behavior

A study was conducted to monitor the viability of active and base collection of the gene bank from 1989. Hundred and seventy four accessions from base collection and 1566 accessions from active collection were tested for viability. The results revealed that viability of rice and sesame remains as same as initial germination and 5% germination drop was observed from *Leguminoseae* crops (Cowpea, Green gram, Black gram, Soy bean, Ground nut, Horse gram) and Solanaceous vegetables (Brinjal, Tomato and Capsicum) of base collection. In active collection, 5-25% germination drop was observed from Solanaceous vegetables (Brinjal, Ela batu, Ahas batu, Gona batu, Tibbatu, Del batu, Tomato, Capsicum) and 1-5% germination drop observed from vegetable legumes (Common beans, Yard long bean, Winged bean, Jack bean, Sword bean, Hyacinth bean, Yam bean) and grain legumes (Cowpea, Green gram, Black gram, Soy bean, Ground nut, Horse gram).

On Farm Conservation

Selected five farmers in Ussapitiya and Edanduwawa village and given six vegetables namely Tomato, Brinjal, Bitter gourd, Beans, Winged bean, Capsicum for onfarm conservation. Four farmers successfully cultivated but the crop was damaged due to heavy rain of the other farmer.

Characterization, multiplication and rejuvenation of Plant Genetic Resources

Multiplication of germplasm

Multiplied 42 accessions/collections of cowpea and 25 accessions of finger millet and conserved in the gene bank.

Publication of characterization catalogues

Characterization catalogues will be published for tomato, luffa and brinjal in February 2011.

Incorporation of yellow mosaic resistance to cultivated okra variety MI-7

Introgression of gene(s) which confers resistance to yellow vein mosaic virus to the cultivated variety MI-7 was done by the Biotechnology unit using the *Abelmoschus angulosus* as a donor parent. This produced 40 progenies which were established in the field during 2010/2011 Maha season and the 4th back crossing will be done in due course.

Characterization of germplasm

Characterized 23 accessions of tomato (*Lycopersicon esculentum* Mill.) and 25 accessions each of Luffa (*Luffa acutangula* (L) Roxb. and brinjal (*Solanum melongena* L.).. Shannon-Weaver (Sh.W) and Nei diversity index and the number of allele responsible for each trait were worked out for respective crops are given in Table 3.1.5.3, 4 and 5. Cluster analysis was performed to identify the accessions with more similarities/ dissimilarities.

Table 3.1.5.3: Diversity indexes and the number of alleles affecting the various traits in tomato

Trait	Sh.W.	Nei	Allele
Days to flowering	1.607	0.741	7
Stigma position in relation to anthers at full anthesis	0.387	0.227	2
Days to maturity	1.132	0.609	4
Predominant fruit shape	1.469	0.752	5
Exterior colour of ripe fruit	1.616	0.756	7
Firmness of ripe fruit	0.877	0.529	3
Radial cracking	.036	0.563	4
Length of ripe fruit	2.834	0.938	18
Fruit width	.075	0.953	22
$_{p}$H	2.894	0.941	19
Total Soluble Solids	3.015	0.949	21
Average fruit weight	2.955	0.945	20

Table 3.1.5.4: Diversity indexes and the number of alleles affecting the various traits in Luffa

TRAIT	SH.W.	NEI	ALLELE
Days to flower (staminate)	1.898	0.797	10
Days to flower (pistillate)	1.796	0.8	8
Days to green harvest stage	1.459	0.736	5
Days to maturity	1.839	0.826	7
Fruit weight (g)	2.443	0.896	14

Biotechnology

Evaluation of rice germplasm and characterization of their resistance genes against brown planthopper (BPH), *Nilaparvata lugens* (Stål)

Screened 60 rice germplasm for BPH reaction and 3 accessions showed resistance, 14 accessions showed moderate resistance and the rest were susceptible. Resistant germplasm are further tested and explored in variety development programmes as sources of BPH resistance. Future studies are aimed to characterize and map the responsible genes for resistance through molecular and genetical studies.

Evaluation of rice germplasm and characterization of their resistance genes against rice thrips; *Stenchaetothrips biformis*

Screened 135 rice germplasm for pest in the field condition at PGRC. Dahanala showed the highest resistance. Acc. 3134, Acc. 10941, Acc. 3147, Acc. 10508, Acc.. 3134, Acc. 10941, Acc. 3147, Acc. 10508, Acc. 11522, Acc. 11470

and Acc. 11489 also showed significantly higher resistance. Many germplasm were susceptible while few germplasm showed moderate resistance to the pest.

These resistant germplasm were further tested and explored in variety development programmes as sources of resistance. Future

Table 3.1.5.5: Diversity indexes and the number of alleles affecting the various traits in Brinjal

Trait	**Sh.W.**	**Nei**	**Allele**
Plant height at flowering stage (cm)	3.135	0.957	23
Days to flowering	1.771	0.779	8
Fruit color at physiological ripeness	0.387	0.227	2
No. of fruits per plant	1.4	0.715	5
Fruit yield per plant (table use maturity)	2.955	0.945	20
Weight of fruit at table use maturity	2.502	0.907	14

studies aim to characterize and map the responsible genes for resistance through molecular and genetical studies.

Detection of somaclonal variations in micro propagated "Embul" banana through molecular and cytological analysis

PCR analysis was continued with DNA of 7 off type plants and a healthy plant and looked for polymorphism. Seven primers showed polymorphic bands among off types and between healthy and off type plants. Analysis of polymorphic bands showed 21% variation among off types. Cluster analysis clearly showed genetic difference among the plants of off types and between the plants of healthy and off types. The cause for this genetic variation may be somaclonal variation that would have occurred during micropropagation and production of these banana plants.

Development of molecular markers for purity testing of locally developed 2 tomato hybrid varieties; Bhatiya & Maheshi and maize hybrid variety; Sampath

PCR analysis was conducted with DNA of the respective inbred parental lines and hybrids using Simple Sequence Repeat (SSR) primers and looked for polymorphic markers. PCR analysis was completed with 20 SSR primers for the 2 tomato hybrids during 2010. However, none of the SSR primers showed polymorphism between inbred parental lines of any variety of the 2 hybrids. Analysis will be continued further to identify reliable markers that give polymorphism between parental lines.

PCR analysis was completed with 14 SSR primers for Maize hybrid; Sampath variety. Two markers showed polymorphism between two parental lines. Further analysis will be done to confirm their performance. If it is possible to obtain promising results, the two markers can be used to test the purity of commercial seed stocks of Sampath hybrid variety.

***In-vitro* conservation**

Maintained 08 banana, 115 sweet potato, 60 *Dioscorea* and 15 potato germplasm under *in-vitro* form in the laboratory. Also maintained replicates of sweet potato and *Dioscorea* germplasm in the potted form in the planthouse.

Special Projects

SL-USA project

Continued the activities of Project No. 1 of SL-USA Cooperative Germplasm Development Programme on Production of planting materials of banana and sweet orange through micro propagation which commenced in August 2009. The aim is to produce disease free planting materials of banana and sweet orange varieties. The programme emphasized much in optimizing protocols for micropropagation of banana varieties *in vitro* micro grafting and semi micro-grafting of sweet orange varieties from January to May 2010.

Micro-propagation of banana

Established *In-vitro* cultures of Rathambala, Embon, Puwalu, Seeni, Agra (Kolokuttu), Kandula (dual type), Prasad (ash plantain) and Pulathisi (cooking type).

Multiplied about 177 plants of Embon, Prasad, Puwalu and Embul varieties,are in the hardening stage ready for delivery for field cultivation in a few months. The programme also contained about 1000 micro propagated cultures of different banana varieties at different stages of multiplication and 60 successful new cultures of Seeni, Embon and Rathambala varieties in the initiation stage by the end of 2010.

Micro-propagation of sweet orange

Collected seeds of several citrus species and tested for root stocks in micro and semi micro grafting of sweet orange varieties. These species include *Citrus jambhiri* (rough lemon, Yongdehi, Leema or Yakdehi), *Citrus aurantium* (Sour orange) and *Citrus madurensis loureiro* or *Citrofortunella mitis* (Philippine red lime). The programme produced many i*n-vitro* micro grafted plants. However, its success rate was low and it was possible to produce only about 60 plantlets of initiation stage and 75 plantlets of hardening stage by the end of 2010. The success rate of semi-micro grafting was comparatively higher. Semi-micro grafting realized about 30 plantlets of initiation stage and 60 plantlets of hardening stage by the end of 2010.

PGR Information Management System

PGR database

Continued the programme for improvement and incorporation of data into the database and at present the database contains passport data of 12,620 accessions and characterization data of 25 crops including rice, maize, finger millet, foxtail millet, sorghum, soybean, black gram, cowpea, mung bean, pigeon pea, ground nut, *Amaranthus*, bean, winged bean, yard long bean, brinjal, tomato, capsicum, okra , pumpkin, snake gourd, bitter gourd, smooth luffa, mustard, and sesame.

FAO PROJECT: CAPACITY BUILDING AND REGIONAL COLLABORATION FOR ENHANCING THE CONSERVATION AND SUSTAINABLE USE OF PLANT GENETIC RESOURCES IN ASIA

ESTABLISHMENT OF A NATIONAL INFORMATION SHARING MECHANISM ON THE IMPLEMENTATION OF THE GLOBAL PLAN OF ACTION (GPA) FOR THE CONSERVATION AND SUSTAINABLE UTILIZATION OF PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE (PGRFA)

The Global Plan of Action (GPA), for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture was formally adopted by representatives of 150 countries including Sri Lanka during the Fourth International Technical Conference on Plant Genetic Resources, held in Leipzig, Germany in June 1996. The plan contains the priority activities identified, at local, national, regional and international levels and provides a framework for conservation and utilization activities with a solid foundation.

ACTIVITIES STARTED IN 2010 TO CONTINUE THE NATIONAL INFORMATION SHARING MECHANISM OF THE GLOBAL PLAN OF ACTION (NISM-GPA) FROM 2009 ONWARDS UNDER THE FAO PROJECT "CAPACITY BUILDING AND REGIONAL COLLABORATION FOR ENHANCING THE CONSERVATION AND SUSTAINABLE USE OF PLANT GENETIC RESOURCES IN ASIA (GCP/RAS/240/JPN). ACCORDINGLY, THE DATABASE WILL BE UPDATED AND IMPROVED COLLABORATING WITH MORE STAKEHOLDERS.

THE FIRST NATIONAL STAKEHOLDERS' WORKSHOP OF THE PROJECT WAS ORGANIZED BY PGRC AND HELD AT THE PARADISE BEACH HOTEL, NEGAMBO FROM 14TH-15TH JUNE, 2010. A TOTAL OF 35 PARTICIPANTS FROM VARIOUS STAKEHOLDER ORGANIZATIONS PARTICIPATED. THE OBJECTIVE OF THE PROJECT AND PROCEDURES TO BE FOLLOWED WERE EXPLAINED TO HEADS OF STAKEHOLDER INSTITUTES AND CONTACT PERSONS WERE IDENTIFIED. THE SECOND NATIONAL STAKEHOLDERS' WORKSHOP OF THE PROJECT WAS HELD ON 27TH AUGUST, 2010 AT THE PLANT GENETIC RESOURCES CENTRE, GANNORUWA, PERADENIYA. A TOTAL OF 49 PERSONS PARTICIPATED AND THE COMPUTER APPLICATION FOR NISM-GPA WAS DEMONSTRATED. THE STAKEHOLDERS WERE REQUESTED TO PROVIDE BASIC INFORMATION FOR THE DATABASE. DATA COLLECTION ACTIVITIES WERE INITIATED IN NOVEMBER, 2010.

Celebrating International Year of Biodiversity

A workshop was organized by the Plant Genetic Resources Center (PGRC) to celebrate the International Year of Biodiversity on 27th December 2010 at the Cultural Centre, Dambana. The objective of the workshop was to implement a collaborative programme with farmers and indigenous farmers in order to enhance conservation and use of PGRFA.

Twenty-two farmers of Hasalaka area, 53 indigenous people, 31 DOA officers, 01 officer from the cultural center, Dambana, participated in the workshop. Chief of the indigenous people, Uru Warige Wanniya (Wanniyala aththo) was invited as the guest of honour.

The programme included presentations on Biodiversity, discussions, demonstrations and exchange of material with the aim of initiating and strengthening the present PGRFA conservation and utilization programme.

Seed samples were handed over to the chief of the indigenous people. These included sesame variety Uma, a *Cucumis* (kekiri) accession, and a finger millet accession. Two chillie varieties (Wanni Miris and advanced line MICH-06) received from Field Crop Research and Development Institute (FCRDI) were also distributed. The programme will be continued in North and Eastern provinces.

Training and awareness programme

Conducted 62 awareness programmes for students of 60 schools, 08 groups of teachers, 20 groups of university students, four groups of officers of the Department of Wildlife, 03 groups of students from Schools of Agriculture, 03 farmer organizations, 01 group of Public Health Inspectors, and 04 other groups. A total of 2262 individuals participated in these programmes. PGRC also provided in plant training for 05 students from Advanced Technological Institute, Naiwala.

The Biotechnology division conducted following special trainings:

- Three students from the University of Sri Jayawardhanapura were trained in biotechnology for 03 months

- Three students from the University of Kelaniya were trained in biotechnology for 02 months
- Two students from University of Ruhuna trained for 05 months and completed their research projects for the partial fulfillment of their degrees
- One student from Post Graduate Institute of Agriculture, Peradeniya underwent 6 months training and completed the research project for the M.Sc. degree

Exhibitions

The PGRC participated in the Deyata Kirula exhibition held at Pallekele and demonstrated conservation activities, and diversity of crops to general public.

PLAN FOR 2010

- Continuation of exploration and collection, especially in selected areas of North and Eastern Provinces.
- Continuation of conservation of genetic resources in the seed gene bank, *in vitro* form, in green houses and in the field gene bank
- Continuation of exchange of germplasm
- Continuation of back cross breeding procedure for the development of okra variety MI-7 having resistance to yellow mosaic virus
- Evaluation and characterization of rice germplasm for brown planthopper (BPH), *Nilaparvata lugens* (Stål) and thrips, *Stenchaetothrips biformis*
- Development of DNA marker based protocols for hybridity testing of locally developed hybrid varieties of tomato, brinjal and maize.
- Molecular analysis of genetic purity status among seed samples of Rampur onion varieties
- Studying the genetic relationship among exotic and locally developed maize inbred lines
- Production of disease free planting materials of banana and sweet orange through micro grafting
- Phenotypic and molecular characterization of rice germplasm for drought
- Awareness, demonstration and training programmes on biotechnology, GMO, risk assessment of genetically modified organisms (GMOs), food, feed and processed products
- Maintenance and improvement of the present information management system

STAFF LIST

Cadre post	No.
Deputy Director	01
Research Officer	08
Administrative Officer	01
Agricultural Monitoring Officer	04
Programme Assistant	03
Management Assistants' Service	08
Agricultural Instructor	05
Research Assistant	04
Laboratory Sub Assistant	05
KKS	01

Cinema Operator	01	Circuit Bungalow Keeper	01
Driver	04	Watcher	06
Store Keeper	01	Labourer	21
Lorry Cleaner	01	**Total**	**79**
Carpenter	01		
Electrician	03		

3.2 SEED AND PLANTING MATERIAL DEVELOPMENT CENTRE (SPMDC) - PERADENIYA

Mission of the Seed and Planting Material Development Centre (SPMDC) is to provide an assured supply of quality seed and planting material at competitive prices to Sri Lankan farming community.The SPMDC plays a vital role in seed production in the country. Basic seeds of all locally recommended crop varieties are produced in 18 government seed production farms managed by this Centre.

However certified seeds mainly of rice, vegetable and other field crops are produced through selected contect growers. The SPMDC operates it's functions through 13 Assistant Directors of Agriculture (Seed) in each region.

BUDGET

Table 3.2.1: Annual budget – 2010 (Rs.)

Vote /Project	Allocation	Expenditure	Expenditure %
Capital	18,850,000	18,400,000	98
Recurrent	53,220,000	51,390,000	97
Projects	174,500,000	163,560,000	94
Seed Production & Purchasing			
Api Wawamu- Rata nagamu	5,750,000	4,910,000	85
Compost Production	500,000	20,000	4

Maize Hybrid Seed Production	1,275,000	790,000	62
Irrigation Facilities	13,000,000	11,200,000	86
Api wawamu-Rata nagamu -Pineapple	546,000	306,000	56
Total	**267,600,000**	**250,600,000**	**94**

PROGRESS

PRODUCTION & SUPPLY OF SEED PADDY

Basic seed paddy production in government seed farms

Produced Foundation seed paddy (FSP) and registered seed paddy (RSP) of 28 recommended rice varieties in seven government seed farms. Foundation seeds were produced using breeder seed supplied by Rice Research and Development Institute (RRDI), Batalagoda, Regional Agricultural Research and Development Centre (RARDC), Bombuwala, Rice Research
Station (RRS), Ambalantota and Agricultural Research Station (ARS), Labuduwa. Produced a total of 105,243 bu (2157.5 tonnes) of registered seed paddy in the year 2010. RSP production was increased by 6.42 % compared to that of the year 2009. In addition, certified seed paddy (CSP) were produced in SPMDC seed farms utilizing the rice fields, which were not used for basic seed paddy production. Together with the quantity of down graded seed paddy from the basic seed production programme, the total of 17,729 bu (363.5 tonnes) of CSP produced during the year 2010.

Table 3.2.2: Basic Paddy Production in government seed farms during 2010 (mt)

Seed Farm	2009/10 Maha			2010 Yala			Total		
	FSP	RSP	CSP	FSP	RSP	CSP	FSP	RSP	CSP
Aluttarama	10.72	140.06	75.79	5.55	79.48	46.17	16.27	219.54	121.96
Ambalantota	1.93	65.99	19.06	1.84	39.87	44.36	3.77	105.86	63.42
Bata ata	1.09	23.70	19.23	1.27	12.05	29.33	2.36	35.75	48.56
Kantale	8.63	266.87	1.72	13.75	250.20	2.93	22.38	517.07	4.65
MahaIlluppallama	22.86	212.50	66.97	15.27	169.08	_	38.13	381.58	66.97
Malwatta	11.77	174.66	43.62	8.92	150.62	3.98	20.69	325.28	47.60
Polonnaruwa	16.23	242.00	10.29	11.91	330.40	_	28.14	572..4	10.29
Total (mt)	**73.23**	**1125.78**	**236.68**	**58.51**	**1031.70**	**126.77**	**131.74**	**2157.48**	**363.45**
Total (bu)	**3572**	**54916**	**11546**	**2855**	**50327**	**6184**	**6426**	**105243**	**17729**

Certified seed paddy production through contract growing programme

Conducted Certified seed paddy production mainly through contract growers and SPMDC had a target to purchase 60,000 bu. in 2009/10 Maha and 2010 Yala seasons (30,000 bu. per season). Due to favourable weather conditions and higher gate price offered by DOA 83,776 bu were able to be purchased. Table 3.2.3 shows the quantities of certified seed paddy purchased during the year of 2010 in nine ADA regions.

SPMDC conducted a collaborative quality seed production programme with the participation of several external agencies including private sector organizations to increase the use of quality seed paddy in commercial cultivation. Under this programme, RSP was issued to the relevant agencies and the resulting crops and the seed were

certified by the Seed Certification Service of the DOA. Furthermore, RSP was also issued to farmers under the secondary seed farm programme to ensure the production of quality seed paddy.

Quantities of certified seed produced by various public and private sector organizations are given in Table 3.2.4.The actual quantity produced by the private sector was higher than the quantity issued because some companies did not participate in the official seed certification programme since they had their own quality control systems. Quantity of CSP produced under the official certification programme was 17,624.18 tonnes (859,718 bu) during the year 2010 (Table 3.2.4) which is equivalent to 15.6% of the total seed paddy requirement of the country. There was an increase by 6% compared to year 2009. Use of certified seed around 15% of the total seed requirement is considered as a satisfactory situation.

Table 3.2.3: Quantity of certified seed paddy purchased

ADA Region	Quantity Purchased			
	2009/10	2010	Total (t)	Total (bu)
	Maha (t)	Yala (t)		
Aluttarama	147.8	129.48	277.29	13,527
Ampara	255.7	191.04	446.74	21,792
Bata atha	42.13	67.22	109.35	5,334
Kantale	59.79	132.89	192.68	9,399
Maha Illuppallama	103.09	48.95	152.04	7,417
Nikaweratiya	131.34	142.27	273.61	13,347
Pelwehera	31.65	37.82	69.47	3,389
Polonnaruwa	42.60	103.33	145.96	7,120
Vavuniya	50.24	-	50.24	2,451
Total (mt)	**864.36**	**853.05**	**1,717.41**	
Total (bu)	**42,163.74**	**41,612.47**		**83,776**

Table 3.2.4: Collaborative certified seed paddy production

Institute	2009/10 Maha		2010 Yala		Year 2010		Production	
	Qty. Issued by DOA (tonnes)	Extent Certified (ac)	Qty. Issued by DOA (tonnes)	Extent Certified (ac)	Qty. Issued by DOA (tonnes)	Extent Certified (ac)	tonnes	bu
DOA							1706.9	83265
Provincial	93.05	2153.0	93.21	1879.5	186.26	4032.5	3720.0	181463
Inter Provincial	58.26	1187.5	45.98	1034.5	104.24	2222.0	2049.8	99990
Agrarian Services	15.27	272.5	35.53	811.5	50.8	1084.0	1000.0	48780
Mahaweli	33.97	781.5	15.21	281.0	49.18	1062.5	980.2	47813

Coop	16.15	361.0	12.47	281.5	28.62	642.5	592.7	28913
Farmer Org.	63.04	1408.5	93.19	2107.0	156.23	3515.5	3243.0	158198
Individual Farmers	72.92	1713.0	45.28	1068.0	118.2	2781.0	2565.5	125145
Private Companies	43.15	970.0	26.38	625.5	69.53	1595.5	1471.8	71798
Other	6.17	144.0	8.10	175.0	14.27	319.0	294.3	14355
Total	**401.98**	**8991**	**375.35**	**8263.5**	**777.33**	**17254.5**	**17624.18**	**859718**

Issue of Seed Paddy

Total seed paddy issued by the DOA for seed production and commercial cultivation for the year 2010 is given in Table 3.2.5. Foundation Seed produced from breeder seed in the previous season was used to produce registered seed in government seed farms. Registered seed was supplied to the contract growers as well as to private seed growers including private sector organizations to produce certified seeds.

Total supply of registered seed during the year 2010 was 1629.26 tonnes (79476 bu). Supply of Certified seed paddy was 1140.07 tonnes (55613 bu).

Table 3.2.5: Quantities of seed paddy issued by the DOA (tonnes)

Season	Programme	Found.	Reg.	Sub Total	Cert.	Grand Total	
						tonnes	bu
2010 Yala	Farm	12.03	3.50	15.53	_	15.53	758
	Cont. Growing	2.05	25.81	27.86	3.46	31.32	1,528
	Private	2.21	358.74	360.95	44.16	405.11	19,761
	Extension	0.06	263.73	263.79	254.11	517.90	25,263
	Sub Total (tonnes)	16.35	651.78	668.13	301.73	969.86	
	Sub Total (bu)	798	31,794	32,592	147,18		47,310
2010/11 Maha	Farm	24.60	3.24	27.84	0.29	28.13	1,372
	Cont.Growing	1.21	45.61	46.82	3.01	49.83	2,431
	Private	5.35	422.32	427.67	112.09	539.76	26,330
	Extension	3.20	506.31	509.51	722.95	1,232.46	60,120

	Sub Total (tonnes)	34.36	977.48	1,011.84	838.34	1,850.18	
	Sub Total (bu)	1,676	47,682	49,358	40,895		90,253
Issues for the year 2010	Farm	36.63	6.74	43.37	0.29	43.66	2,130
	Cont. Growing	3.26	71.42	74.68	6.47	81.15	3,959
	Private	7.56	781.06	788.62	156.25	944.87	46,091
	Extension	3.26	770.04	773.30	977.06	1,750.36	85,383
	Total (tonnes)	**50.71**	**1,629.26**	**1,679.97**	**1,140.07**	**2,820.04**	

PRODUCTION AND DISTRIBUTION OF OTHER FIELD CROP SEED

Varieties of ten OFC crops were used to produce four different classes of seeds (Foundation, Registered, Certified and Commercial seeds) during Year 2010.

Basic seed (Foundation and Registered seeds) production

Total quantities of Foundation seed produced during this year in Government seed farms and registered seed produced in Government farms and contract seed farms are given in Table 3.2.6. Total basic seeds (Foundation and Registered) produced during year 2010 was 64,369 kg which is 43% higher than that of the previous year (45,035 kg). This is mainly due to higher amount of basic seeds of all crops produced (Cowpea, Blackgram, Seasame, Greengram, Groundnut, Finger millet and Soybean) except Chilli and Maize. The expansion of contract Registered seed production programme is mainly attributed to this achievement

Big onion seed production of newly recommended variety "Dambulla selection" was also commenced at Seed farm, Maha lluppallama during this year and 145 kg of mother bulbs were produced. This will be used to establish seed crop during January, 2011. Basic seed production of two new chili varieties (MI- Green and Galkiriagama selection) was also carried out this year.

Certified Seed production

Certified seeds of OFC were mainly produced through contract seed farms. However, hybrid seed of Maize variety "Sampath" was produced mainly at the Government Seed farms at Maha Illuppallama, Alutharama and Bata atha. Total amount of certified seeds produced was 280 tonnes which is 133.56% higher than that of year 2009 (Table 3.2.7). This is mainly due to the expansion of contract programme of all crops during this year.

However, target in contract chilli seed production was not achieved, which is mainly due to unfavorable climatic condition which prevailed both during vegetative and harvesting stages. Furthermore chilli seed farmers sold their green chilli harvest due to higher green chilli prices which prevailed in the country during the podding stage. A limited quantity of Commercial seeds of two green manure crops such as Sunnhemp and *Sesbania rostrata* were also produced for the use of government seed farms and research stations.

Issue of OFC seeds during 2010

The quantities of Basic (Foundation and Registered) and certified seed issued during year 2010 is given in Table 3.2.8. Total seed issued during year 2010 was around 267 tonnes, which was around 80% higher than that of the previous year. This is mainly due to increased issuing of all crops except maize and finger millet seeds. This is the highest quantity issued reported over the last 25 years.

Table 3.2.6: Basic seed production (kg) of OFC during 2010

Crop	Foundation			Registered						Sub Total	Total Production of Basic Seed
	Govt. Farms			Govt. Farms			Contract Programme				
	2009/10 Maha	2010 Yala	Sub Total	2009/10 Maha	2010 Yala	Sub Total	2009/ 10 Maha	2010 Yala	Sub Total		
Black gram	482	147	629	391	312	703	2228	1929	4157	4860	5489
Chilli seed*	83	180	263	0	0	0	0	0	0	0	263
Cowpea	134	196	330	1600	812	2412	1571	8124	9695	12107	12437
Sesame	158	0	158	88	0	88	25	1304	1329	1417	1575
Green gram	326	136	462	422	532	954	3862	9879	13741	14695	15157
Groundnut	2270	1031	3301	414	366	780	2301	558	2859	3639	6940
Finger millet	172	387	559	1445	955	2400	150	235	385	2785	3344
Maize seed (OPV)	824	1716	2540	103	2397	2500	2532	2582	5114	7614	10154
Soybean	0	539	539	139	212	351	471	7511	7982	8333	8872
B. onion (Mother Bulbs)	0	145	145	0	0	0	0	0	0	0	145
Total	**4449**	**4477**	**8926**	**4602**	**5586**	**10188**	**13140**	**32122**	**45262**	**55450**	**64376**

OPV - Open pollinated varieties

* - Basic seed

Table 3.2.7: Certified and commercial seed production (kg) in government seed farms and under contract growing during 2010

Table 3.2.8: Issue (kg) of OFC seeds during 2010

Crop	2010 Yala						2010/11 Maha						Year 2010					
	Br.	Fou./ Basic	Reg.	Cer/ Std	Com.	Total	Br.	Fou./ Basic	Reg.	Cer/ Std.	Com.	Total	Br.	Fou./ Basic	Reg.	Cer/ Std.	Com.	Grand Total
Black gram	**15**	**220**	**764**	**12089**	**1806**	14893	**20**	**1231**	**3332**	**7440**	**12573**	24595	**35**	**1451**	**4095**	**19529**	**14379**	39488
Chilli	**1**	**158**		**802**		960		**522**		**1694**		2216	**1**	**680**	**0**	**2496**	**0**	3177
Cowpea	**29**	**369**	**2750**	**4764**	**1164**	9076	**103**	**954**	**4474**	**6461**	**5200**	17192	**132**	**1323**	**7225**	**11225**	**6363**	26268
Sesame	**0**	**52**	**354**	**5368**	**208**	5981		**50**	**1025**	**3120**	**38**	4232	**0**	**101**	**1379**	**8487**	**245**	10213
Green gram	**8**	**361**	**3699**	**23533**	**571**	28172	**58**	**728**	**8140**	**25819**	**12692**	47437	**66**	**1089**	**11839**	**49352**	**13263**	75609
Groundnut	**116**	**734**	**2935**	**6583**	**2018**	12385	**191**	**557**	**380**	**25368**	**11426**	37922	**307**	**1291**	**3315**	**31951**	**13443**	50307
Finger millet	**1**	**16**	**474**	**293**		784	**5**	**1333**	**1674**	**1543**		4554	**6**	**1349**	**2147**	**1836**	**0**	5338
Maize (OPV)	**8**	**125**	**1237**	**1281**	**4**	2654	**27**	**208**	**5474**	**16442**	**617**	22767	**35**	**332**	**6711**	**17722**	**621**	25420
Maize (Hybrid)				**632**		632				**2256**		2256	**0**	**0**	**0**	**2888**	**0**	2888
Soyabean	**17**	**460**	**2199**	**16507**	**1368**	20550	**60**	**633**	**2789**	**2051**	**1000**	6532	**76**	**1093**	**4988**	**18557**	**2368**	27082
Sunhemp					**712**	712					**599**	599					**1311**	1311
Sesbaniya					**13**	13						0					**13**	13
Total	195	2494	14410	71851	7862	96812	463	6215	27288	92192	44144	170301	657	8709	41698	164042	52006	26711

Table 3.2.8: Issue (kg) of OFC seeds during 2010

Crop	2010 Yala						2010/11 Maha						Year 2010					
	Br.	Fou./ Basic	Reg.	Cer/ Std	Com.	Total	Br.	Fou./ Basic	Reg.	Cer/ Std.	Com.	Total	Br.	Fou./ Basic	Reg.	Cer/ Std.	Com.	Grand Total
Black gram	15	220	764	12089	1806	**14893**	20	1231	3332	7440	12573	24595	35	1451	4095	19529	14379	**39488**
Chilli	1	158		802		**960**		522		1694		2216	1	680	0	2496	0	**3177**
Cowpea	29	369	2750	4764	1164	**9076**	103	954	4474	6461	5200	17192	132	1323	7225	11225	6363	**26268**
Sesame	0	52	354	5368	208	**5981**		50	1025	3120	38	4232	0	101	1379	8487	245	**10213**
Green gram	8	361	3699	23533	571	**28172**	58	728	8140	25819	12692	47437	66	1089	11839	49352	13263	**75609**
Groundnut	116	734	2935	6583	2018	**12385**	191	557	380	25368	11426	37922	307	1291	3315	31951	13443	**50307**
Finger millet	1	16	474	293		**784**	5	1333	1674	1543		4554	6	1349	2147	1836	0	**5338**
Maize (OPV)	8	125	1237	1281	4	**2654**	27	208	5474	16442	617	22767	35	332	6711	17722	621	**25420**
Maize (Hybrid)				632		**632**				2256		2256	0	0	0	2888	0	**2888**
Soyabean	17	460	2199	16507	1368	**20550**	60	633	2789	2051	1000	6532	76	1093	4988	18557	2368	**27082**
Sunhemp					712	**712**					599	599					1311	**1311**
Sesbaniya					13	**13**						0					13	**13**
Total	**195**	**2494**	**14410**	**71851**	**7862**	**96812**	**463**	**6215**	**27288**	**92192**	**44144**	**170301**	**657**	**8709**	**41698**	**164042**	**52006**	**26711**

PRODUCTION AND SUPPLY OF VEGETABLE SEEDS

Basic seed production

There are 55 DOA recommended varieties of 18 vegetable crops grown in the country. Production of basic seeds of some varieties was carried out in seven government seed farms are in Table 3.2.9. Total quantity produced was higher than that of year 2009.

Table 3.2.9: Basic vegetable seed production in government farms during 2010

Crop	Quantity Produced (kg)		
	2009/10 Maha	2010 Yala	Total
Bean	2983.0	471.0	3454.0
Bitter gourd	293.5	174.0	467.5
Brinjal	5.5	-	5.5
Bushitavo	363.0	-	363.0
Mae	591.0	95.0	686.0
Okra	1163.0	351.0	1514.0
Snake gourd	34.0	57.0	91.0
Winged bean	-	66.0	66.0
Tomato	36.8	7.5	44.3
Radish	158.0	-	158.0
Total	**5627.8**	**1221.5**	**6849.3**

Standard Vegetable Seed Production

Both public and the private sector organizations are involved in production of standard seeds. The quantities produced by SPMDC in government farms and under contract growing programme are indicated in Table 3.2.10. The total production in 2010 was also much higher (around 200%) than that of the previous year, which was a similar trend as in basic seed production. Higher production in contract growing was mainly due to higher quantity of bean seed purchased under the programme.

Table 3.2.10: standard vegetable seed production (kg) by DOA during 2010

Crop	Farm Programme			Contract Programme			Grand Total
	2009/10 Maha	2010 Yala	Total	2009/10 Maha	2010 Yala	Total	
Bean		-		18975.0	989.0	19964.0	19964.0
Bitter gourd	58.5	-	58.5	174.0	216.0	390.0	448.5
Brinjal	21.0	16.0	37.0	125.0	60.0	185.0	222.0
Bushitavo	-	84.0	84.0	120.0	702.0	822.0	906.0
Capsicum	31.0	262.0	293.0	17.0	11.0	28.0	321.0
Cucumber	97.5	167.0	264.5	195.0	284.0	479.0	743.5
Luffa	501.0	-	501.0	56.0	-	56.0	557.0
Mae	14.0	689.0	703.0	666.0	721.0	1387.0	2090.0
Okra	155.0	1977.0	2132.0	116.0	691.0	807.0	2939.0
Pumpkin	21.0	-	21.0		-	-	21.0
Spinach	88.0	73.0	161.0	-	-	-	161.0
Snake gourd	-	364.0	364.0	-	364.0	364.0	728.0
Sweet Melon	79.0	55.0	134.0	25.0	95.0	120.0	254.0
Tomato	100.0	212.0	312.0		-	-	312.0
Amaranthus	61.0	129.0	190.0	-	-	-	190.0
Winged bean	260.0	120.0	380.0	502.0	160.0	662.0	1042.0

Hybrid Vegetable Seed Production

F_1 hybrid seeds of two each of Brinjal and tomato varieties were produced successfully in seed farms (Table 3.2.11). Brinjal was produced in Kundasale, Ambepussa and Alutharama while tomato was produced only in Kundasale farm. Production rates of tomato seeds is more or less similar to the year 2009 where as a decrease was observed in Brinjal is much lower.

Table 3.2.11: Hybrid vegetable seed production (kg)

Crop	2009/10 Maha	2010 Yala	Total
Tomato	7.5	6.4	13.9
Brinjal	6.3	12.3	18.6
Total	**13.8**	**18.7**	**32.5**

Vegetable seed distribution

Vegetable seeds were distributed through the DOA sales outlets and registered dealer network. These dealers include Agrarian Service Centers (ASCS), Cooperative societies, Farmer organizations, Provincial DOA and

Table 3.2.12: Vegetable seed supplied by DOA – 2010

Crop	Quantity Supplied (kg)						
	Basic			Standard			Grand Total
	Yala 2010	Maha 2010/11	Total	Yala 2010	Maha 2010/11	Total	
Amaranthus	64.0	82.0	146.0	5.0	67.0	**72.0**	**218.0**
Bean	426.0	1650.0	2076.0	3925.0	8212.0	**12137.0**	**14213.0**
Bitter gourd	29.0	57.0	86.0	508.0	571.0	**1079.0**	**1165.0**
Brinjal	6.0	3.0	9.0	45.0	209.0	**254.0**	**263.0**
Bushitavo	200.0	216.0	416.0	804.0	667.0	**1471.0**	**1887.0**
Capsicum	4.0	8.0	22.0	82.0	165.0	**247.0**	**259.0**
Cucumber	5.0	14.0	19.0	78.0	162.0	**240.0**	**259.0**
Luffa	14.0	57.0	71.0	277.0	279.0	**556.0**	**627.0**
Mea	268.0	160.0	428.0	194.0	914.0	**1108.0**	**1536.0**
Okra	592.0	212.0	804.0	658.0	1289.0	**1947.0**	**2751.0**
Pumpkin	1.0	2.0	3.0	3.0	18.0	**21.0**	**24.0**
Radish	1.0	26.0	27.0	117.0	268.0	**385.0**	**412.0**
Snake gourd	156.0	119.0	275.0	775.0	568.0	**1343.0**	**1618.0**
Spinach	-	4.0	4.0	-	70.0	**70.0**	**74.0**
Sweet Melon	2.0	2.0	4.0	2.0	70.0	**72.0**	**76.0**
Tomato	6.0	6.0	12.0	176.0	244.0	**420.0**	**432.0**
Winged Bean	28.0	26.0	54.0	312.0	746.0	**1058.0**	**1112.0**
Total	**1802.0**	**2644.0**	**4446.0**	**7961.0**	**14519.0**	**22480.0**	**26926.0**

Home Garden Packs **112,888**

PRODUCTION AND SUPPLIES OF SEED POTATO

The production of pre-basic (G_0) basic (G_1, G_2, G_3) and certified seed of variety Granola were 1.48 tonnes, 57.92 tonnes and 60.37 tonnes respectively during the 2009/10 Maha season.

Basic seed production of pre-basic, basic and certified seeds of variety Desiree was 1.8 tonnes.

The production of pre-basic, basic and certified seeds of variety Granola were 2.79 tonnes, 138.5 tonnes and 232.79 tonnes and certified seed production of variety Desiree was 18.55 tonnes during the Yala 2010. The total quantity produced in year 2010 was 514.2 tonnes and 247 tonnes of certified seeds were issued for potato growers.

Observed 5% yield increment in 2010 compared to the previous year. Timely cultivation and use of high amount of organic manure for the potato cultivation were reasons for the immediate yield increment.

Although the amount of pre-basic seeds seems to be lower, it contained considerably high number of seed tubers.

Table 3.2.13: Production of pre-basic (Go) and basic (G1, G2 & G3) seed potato (tonnes) during year 2010

Variety	Pre-basic Seed			Basic-Seed		
	2009/10 Maha	2010Yala	Total	2009/10 Maha	2010 Yala	Total
Granola	1.48	2.79	4.27	57.9	138.5	196.4
Desiree		-	-	1.8	-	1.8
Total	**1.48**	**2.79**	**4.27**	**59.69**	**138.5**	**198.19**

Table 3.2.14: Production of certified seed potato (tonnes) during 2010

Variety	2009/10 Maha	2010 Yala	Total
Granola	60.37	232.79	293.16
Desiree	-	18.55	18.55
Total	**60.37**	**251.34**	**311.71**

Table 3.2.15: Seed potato supplied by DOA (tonnes)

Variety	2010 Yala	2010/11 Maha	Total
Granola	86.7	160.3	247.0

PRODUCTION & SUPPLY OF PLANTING MATERIALS

Seed & Planting Material Development Centre produces quality planting material under the categories of budded plants, seedlings, rooted and stem cuttings as well as suckers to fulfill the planting material demand of fruit plants in the country. Hence, planting material production programmes were conducted under ten seed farms of SPMDC and eight horticultural farms of HORDI during the year 2010. Accordingly produced and distributed 230,000 plants belonging to 30 varieties of twenty fruit crops during the year.

Table 3.2.16: Production and supply of planting material in DOA farms-2010

Crop	Prod.	Issues
Budded Plants		
Avacado	4854	3970
Beli	1226	1034
Durian	7426	4341
Guava	1987	1883
Jack	7647	5183
Jambu	2405	1310
Lime	2735	2799
Mango	168035	90167
Mandarin	1540	1083
Mangosteen	422	200
Orange	5118	4013
Apple	43	17
Pears	800	25
Rambutan	33439	26312
Sapodilla	1521	768
Star fruit	1583	900
Woodapple	1217	1483
Goraka	1207	838
Other	945	1842
Sub Total	**244,150**	**148,168**
Rooted Cuttings		

Crop	Prod.	Issues
Grapes	970	1688
Jambu	2078	1487
Pomegranate	1384	664
Lemonime	4684	2432
Lime	640	09
Pepper	3334	2334
Guava	462	440
Dragon fruit	3055	1296
Other	956	721
Sub Total	**17563**	**11071**
Seedlings		
Amberalla	9160	9036
Star fruit	210	140
Woodapple	734	76
Goraka	253	263
Papaya	14438	15467
Pomegranate	18283	16761
Guava	12189	8199
Beli	300	01
Jambu	316	93
Kathuru	8898	6195
Orange	1557	1347
Mangosteen	3971	2503
Lime	9506	6937
Jack	100	63
Sub Total	**79915**	**67081**
Suckers		
Banana	1898	1898
Sub Total	**1898**	**1898**
Vegetable plants	14270	14133
Sub Total	**14270**	**14133**
Grand Total	**357,797**	**242,351**

3.2.17: Production of Other Commodities

Product	Quantity
Banana (kg)	17100
Mango (kg)	2266
Papaya (kg)	2132
Grapes (kg)	129
Pears (kg)	449
Orange (kg)	327
Rambutan (kg)	174
Consumption Potato (kg)	26,932
Consumption Vegetable (kg)	5607
Leafy Vegetables (bundles)	824
Cassava (kg)	2493
Coconut (Nuts)	34,924
King Coconut (Nuts)	3150
Brinjal (packets)	740
Consumption OFC	
Maize (kg)	2477
Maize green cobs (No.)	2,822
Dry chilli (kg)	97
Green gram (kg)	877
Cowpea (kg)	350
Sesame (kg)	40
Soya (kg)	633
Kurakkan (kg)	104
Blackgram (kg)	493
Groundnut (kg)	1630
Animal Products	
Milk (L)	36615
Yoghurt (cups)	4110
Curd (pots)	1131

PERFORMANCE OF THE ADVANCE ACCOUNTS-2010

The production of seed and planting material was carried out under the Advance Account.

Performance of the Advance Account during the year is given in Table 3.2.18.

Table 3.2.18: Performance of the Advance Accounts in Rs.

Farm	Income	Expenditure
Aluttarama	33,859,223.43	30,061,725.28
Malwatta	24,554,944.65	20,607,882.19
Bata atha	11,514,563.27	25,297,831.30
Ambalantota	9,305,445.50	8,948,258.00
Middeniya	1,351,606.00	8,811,083.50
Ambepussa	6,568,330.11	11,930,054.67
Kantale	30,668,239.00	19,672,024.05
Kundasale	20,401,360.35	16,689,108.55
Maha Illuppallama	30,202,593.41	31,887,943.67
Sita Eliya	25,639,312.13	18,951,257.10
Udaradella	8,403,872.50	8,260,093.81
Meepilimana	8,912,933.00	9,166,060.56
Kandapola	14,971,420.56	11,253,715.60
Pidurutalagala	29,268,744.86	15,292,579.30
Polonnaruwa	34,172,048.00	32,791,887.07
Murunkan	380,286.62	1,030,970.50
Total	**290,174,923.39**	**270,652,475.15**

Difference between income & expenditure – Rs. + 19,522,448.24

(Expenditure incurred for seeds used in farms under issue orders are not included.)

STAFF LIST

Cadre post	No.
Ag. Officer	18
Research Officer	01
Accountant	01
Agri. Instructor	118
Farm Machinery Instructor	01
Agricultural Monitoring Officer	03
Programme Assistant	02
Administrative Officer	02
Management Assistant	75
Farm Clerk	17
Driver	45
Tractor Operator	16
Electrician	02
Mechanic	01
Machine Operator	08
Carpenter	04
Budder	02
Circuit Bungalow Keeper	03
KKS	05
Storeman	07
Watcher	62
Lorry Cleaner	09
Special Store Labourer	01
Sanitary Labourer	04
Labourer (Grade III)	361
Total	**768**

3.3 SOCIO ECONOMICS AND PLANNING CENTRE (SEPC)

The SEPC functions are conducting socio-economic research and agricultural policy analysis, research on development planning and helping Department of Agriculture and Ministry of Agriculture for formulating agricultural policies. The SEPC maintains a statistical unit to compile agricultural statistical information. The centre also coordinates the activities of local and foreign funded projects of the DOA.

In 2009, socio-economic research and policy analysis was concentrated on focusing economic and financial viability of agriculture development programmes, investment in agriculture and input policies .The centre contributed to streamline various research and development programmes of the DOA by identifying and prioritizing research agenda and guiding policy makers in developing strategies to solve problems concerning food shortage, especially in the context of recent changes in government policies and variations in global and domestic economic environment. The comprehensive programme to build a database on cost and returns of all major food crops on district and seasonal basis was continued.

BUDGET

Allocations received and expenditure incurred under different votes are given in Table 3.3.1.

Table 3.3.1: Annual budget - 2010 (Rs.)

Vote	Allocation	Expenditure
Capital	1,122,000	828,254
Recurrent	2,766,670	2,480,869
TOTAL	**3,888,670**	**3,309,123**

PROGRESS

Studies conducted

- **Cost and returns of crop production**

  Published the costs and returns study of *Maha* 2008/2009 and *Yala* 2009 for paddy and subsidiary food crops, root and tuber crops and vegetables April and August 2010 respectively. The data include average yield, gross and net returns, total and unit cost of production and farm gate price. The data are useful in making decisions on crop production and marketing at farm level as well as in policy making at national level.

- **Rice supply and demand in Sri Lanka: The future outlook**

  Conducted a study to examine the changes in the demand and supply of rice and possible avenues to face the challenges of the next decade. Rice still behaves as a normal good and demand for rice is projected to increase by 12 percent by 2020 owing to population growth. Promotion of rice based products and quality improvement and reducing effect of wheat flour on demand for rice, on demand side and crop diversification,

cultivation of organic, traditional and high valued rice and exploring the possibility of expansion of export and maintaining buffer stock can be practiced to a certain degree to maintain the balance of supply and demand.

- **Effectiveness of public awareness programmes of Crop Wild Relatives (CWR) Project**

Study revealed that In-situ Conservation of Crop Wild Relatives Project has significantly contributed to improve the awareness of all stakeholder categories (primary education, extension workers, policy makers, research scientists, protected area managers, higher education category, and community). However, creation of awareness has to be further improved especially among higher education and the policy maker categories.

- **Technical efficiency of potato cultivation in Sri Lanka and regional differences**

The decrease of productivity as well as low profitability has been identified as major problems in potato cultivation. One of the factors that decide profitability is efficiency of resource and technology use. Study revealed that potato production in Badulla and Nuwara-Eliya Districts can be further increased with available resources and technology, by improving efficiency of farmers.

- **Export market instability in pineapple industry of Sri Lanka**

Pineapple occupies a share of 40-45% of foreign exchange income earnings from fruits. Analysis of pineapple export market behavior is paramount in terms of the position of Sri Lanka among competing countries. Stability and the volatility of export market need to be estimated as the pineapple exports are confined only to Gulf countries. Export volume and unit prices (FOB) of pineapple for the period of 1995-2007 were analyzed to get trend, fluctuations, and volatility of exports. The study revealed that export price variability is high in Sri Lanka compared to world situation. However Sri Lankan pineapple trade is not fully diversified as it displays considerable export concentration to Gulf countries and Maldives. To minimize the risk of the unfavorable market conditions due to price falls by the trade countries, it is suggested to diversify pineapple exports to many countries.

- **Analysis of consumer preferences for rice based noodles and biscuits**

Sri Lanka is nearly self-sufficient in rice production and promotion of rice-based food products appeared to be one of the best alternatives to absorb any surplus resulting from increased production, while moving consumers away from wheat-based products. Study conducted in Kurunegala and Kandy Districts by analyzing the consumer preferences for rice-based noodles and biscuits using conjoint analysis revealed that the thickness of rice noodle strands is the most important attribute. In the case o of rice biscuit, the type, shape and price attributes were significant except shelf life. Consumers preferred the savory type biscuits than plain or sweet tastes with round shape. The consumer preferences could be useful parameters in developing rice-based products for a competitive market.

- **Trade and marketing of rice**

Rice marketing of Sri Lanka has undergone a series of changes during the past few decades. A study conducted to review changes in structure, conduct and performance and related outcomes with respect to different stakeholders of the rice marketing channel reveiled that the stability of marketing margins and market integration indicates the presence of an efficient rice marketing system. However, opportunities are available for improving the product quality, product branding, niche marketing, etc. to improve the welfare of farmers as well as consumers. The presence of genetic diversity among rice varieties could be used for further development of the quality standards. Consistent trade policy, marketing extension and institutional development to support diverse marketing approaches are imperative for the development of a social rice marketing system in Sri Lanka.

- **Trade policy review**

Sound trade policy analysis is imperative for effective decision making process and impacts of the trade policies on input and output market as well as the dynamics of the inputs/output markets need to be considered exclusively in trade policy making processes. Anti export bias of domestic agricultural policies and trade taxes (cess and tariff) need particular attention. The indirect costs of the domestic policies of fragile production environments and other related issues of environmental degradation have to be explicitly considered in designing agricultural trade policies while resource use efficiency should be one of the main criteria in articulating trade policies. The unnecessary market intervention promotes marketing inefficiency and the benefits of such interventions mostly derived by the intermediaries of marketing channels or well organized large scale processors/producers. The capability of such policies to reach the target group, poor farmers, should critically be reviewed and the best policy option in any situation would be price based on market forces with minimum policy interventions.

- **Dynamics of rice market of Sri Lanka**

Rice marketing of Sri Lanka has undergone a series of changes during the past few decades and the rice marketing system operates towards satisfying the consumers' needs. The trade policy changes have lagged impact on producer price of paddy and consistent trade policy, marketing extension and institutional development to support diverse marketing approaches which are imperative for the development of a social rice marketing system in Sri Lanka.

- **Micro finance and poverty**

Micro finance has been identified as a tool of alleviating poverty. A study was conducted to investigate the impact of micro finance on household income and poverty. It was found that incidence, depth and severity of poverty and inequality are less among the households, who have received micro credit and other services. Micro credit could be utilized to reduce poverty levels of rural households but its effectiveness need strong institutional support.

- **Food security and stability of Wet-zone Paddy Production**

A study was carried out to determine input output relationship and supply responses, evaluate the

changes in resource use efficiency in paddy production in different wet zone districts and to determine economics (including non market values) of paddy production. The economic analysis indicates profitable paddy production in the wet zone. Hence, the paddy production in wet zone districts is economical and the production quantities are significantly influenced by price of rice and related food security concerns and quality of rice produced in their own fields.

- **Crop enterprise budget (Paddy OFC and Vegetable crops)**

The enterprise budget for selected fruit crops (Orange, Lime, Banana, Passion fruit, Pineapple, Rambutan, Papaya, Cashew, Guava, Pomegranate, Dragon fruit and Pears) and floricultural crops (Anthurium, Alstromeria, Gebera, Carnation and Madona lily) was prepared and the document is yet to be published.

- **Publishing AgStat -2010**

Completed and published the booklet on agricultural statistics comprising of salient features of information on food crop sector in August-2010.

- **Crop forecast**

Crop forecast is a monthly publication of SEPC which monitors the monthly cultivation progress of paddy, other field crops and vegetables with a forecast on the production levels.

Workshop and Conferences organized

- **Food safety in Sri Lanka (26 March 2010 in Gannoruwa)**

A capacity building workshop was held with the financial assistance of JICA- Sri Lanka office and JICA-Alumni Association of Agriculture to enhance the capacity of various stakeholders, particularly in the DOA. The outcome of this workshop indicates that the role of DOA has to be strengthened through the promotion of good agricultural practices to ensure the supply of safe food to the nation. It was recommended to establish a joint agency by the Ministry of Agriculture and Ministry of Health to monitor/regulate food safety related issues.

- **3rd Expert Group Meeting of BIMSTEC (22-23 Nov. 2010 in Kandy)**

All member countries, Bangladesh, Bhutan, India, Myanmar, Pakistan, Nepal, Sri Lanka, were represented in the two-day conference and the attention of the participants was mainly focused on discussing the progress of cooperation and potential areas for future cooperation on agriculture. It was decided to include organic farming, post harvest technologies and value addition components that under the Good Agriculture Practices (GAP) and to accelerate projects which are not costly. Sri Lanka expressed the willingness to provide assistance in the areas of IPM in rice, crop varieties, seed certification, and production of quality seeds, particularly for rice, statistical methods and contract grower systems. Further, Sri Lanka sought technical cooperation in the areas of animal vaccine production, food processing, good agricultural and manufacturing practices, production of bio pesticides, crop forecasting, dairy feed management practices, and human resource development

Policy document prepared

- **Economic evaluation of seed farms**

  Economic evaluation of all the seed farms in the Department of Agriculture was conducted focusing the cost benefit analysis of the Seed Farm Development Project in year 2010. This repot was submitted to the Ministry of Agriculture.

- **Corporate plan 2011-2013 of the Department of Agriculture**

  The priorities and plan for the period of 2011 to 2013 were prepared.

Co-ordination of programmes

- Model Villages Programme of DOA
- Green Super Rice (GSR) project activities, A collaborative study with IRRI
- Organic Fertilizer Project

Participation in seminars, workshops and Training Programmes

Participation of various committees

- Perera T.H.C.S., Director, Board of Directors – Chillaw Plantations -Member
- Perera T.H.C.S., Director, Board of Directors – Agriculture and Agrarian Insurance Board – Member
- Perera T.H.C.S., Director, Socio Economics Policy Analysis Committee of CARP-Member
- Perera T.H.C.S., Director, Procurement Committee – Department of Census and Statistics- Member
- Perera T.H.C.S., Director, BIMIMSTEC Focal Point for Agriculture Sector - Member
- Perera T.H.C.S., Director, Seed Task Force Committee- Member
- Perera T.H.C.S., Director, Committee on Agriculture and Irrigation Development in Northern Province - Member
- Perera T.H.C.S. , Director, (SEPC), Model Villages Programme of the DOA- Coordinator
- Herath R.M., Economist, Rice Development Committee – Member
- Herath .R.M., Economist, Technology Release Committee -Secretary

Lectures conducted

- Analysis techniques of cost and benefits for fruit crops
- Crop damage estimates

Foreign workshops Participated

- WTO/ESCAP Regional Workshop - Agriculture and Agricultural Negotiations, Hanoi – Vietnam
- SANDEE (South Asian Network for Development and Environmental Economics) - Training course on Environmental and Natural Resource Economics

Domestic workshops participated

- Result Based Monitoring Workshop - 05.01.2010 ISTI, Gannoruwa

- Fourth Annual Research Forum of Sri Lanka Agricultural Economics Association (SAEA) workshop organized by the Sri Lanka Agricultural Economics Association – 17th December, 2010 at the Postgraduate Institute ofAgriculture, University of Peradeniya.

- Workshop on Socio Economic aspects and Crop Production, Coconut Research Institute, Lunuwila - 19.02.2010

- Integrated Strategic Environmental Workshop- 25.03.2010 Hotel Taj Samudra, Colombo

- 3rd BIMSTEC Expert Group Meeting - 22.11.2010 to 23.11.2010 Hotel, Topaz, Kandy

- Asian Bio-Technology and Development- 15.12.2010 Conference Hotel Amaya Hills, Kandy

- The Seminar on Statistical forecasting techniques from 28-29 June 2010 organized by the Applied Statistical Association of Sri Lanka.

Human resources development

- Four officers were trained through a short course on basic statistics conducted by the Applied Statistics Association of Sri Lanka

PLAN FOR 2011

Socio economic research

- Cost of cultivation study on major food crops -2010/2011 *Maha*
- Cost of cultivation study pertaining to major food crops -2011 *Yala*
- Assessment of risks in food crop production
- Youth and future agriculture
- Study on farmer perception and decision making on adoption of recommended rice varieties
- Household survey to assess the livelihood strategies of rice farmers in Sri Lanka
- Production and marketing of Manioc in Sri Lanka
- Diffusion and adoption of selected rice technologies

Agricultural policy analysis

- Agricultural trade policy compliance with WTO agreements
- Study on regrional trade agreements (Gravity model approach)

Production and marketing studies

- Analysis of factor markets in crop production in Kalpitiya Peninsula
- Crop-cut survey on root and tuber crops
- Market evaluation of value added rice/rice based products

Environmental economics

- Impacts of climate change on food crop sector and evaluation of farmer adaptation measures
- Health consequence and socio- economic impact of pesticide use - A case study in Anuradhapura District
- Environmental impact evaluation of organic rice cultivation

Data collection, analysis and publication of agricultural information

- AgStat 2011 (Vol. VIII)

- Annual Report 2010
- Crop Enterprise budget – Fruits and Floriculture
- Crop Forecasting - 2010/11 *Maha*
- Crop Forecasting - 2011 *Yala*
- Collection, maintenance and dissemination of agricultural information

Project handling and planning

- Organic manure production and utilization project
- Co-ordination of disciplinary working groups
- Co-ordination of Model villages programme

Human resources development

- Computer training for technical staff
- Computer training for administrative staff

STAFF LIST

Cadre Post	No.
Director	01
Agricultural Economist	08
Agricultural Monitoring Officer	01
Economist Assistant	12
Programme Assistant	06
Agricultural Instructor	02
Management Assistants' Service	08
Driver	06
Labourer	03
K.K.S.	01
Total	**48**

3.4 PROGRESS MONITORING AND EVALUATION UNIT (PMEU)

The PMEU is responsible for monitoring and evaluation of programmes and activities conducted by all institutes and centers of the DOA. In addition, it holds the responsibility for preparing Annual Action Plan, Annual Performance Report, Monthly Progress reports of the DOA and other relevant reports required by the Ministry of Agriculture and other Institutes. Progress review meetings of the DOA are also convened by the PMEU in order to streamline the activities of the DOA.

BUDGET

Allocations received and expenditure incurred for PMEU under different votes for the year 2010 are given in Table 3.4.1.

Table 3.4.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure
Capital	655,000	247,575
Recurrent	1,559,000	1,207,228
TOTAL	**2,214,000**	**1,454,803**

PROGRESS

Compilation of Action Plans

Action plans for the year 2010 were compiled under following categories.

- Capital expenditure
- Recurrent expenditure
- Special projects funded through DOA
- Special projects funded by the Ministry of Agriculture
- Technical programme of the DOA

Progress Monitoring of Capital and Recurrent expenditure

Continued the monitoring of physical and financial progress of capital work and recurrent expenditure for the year 2010. Prepared and submitted monthly progress reports to the Ministry of Agriculture on Capital and Recurrent expenditure.

During the year 2010, allocations received in 3 installments through a Vote on Account for the first 7 months, by a Presidential Decree thereafter, the budget approved by the Parliament in July 2010. Therefore some Capital works were compelled to be deviated from the schedule.

Table 3.4.2: Summary of progress of DOA

Vote	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure %
Capital	193.7	116.7	60
Recurrent	1,765.2	1,666.4	94
Projects under DOA votes	377.2	317.4	84
Projects under Ministry votes	212.3	142.3	67
Total	**2,548.4**	**2,242.8**	**88**

Progress Monitoring of Special Projects

Special Projects under DOA votes

Monitored and monthly reports of physical and financial progress submitted to the Ministry of Agriculture of 12 special projects under DOA votess. Financial progress of special projects under DOA votes are given in Table 3.4.3.

Table 3.4.3: Progress of special projects under DOA votes

Project	Institute	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure %
Hybrid seed development	HORDI/ FCRDI/ RRDI	9.0	6.7	74
Small scale agricultural research	HORDI/ RRDI	3.5	3.5	100
Infrastructure development	RRDI	110.0	75.6	69
Media programme	ETC	18.0	17.3	96
School farm development	ETC	16.0	14.6	91
Training & capacity building	ETC	8.0	7.9	98
Agro Technology parks	ETC	4.0	3.9	98
Seed production & purchasing	SPMDC	174.5	167.6	96
Development of irrigation	SPMDC	13.0	3.7	29
Implementation of Seed Act	SCS	15.0	10.8	72
SL-USDA Germplasm development programme	PGRC	4.2	4.1	98
Annual Symposium of the DOA	ETC	2.5	1.8	71
Total		**377.2**	**317.4**	**84**

Special Projects under Ministry of Agriculture votes

Monitored and monthly reports of physical and financial progress submitted to the Ministry of 25 special projects under the Ministry of Agriculture votes. Financial progress of special projects under Ministry votes are given in Table 3.4.4.

Table 3.4.4: Progress of special projects under Ministry votes

Project	Institute	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure %
Api wawamu Rata nagamu				
Rice sector development	ETC	3.34	2.75	82
Other field crops	FCRDI	3.97	3.94	99
Vegetables	HORDI	4.50	5.20	115
Fruits	HORDI	4.80	4.80	100
Media programme	ETC	7.85	7.85	100
Bee honey production	ETC	0.54	0.54	100
Farm women	ETC	0.90	0.65	72
Community based seed production via 'Krushi Seva Piyasa'	ETC/ RRDI	0.65	0.50	84
Seed Certification Service	SCS	3.50	3.5	100
Micro irrigation	ETC	9.7	3.48	36
Home gardening	ETC	6.0	5.97	99
Farm development	SPMDC	8.23	5.58	68
Big onion demonstration on IPAE areas	ETC	2.3	1.90	83
Red onion demonstration on IPAE areas	ETC	2.97	2.46	83
Rain water harvesting	NRMC	1.30	0.21	16
Soil conservation	NRMC	0.97	0.08	8
Other projects				
Cold room	SPMDC	9.63	9.5	99
Govi sathiya	ETC	10.36	10.08	97
Deyata Kirula	ETC	2.69	1.06	39
- Banana	ETC	2.09	2.08	100
- Paddy	ETC	1.0	0.19	19
- Orange	ETC	4.17	1.12	27
- Thorana	ETC	3.0	0.70	23

Project	Institute	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure %
One crop one village	HORDI	3.87	3.19	82
Other small projects		9.90	4.83	49
Organic fertilizer		97.55	59.44	61
Total		**212.24**	**142.36**	**67**

Technical programme

Compiled the quarterly progress reports on the technical programme of the DOA.

Other Reports

Prepared and submitted progress reports of activities under 'Mahinda Chintanaya' related projects for which the total estimated cost exceeds Rs. 50 million to the Ministry of Agriculture.

Achievements of DOA

Compiled and submitted the achievements of DOA in the year 2010 to the Ministry of Agriculture and the Central Bank for inclusion in the progress report for the parliamentary budget speech and the Annual Report of the Central Bank.

Annual Performance Report

Prepared Annual performance report of the DOA for the year 2009 and furnished for distribution in the Parliament, all relevant Ministries, Universities, libraries and other relevant institutions.

PLAN FOR 2011

- Preparation of Action Plans for DOA programmes
- Monitoring progress of capital and recurrent work and special projects
- Conducting monthly physical and financial progress review meetings
- Compilation of the Annual Performance Report of the DOA
- Providing information for the Central Bank report and the budget speech.
- Compilation of progress reports for projects over 50 million

STAFF LIST

Cadre post	No.
Deputy Director	01
Agricultural Economist	02
Translator	03
Programme Assistant	02
Management Assistance Service	02
Driver	03
KKS	01
Labourer	03
Watcher	02
Total	**19**

3.5 NATURAL RESOURCES MANAGEMENT CENTER (NRMC)

The Natural Resources Management Center (NRMC) strives to optimize use of land and water resources on a scientific basis to improve national productivity in a sustainable manner. The main activities of this centre include research on soil conservation and watershed management, land suitability evaluation, crop monitoring and forecasting, agro-meteorological and climate change, productivity enhancement, soil and water quality and on – farm irrigation management. Other responsibilities of the centre are maintenance of the agro-meteorological observation network of the country, implementation of the Soil Conservation Act, technology dissemination, provision of technical assistance to clients on related subjects and environmental impact assessment of various development projects.

BUDGET

Table 3.5.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	2,173,000	1,324,934	61
Recurrent	2,226,500	1,804,003	81
Projects			
Rain Water Harvesting Project	1,300,000	653,616	50
Implementation of Soil Conservation Act	968,000	384,103	49
Wari Pubuduwa	495,991	488,939	99
Drought Mitigation Project	225,000	221,118	98
Land Development Project	191,200	97,840	51
TOTAL	**7,579,691**	**4,974,552**	**66**

PROGRESS

RESEARCH

Determination of onset time of rains during Yala and Maha seasons in major rice growing regions of Sri Lanka

Out of three rice eco-systems in the Dry and Intermediate zones namely, major irrigation, minor irrigation and rain fed, only the major irrigation systems are comparatively less sensitive to the rainfall rhythm in both Yala and Maha seasons of respective climatic zones. Since both these rainy seasons are short in an absolute scale, it is important to establish the rice crop in the field as early as possible to avoid wasting valuable growth time. Study undertaken to determine, from a retrospective point of view, the spatial distribution of onset time of rains in Yala and Maha seasons in major rice growing regions of Sri Lanka.

This study has shown that there is a high spatial variability of onset time of both Yala and Maha seasons. However, it is also clear that conventional onset time of the major rice growing areas of the country remained unchanged despite changes of rainfall regime attributed to climate change.

Enhancing productivity of fruit crops under Kandyan forest garden system in the Kandy District

Study which commenced in 2006 with the objective of identifying land related limitations to fruit crop production in the Kandyan forest garden system and to adopt corrective measures in the form of Better Management Package (BMP) was completed. Soil, socio economics, land related limitations identified. Corrective measures such as selection of shade free sites for planting fruits, soil conservation using lock and spill drains and individual flat forms, storm water management using percolation pits, micro fencing to protect the plantlets, pit application of lime at 3 weeks prior to crop planting, pit application of cow dung at planting, using chemical fertilizer up to fruit bearing stage as recommended, insect pest control up to crop bearing stage as required and training and pruning of plant canopy recommended. This technology is to be submitted to the Technology Release Committee.

Reintroduction of vegetable to Kandyan forest garden system in the Kandy District

Completed the study commenced in 2009 with 5 farmers to identify land related limitations to vegetable production in the Kandyan forest garden system and to adopt corrective measures in the form of Better Management Package (BMP) for reintroduction of vegetables. Introduction of a metal structure with vertical expansion technology, cultivation of vegetables in soil containers on a metal frame,.This technology is to be submitted to the Technology Release Committee.

Development of a Yaya approach for on farm soil management in irrigated agriculture (A simplified method for soil testing and making fertilizer recommendations)

A low cost, farmer participatory and multi functional method based on Remote Sensing and GIS technology for testing soil and making fertilizer recommendations was developed and tested in the fields with CIDA and JICA funding. Studies conducted at Abakolawewa in Galgamuwa and Hidogama in Srawasthipura villages for field validation of the

method with PEACE Project funding showed suitability of the method for field implementation.

Low cost method for rapid insulation of surfaces exposed by mass movements in steep lands

A low cost rapid method with locally available materials as inputs for insulation of surfaces exposed by mass movements in steep lands was developed and tested at the land slide stabilization site at Peradeniya town in collaboration with National Building Research Organization (NBRO). The method involves few steps; smoothening of the exposed land surface, insulation of the surface with a growth media to a depth of 15 cm, mulching the growth media with 2 cm layer of available bio degradable material, placing a metal mesh over the mulch, fixing the mesh to the earth using metal pegs, planting cuttings of plants and post plant operations to establish the vegetation cover. The method so developed and the testing is in progress. Initial results show that the method is highly suitable and successful in insulation and stabilizing surface exposed to soil erosion.

Perimeter Survey, Soil Survey, and Crop Suitability Survey

- Completed perimeter Survey, Soil Survey, and Crop Suitability Survey of Bata Atha, Niraviya and Ambepussa farms. Prepared soil maps, crop suitability maps and contour maps using prevailing climatic conditions.
- Prepared and submitted soil maps, contour maps, crop suitability maps and crops suitability reports.

The name of farms and extents are given in Table 3.6.2.

Table 3.6.2: Extents surveyed

Farm	Extents
Bata atha	600 Acres
Niraviya	400 Acres
Ambepussa	200 Acres
Doluwa D.S. Division	80 Acres

- Under "Tea small holding entrepreneurship programme" soil conservation measures were demarcated for 80 acres of land and farmer awareness creation programme was launched at several Grama Niladari Divisions in Doluwa D.S. Division.

TECHNOLOGY DISSEMINATION

Trainings on soil and water conservation, and related areas

- Conducted two 5-day trainings on Soil Conservation and Land Development for 71 Technical Officers of the DOA.
- Conducted one 4-day training programme on Soil Conservation and Land Development for 40 Technical Officers of the Provincial Department of Agriculture (NWP).
- Conducted one 3-day training course on Soil Conservation and Land Development in collaboration with AgEdis for 30 commercial farmers.
- Conducted two 2-day trainings on Soil Conservation and Watershed Management for

Technical Officers of the Southern Provincial Department of Agriculture and farmers in

- Conducted five 1-day training courses on Soil Conservation, Watershed Management, and Land Management for 681 students and farmers.
- Conducted twenty two 1-day training sessions on Soil Conservation for 460 estate workers in collaboration with Plan Sri Lanka.
- Conducted twelve 1-day training sessions on Land Use Planning for 380 lead farmers under IFAD funded Small Holder Entrepreneurship Development Project.
- Conducted three 1-day training programmes on Rainwater Harvesting for extension officers of the Southern Province, executive officers of World Vision Sri Lanka and students of Agriculture Faculty of the Rajarata University.

Demonstrations and exhibitions on soil and water conservation

- Soil conservation demonstration established at Agriculture Technology Park at Gannoruwa in 2004 with the aim of demonstrating presently available soil conservation and watershed management technologies for the benefit of different categories of end users in the country was maintained. Accordingly, 7,647 farmers, 62,995 school students, 5,411 teachers and 17,337 general public visited the demonstration.
- Established an on-farm soil conservation demonstration at Maradankalla village in Galenbidunuwewa DS division. Approximately 20 hectares of rain fed uplands belonging to 21 farmers were conserved with 10,077m of soil bunds as conservation technique in a 50 hectare land block situated in the tank catchment.
- Established two demonstrations to demonstrate rainwater harvesting measures i.e. land terracing and farm ponds, for increasing rainfall effectiveness in Palugaswewa and Tanamalwila DS divisions. The demonstrations covered 3 acres belonging to 2 farmers in Palugaswewa and 4 acres belonging to 4 farmers in Tanamalwila.
- Established a demonstration site and exhibition stall at the Deyata Kirula exhibition in February 2010 at Kundasale, Kandy.
- Established demonstration site and exhibition stall at 'Govi Sathiya' exhibition in September 2010 at Bata Atha Farm

Hadabima with a participation of 50.

Television and Radio programmes

- Officers participated in 5 television and 4 radio programmes on soil conservation, watershed management and rain water harvesting.

Workshops

- Conducted a workshop on "Water for Sanitation" on the World Water Day – 2010 with 95 participants.

TECHNICAL ASSISTANCE

One of the main activities of the centre is to provide expertise technical assistance for different clients and the centre provided the following technical assistance during the year.

- Carrying out a soil survey and preparation of land suitability map for 40 ha land block of Nirawiya Farm of Mahaweli Authority

- Surface stabilization of exposed area due to mass movement of soil at Peradeniya town

- Improvement and maintenance of soil conservation demonstration at training farm of "Hadabima" at Mawathura.
- Preparation of training module on Small and Medium Scale Commercial Farm Development for AgEdis.
- Preparation of land development plans for small and medium scale commercial farm development programme of AgEdis.

OTHER ACTIVITIES

Implementation of Soil Conservation Act

The process of obtaining approval for the proposed amendments to the Act was continued by providing necessary information to the concerned parties.

Maintenance of database

The database on agro-climate, land and water resources was collected, computerized and maintained for the provision of information to various clients.

Maintenance of Agro-meteorological observation network

Agro meteorological observation network consisting of 28 agro-meteorological observation stations along with 70 rain gauging stations was maintained according to the WHO standards.

Representations in technical committees

The staff of the NRMC served in the followings Committees.

- Strategic Environmental Assessment (SEA) Programme for the Northern Province
- Technical Evaluation Committees of Central Environmental Authority for granting environmental clearance for various projects i.e. land blocking out (30 No.s), metal quarries (10 No.s), mini hydropower (50 nos) and timber harvesting (60 No.s) projects.
- Water Management Panel in Mahaweli Authority of Sri Lanka

PLAN FOR 2011

Research

- In-depth analysis of rainfall data of selected agro-ecological regions to determine their suitability for inter-season cultivation;
- Mitigating the impact of drought for agricultural in a Changing climate in Sri Lanka: A system approach to build the resilience of farmers in a selected location of Monaragala District
- Development of recommendations for enhancing agricultural productivity in Kandyan home gardens: A case study at Wattappola village
- Development of recommendations for enhancing productivity in large scale rain-fed maize-sesame rotation in the Dry Zone: A case study at Maradankalla village
- Evaluation of impact rainwater harvesting techniques on soil moisture storage and distribution
- Introduce efficient water resource management technologies for different cropping systems

- Identification of areas and Water saving field demonstration (Land Development and Rain water harvesting) to introduce efficient water management practices to cultivate same land in both seasons
- Identification of suitable areas (DL1a) to encourage inter-seasonal cultivation
- Identification of suitable areas in Mahaweli H area for crop diversification
- Identification of new lands in the Northern Region for commercial agriculture
- Identification of abandoned lands in the Northern Region for agriculture
- Correct estimation of paddy lands in the Eastern region and development of a yield forecasting system.
- Further refinement of agro ecological sub zones of Sri Lanka
- Improvement of soil map of Sri Lanka (Detailed Soil Series map of Northern region)
- Assessment of shallow ground water and water quality in the Northern region
- Identification of drought prone areas within Agro-Ecological regions
- Development of land based technologies for drought mitigation
- Mitigation of excess moisture impacts through appropriate technologies
- Development of soil management practices on yaya basis

Technology dissemination

- Training of officers and farmers on soil and water conservation, and natural resources management
- Demonstration of recommended soil conservation measures
- Workshop on rainwater harvesting for agriculture (World Water Day workshop)
- Mitigation of impacts of agricultural droughts in Moneragala District

Technical assistance

- Preparation of soil conservation and storm water drainage management plans for development projects
- Provision of technical assistance on soil and water conservation to various agencies

Other

- Implementation of Soil Conservation Act
- Maintenance of database on agro climate, land and water resources
- Maintenance of agro meteorological observation network
- Representation in Technical Committees such as Technical Evaluation Committees for Granting Environmental Clearance for Development Projects and Environmental Monitoring Committees

STAFF LIST

Cadre Post	No.

Additional Director	01
Research Officer	07
Agricultural Officer	02
Subject Matter Specialist	01
Research Assistant	02
Agricultural Instructor	06
Programme Assistant	03
Soil Surveyor	05
Research Sub Assistant	02
Management Assistants' Service	07
KKS	01
Driver	06
Watcher	02
Labourer	03

Total	**48**

3.6 EXTENSION & TRAINING CENTRE (ETC) PERADENIYA

The goal of the Extension & Training Centre is to achieve highest level of productivity in the food crops sector to ensure food security of the country as well as to improve living standards of the farming community. Activities of the division are focused on four main areas: extension, training, communication and agricultural education & examinations. Following activities are implementing to achieve the objectives of the division by the respective areas.

- Direct extension programmes conducted by six inter provincial units in major irrigation schemes
- Collaborative extension programmes with Provincial Departments of Agriculture and Mahaweli Authority of Sri Lanka in respective areas.
- Conducting training programmes for extension staff, farmers, entrepreneurs and others at three In-Service Training Centers, two District Agricultural Training Centers and Farm Mechanization Training Center.
- Conduct two-year Diploma course in Agriculture at Kundasale, Pelwehera, Angunakolapelessa, Vavuniya and Karapincha Schools of Agriculture.
- Collect, manage and disseminate information using electronic and print media carried out by four units of Farm Broadcasting Service, Audio Visual Centre, Press and Information Centre.
- Conducting mobile extension programmes and Young Farmers Club activities.
- Conducting agriculture development work at two Bee Development Units.
- Conducting Organic farming programmes through the Fertilizer Unit.
- Conducting Agriculture Enterprise Development, OFC development

programmes and Farm women's Agricultural Extension work.

- Training and development activitie on Horticultural Crops at Bibile Horticultural Crops Training & Development Centre.

* Conducting training programmes for Agriculture Research and Production Assistants at Schools of Agriculture Wariyapola, Anuradhapura, and Labuduwa, and Horticultural Crops Training & Development Center, Bibile.

BUDGET

Allocation and expenditure under different votes are given in Table 3.6.1.

Table 3.6.1: Annual budget – 2010 (Rs.)

Head	Allocation	Expenditure	Expenditure %
Capital	27,200,000	20,038,000	74
Recurrent	103,720,000	94,150,000	91
Projects			
Training and capacity building	8,000,000	7,484,000	94
Agricultural Training Farms	16,000,000	14,618,000	91
Media Programme	18,000,000	17,400,000	97
Promotion of Food & Nutritional Security through Farm Women Groups	905,000	653,000	72
Enhancement of bee honey production in Sri Lanka	540,000	540,000	100
Community based seed production via KSP	600,000	514,600	86

Media programs under "Api Wawamu Rata Nagamu" programme	7,850,000	7,850,000	100
Enhancement of Fruit & Vegetable Productivity Through Micro Irrigation Technology	9,700,000	3,477,000	36
Promotion of organic fertilizer production & its use	48,500,000	30,826,000	64
Home gardening	6,000,000	5,900,000	98
Rice sector development Programme	2,000,000	2,000,000	100
TOTAL	**249,015,000**	**205,450,600**	**83**

PROGRESS

Special Projects

Training and capacity building

Three sub projects were conducted under this project.

- One year training for Agricultural Research & Production Assistants

  222 Nos. of Agricultural Research & Production Assistants were trained under this project

- Training & capacity building at Schools of Agriculture

  Purchased new equipments to the value of Rs.2.142 million were provided to improve the quality of teaching agriculture diploma students.

- Improvement of capacity and facilities at ISTI and FMTC

  Improved training facilities and providing training aids for 3 Training Centers,

  Improved computer facilities at ISTI, Gannoruwa

  Improved facilities for quality and capacity of the hostels

  Improved facilities for practical trainings.

Agricultural Training Farms

Agricultural training farm lands at Agricultural Schools, In-service Training Institutes, and District Agricultural Training Centers were improved under this project.

Media Programme

- Produced, edited and telecast 100 TV programmes
- Produced edited and broadcast 1400 radio programmes
- Printed and distributed 2,409,272 copies of different technical publications

Home Gardening Development Programme

7700 Nos. of selected home gardens were developed in Anuradhapura, Ampara,

Hambantota, Hasalaka, Moneragala and Polonnaruwa Inter-Provincial areas. Seed and planting materials were also provided for these home gardens. In addition to the development of model home gardens were developed and quality improvement of existing home gardens at Aralaganwila and Angunakolapellessa ISTIs, DATC Weeravila, SOA Anuradhapura, Karapincha, Labuduwa, Pelwehera, Vavuniya, Angunakolapelessa, Wariyapola, and the Walpita and Pasyala research stations were carried out. Furthermore, home garden at Horticultural HORDI was improved.

Promotion of food & nutrition through Farm women organizations

Provided 21 Nos. of mobile sales units to farmers with 50% farmer contribution. Also, a national level quiz programme on agriculture, food & nutrition was conducted.

Establishment of micro irrigation systems to achieve higher yield from fruit cultivation

- Provided 122 micro irrigation systems to farmers at concessionary rate to increase fruit productivity through the introduction of micro irrigation technology.
- Conducted 22 Nos. of training programs on use of micro irrigation systems for officers and farmers.

Establishment of Agricultural supply points named as "Krushi Seva Piyasa" at private level

The objective of the project was to supply services to farmers on agricultural information, and inputs by establishing “Krushi Seva piyasa” outlets at district level. The target was to establish and open 19 No. of units by the end of year 2010.

Agro Technological Parks – Gannoruwa & Bata atha

Enhancement of National Bee Honey Production

- Developed 30 bee honey production villages and 5 training centers under this project.
- Conducted special trainings for 100 officers and 650 bee honey producers
- Produced 400 bee boxes and smokers

Two Agro Technological parks were maintained for,

- Technology transfer to the farmer through live demonstrations
- Demonstration of new & ancient agricultural technologies

- Promotion of agro tourism for local & foreign tourists
- Functions as a centre to disseminate agricultural technology information & instructions.
- 202,584 visitors visited the Gannoruwa & Bata A-Park Agro Tech Parks during the year 2010.

Organic fertilizer Production & Promotion Programme

Trained 5293 Nos. of farmers and 253 Nos. of officers on compost production.

Conducted 1309 Nos. of demonstrations on cultivation of green manure and 3466 Nos. of IPNS demonstrations.

Extension Activities in Inter-Provincial Areas

Extension activities conducted by the Inter-Provincial areas in 2010 are given in the Tables below.

Table 3.6.2: Extension Activities Inter-Provincial Areas

Indicator	IP Anuradhapura		IP Polonnaruwa		IP Monaragala		IP Kandy		IP Ampara		IP Hambantota		Total	
	2009/10 Maha	2010 Yala	2009/ 10 Maha	2010 Yala	2009/10 Maha	2010 Yala	2009/10 Maha	2010 Yala	2009/10 Maha	2010 Yala	2009/10 Maha	2010 Yala	2009/ 10 Maha	2010 Yala
Total Paddy extent (ha) - Yaya Programme	29527	12553	31598	27404	13057	3417	13503	9688	75195	59006	15353	15465	178233	127533
Extent (ha) - Yaya Programme	1085	1239	14846	16834	816	1230	1613	76	42551	40325	10159	8492	71070	68196
No. of farmers	1641	3631	15718	13627	945	1390	2180	1305	26702	27335	12386	10258	59572	57546
No. of yaya	156	104	534	535	74	65	111	1086	1105	1195	239	215	2219	3200
Max. yield demonstation yaya ("Saruketha) – Extent (ha)	537	695	1501	1732		77	1167	947	9550	9793	1250	1111	14005	14355
No. of farmers	867	1194	1213	1786		90	1635	76	10150	10182	1028	990	14893	14318
No. of yaya	126	68	117	128		6	70	59	497	494	66	44	876	799
Introduction of new Large scale VAT	3	3	3	4	2		4	3			3	3	15	13
Introduction of new Small scale VAT			2	31	8			7			1	2	11	40

Table 3.6.3: Extension Activities Inter-Provincial Areas

Indicator	IP Anuradhapura		IP Polonnaruwa		IP Monaragala		IP Kandy		IP Ampara		IP Hambantota		Total	
	2009/10 Maha	2010 Yala	2009/10 Maha	2010 Yala	2009/10 Maha	2010 Yala	2009/10 Maha	2010 Yala	2009/10 Maha	2010 Yala	2009/10 Maha	2010 Yala	2009/10 Maha	2010 Yala
No. of farmers	4180	4885	19885	14215	1442	2178	11600	8652	2550	25581	11591	9820	51248	65331
Use of organic matter and soil fertility - Charcoal application - Extent(ha)	500	147	1616	823	80	94	185	393	950	972	1448	1305	4779	3734
Use of organic matter and soil fertility - Promotion of organic matter - No of programme			16	83	6		35		37	33	14	8	108	124
Use of balannce fertilizer (Organic+Inorganic) - Extent(ha)		310	2469	5710					45780	46891	4069	4081.2	52318	56992.2
No. of farmers			4491	7814					25050	25054	3841	3489	33382	36357
No of samples				1	5	1					16		21	2

Table 3.6.4: Extension Activities Inter-Provincial Areas

Indicator	IP Anuradhapura		IP Polonnaruwa		IP Monaragala		IP Kandy		IP Ampara		IP Hambanthota		Total	
	Progress													
	2009/10 Maha	2010 Yala	2009/10 Maha	2010 Yala	2009/10 Maha	2010 Yala	2009/10 Maha	2010 Yala	2009/10 Maha	2010 Yala	2009/10 Maha	2010 Yala	2009/10 Maha	2010 Yala
CSP production programme – Extent (ha)	122		317	202	16.2	52	62	84.6	760	741	168.1	295.2	1445.3	1374.8
Seed paddy programme with other organization – Extent (ha)	112.4	208	272	115			12.2	8.6	280	265	13	55.2	689.6	651.8
IPM programme – Extent (ha)	292	202	262	410		63	102	11	815	698	346	597	1817	1981
No. of IPM yaya	28		23	18		6	10	15	32	27	25	30	118	96
No of training conducted on paddy, OFCC, vegetables and fruits	181	104	259	432	176	91	503	366	2602	677	405	191	4126	1861
No of farmer production societies established in the season (Yala/ Maha)	234	213	263	473	57	76			254	705	374	407	1182	1874

Development Activities

At the beginning of the year, Rs 13.4 million was allocated to rice productivity improvement programme. But, funds were limited up to Rs 2.0 million in the second quarter of the year. However, it was to arrive at significant achievements within Inter Provincial areas. Under the "yaya" concept, a variety of technology transfer activities such as farmer training, demonstrations and plant clinics were carried out to improve the quality and quantity of production. Also, the "Api Wawamu Rata nagamu" programme assisted in promoting mid seasonal cultivation of other crops to increase cropping intensity of paddy lands in Inter Provincial and provincial areas. During the year, following achievements were recorded in the project area.

No of yaya	758
Area under the yaya programme	19,585 ha
No of training sessions	2,483
No of trainees	17,967

In-Service Training Institute, Gannoruwa

This is the main agricultural training institute at national level and is responsible to improve knowledge, skills and change attitudes of agricultural officers, entrepreneurs, farmers and others interested in agriculture.

A total of 352 training programmes were conducted in 2010 (6958 man days) of which 80 were for officers (5811 man days), 7 for farmers (907man days) and 38 field training programmes (709 man days). Also, 89 of workshops / seminars / meetings / discussions, (8848 man days) and 5 outdoor training programmes (142 man days) were conducted.

In-Service Training Institute – Angunakolapelessa

This institute offers in-service training for officers in the agriculture sector and farmers in Galle, Matara and Hambantota Provincial Extension districts. During the year, a total of 95 training programmes were conducted (3949 man days) of which 42 programmes for officers (3036 man days) and 13 for farmers (424 man days). Also, four workshops/ seminars/ meetings/ discussions (186 man days), 4 field training programmes (480 man days) and 5 outdoor training classes (234 man days) were conducted.

In-Service Training Institute, Hansayapalama – Aralaganwila

This Institute offers services especially for farmers and officers of Mahaweli B, C. & G zones, Ampara, Polonnaruwa, Mahiyangana and Batticaloa areas. Altogether 55 No. of (4667 man days) were conducted of which 19 Nos. of programmes (527 man days) were for officers, 36 programmes for farmers (4620 man days), and 41 field training programmes (1872 man days) and 01 outdoor training programme for farmers. (35 man days)

Farm Mechanization Training Centre

Farm Mechanization Training Center (FMTC) located at Puliyankulama in Anuradhapura District is the sole national level training centre for providing farm machinery trainings. FMTC offers training sessions on tractors, water pumps, plant protection equipment, paddy reapers, paddy threshers, paddy combined harvesters and hand implements. In addition, FMTC also endeavours to popularize micro-irrigation techniques among the farming

community. The service of the FMTC is provided to farmers, officers in the agricultural sector, university undergraduates of faculties of agriculture, students of the schools of agriculture, technical colleges and schools, private sector personnel involved in farm mechanization etc. During the year, FMTC conducted training programmes (695 man days) for officers, 5 programmes for farmers (252 man days), 34 field training programmes (3610 man days) 5 work shops/ seminars/ meetings/ discussions (272 man days), and 01 outdoor training programme (20 man days) for farmers.

District Agricultural Training Centre - Weerawila

During the year, the center provided 13 training programmes for farmers, 6 trainings for officers, 11 trainings for school students. Also one year training for 21 Nos. of Agricultural Research & Production Assistants (2009 group) was completed in May 2010.

District Agricultural Training Centre - Ampara

A total of 33 training programmes were conducted (3324 man days) consisting of 09 officers, (261 man days), 15 farmers (502 man days), 09 for others, (841 man days), 20 work shops (670 man days), 25 field visits (600 man days) and 6 outdoor trainings for farmers (250 man days).

Women's Agricultural Extension Programme

The special project "Promotion of food & nutrition through Farm women organization" and a programme under the 150 day Intensive Development Plan were implemented in 28 Provincial and Inter Provincial areas.

Trained 234 Nos. of extension officers on Women's Agricultural Extension programme. Trained 25,057 farm women on human nutrition, agricultural entrepreneurship and resource management.

Established 456 Nos. of farmer organizations with 1148 No. of members .

Provided 31 Nos. of mobile sales units for farmers with 50% farmer contribution.

Agro Enterprise Development & Information Service (AgEDIS)

The mandate of AgEDIS provides information and services required to start new Agro-enterprises or to develop existing agro-enterprises. During the year, AgEDIS has conducted 10 training programmes on Agri Business Enterprise Development (499 man days) and coordinated the Establishment of "Krushi Seva Piyasa, a special project on public -private collaborative programme to offer services to agro entrepreneurs funded by the Ministry of Agriculture. Under this project 19 No. of Krushi Sewa Piayasa outlets were opened at district level.

Bee Development unit Bindunuwewa - Bandarawela

The main bee keeping unit is located in Bandarawela with a subunit in Mawathagama. Activities conducted during the year comprised of production of bee keeping appliances, production and processing bees honey, conducting training on bee keeping and manufacturing of equipment produced by private sector manufacturers, coordinating with private and government organizations and assisting research programmes on bee development

During the year, the unit produced 307 kg bees' honey, 73 bee hives, and 826 bee boxes. Conducted training programmes on bee keeping (04 programmes for officers (219 man days) and 11 programmes for farmers (492 man days) with 4 training programmes on manufacturing of bee keeping equipment (86 man days).

Young Farmers' Club (YFC) & Mobile, Extension Service Unit

Objectives of the YFC is to establish sustainable organizations at village level, produce youth who can sustain themselves, develop a new generation of farmers knowledgeable on new technologies, uplift entrepreneurial abilities of youth and reduce unemployment through agriculture.

During the year, programmes were conducted island wide to encourage the participation of young generation in agriculture. Conducted a total of 07 training programmes for officers, 35 training programmes for YFC members, 83 cultural programmes, 95 religious programmes, 87 educational programmes and 87 social programmes.

Irrigation Management and Advanced Agricultural Technology Unit

During the year, the unit has implemented programmes with a view to popularizing micro irrigation, protected agriculture, papaya crop development (AWRN), advanced technology for nursery management and fertigation for commercial farmers and government institutes.
This unit, also provided services on micro irrigation, protected culture, establishment of large scale commercial farms and functioned as the main resource center for the above technologies.

Planning and Progress Monitoring Unit

The Planning and progress monitoring unit is responsible on preparing action plans, monitoring and evaluating financial and technical activities, and special projects conducted by the Extension & Training Division. The unit is also involved in preparation of indicative targets for annual implementation programme, provide information on the division for the Annual report of the DOA,,Central Bank report and Budget Speech while disseminating information of relevance to relevant agencies. In addition, coordination of the special project "Media Programme" is handled by this unit.

TV & Farm Broadcasting Service

This service broadcast radio programmes on agriculture mainly in Sinhala and Tamil languages throughout the country via different radio channels and broadcasted 2418.radio programmes during the year

Audio Visual Centre

Maintenance of two Agro Technological parks Gannoruwa & Bata Atha is done by Audio Visual center. Gannoruwa agricultural complex transformed to a tropical agricultural theme park /agricultural science garden /live crop museum in 2004 continue to draw large crowds, students, farmers, agricultural entrepreneurs and general public.

National Agricultural Information Network (Cyber Agricultural Extension)

Objective of this programme is to establish a quick information exchange mechanism in the agricultural sector and planning to establish Cyber extension units (Rural Knowledge Centers) at all Govijana Kendrayas with links to Research Centers, Extension and Training Center of the DOA and to private sector organizations. Being the initial stage of the programme only the CDROM based information dissemination system was implemented.

CDROMs already produced by the Audio Visual Center of the DOA on flip chart technology will enable village level extension workers of the villages to produce low cost audio visual aids at village level which could be used in training classes. Farmers can also bring live samples to the cyber extension unit and send pictures through e-mail to Research Centers.

After realizing the value of cyber extension, Ministry of Agriculture of the Eastern Province funded to establish 31 cyber units in the province. A new concept was introduced to cyber extension by establishing a data base on commercial level farmers as a supportive measure for agricultural marketing activities. Name of the farmer, types of crops cultivated, crop extent and crop forecast were included in this data base.

Other Activities performed/material produced by the Audio Visual Center during 2010 are listed below.

Also, produced 101 video / radio programmes. Provided 1622 graphic communications 8 trainings and 44398 toll free advisory services.

Information Center

The responsibility of this unit is to distribute printed publications of the DOA. The main sales center is located at Peradeniya with 34 sub sales centers island wide. The Centre distributed 115,729 copies of publications and 1387 CD ROMs during the year and the total income was Rs. 4,045,026.

Agricultural Education

The five Schools of Agriculture located at Kundasale, Pelwehera, Angunakolapelessa Vavuniya and Karapincha offer two year programme leading to Diploma in Agriculture. The Schools of Agriculture at Labuduwa, Wariyapola and Anuradhapura function as special Training Centers and offer short term courses in agriculture. 226 students underwent the second year training programme for Diploma in Agriculture at the five Schools of Agriculture. The number of students in the SOAs is given in the Table 3.6.6. 106 students obtained the Diploma qualification in 2010.

One year practical agriculture training course for Agricultural Research & Production Assistants (ARPA)

Target group of this course is ARPA attached to the Department of Agrarian Development. Details of ARPA trained in 2010/2011 are given below.

Table 3.6.5: Sale of publications (Sinhala & Tamil)

Title	Sinhala	Tamil	Title	Sinhala	Tamil
Home Gardening	30,187	1,241	Vegetable cultivation	9,774	781
Bee keeping	3,683	281	Use of organic manure	9,584	691
Disease free banana cultivation	1,085		Major pests & diseases of banana	2,639	
Mushroom cultivation	5,267	349	Pineapple	934	
Orange & Mandarin	2,061		Big onion cultivation	597	541
Nutrition	54		Tree planting	584	
Tuber crop based recipes	329		Certified seed paddy production	1,072	194
Identification of insect pests in fruit crops	627	145	Higher yields from rice cultivation	1,341	282
Hydroponics	303		A collection of insect control measures	688	
Dwarf ambarella	466		Storage of seeds	867	274
Domestic crop based menus	426		Passion fruit	865	
Avocado		129	Self seed paddy production	662	
Rainfall & Ecological Zones of Sri Lanka	1,021		Nutritional value of Sri Lankan fruit crops	476	
Post harvest technology of fruit crops	1,036		Tissue culture	1,202	
Melon cultivation	1,043	76	Domestic food technology	1,200	
Bites from domestic crops	1,303		New taste from rice	1,070	
Integrated plant nutrient system	175	122	Brinjal cultivation	407	
Mango cultivation	1,531		Field problems in rice cultivation	2,075	239
Use of fertilizer in rice cultivation	552		Pomegranate cultivation	1,550	373
Diseases in rice cultivation	3,064	139	Bee keeping for production of bee honey	613	
Agricultural technology in brief	8,000	1,201	Mangosteen	203	121
Recommended rice varieties	723	143	Cultivation of jak	94	82
Agro ecological map of Sri Lanka	356		Neem		190
Guava cultivation		118	Woodapple cultivation		136
Rambutan cultivation		160	Chilli cultivation		381
Grape cultivation		276	Banana cultivation		565

Table: 3.6.5: No. of Students in the Schools of Agriculture during 2010

Agriculture School	Year	Medium						Total	G.total
		Sinhala		Tamil		English			
		Boys	Girls	Boys	Girls	Boys	Girls		
Kundasale	1st	33	29	17	12	08	10	109	207
	2nd	24	20	06	14	12	7	98	
Angunakollpellessa	1st	22	10					32	82
	2nd	40	10					50	
Pelwhera	1st	30	12					42	88
	2nd	38	08					46	
Vavuniya	1st			10	08			18	50
	2nd			13	19			32	
Karapincha	1st	23						23	23
	2nd								
Total		**210**	**89**	**51**	**56**	**16**	**28**	**450**	**450**

Table 3.6.6: Training progress in 2009/2010

Training Center	No. of ARPA trained		Total No. of ARPA being trained
	Batch I	Batch II	
School of Agriculture Anuradhapura	21	19	40
School of Agriculture Wariyapola	36	40	76
School of Agriculture Labuduwa	20	34	54
Horticultural Training & Development Center Bibile	26	34	60
Total	**101**	**128**	**229**

Examination Unit

Conducted following exams by the Examination unit in year 2010.

- New admission for Schools of Agriculture (255 – No of applicants)
- Exams for Diploma course (416 - No of students)
- Departmental exams for Agriculture Instructors (186 – No of AI)
- Exam for one year course in School of Agriculture (198 – No of ARPA)
- Efficiency bar exams for SLAgS officers, Agric Engineers, Drivers, Seed Technicians
- Oral tests for language proficienc)
- Exam for one year course in School of Agriculture (198 – No of ARPA)
- Efficiency bar exams for SLAgS officers, Agric Engineers, Drivers, Seed Technicians
- Oral exams for language proficiency (Sinhala & Tamil)

PLAN FOR 2011

Special Projects

- Media programme - Fund allocation Rs.20 million
- Land development at School of Agriculture & Training Centers
- Training & Capacity Building at Schools of Agriculture & Training Centers
- Agro parks – Gannoruwa / Bata atha
- Mid Season Legume croup Cultivation in Inter provincial Area
- Production and use of organic fertilizer.
- Media activities under "Api Wawamu Rata Nagamu" Programme
- Other Field Crop cultivation in Inter-Provincial areas
- Enhancing Bee Honey Production
- Paddy productivity improvement
- Community based seed production programme
- Production of citrus plants at HTDI Bibile
- Maize cultivation at HTDI Bibile
- Establishment of Model villages

Other routine agricultural programmes

Inter-Provincial areas

- No. of Paddy yaya - 73,332
- Area under the yaya program -249,742 ha
- No of paddy training classes - 24,213
- No of trainees for paddy training classe - 551,437
- Certified Seed Paddy production programme extent - 9116 ha
- Self seed paddy production programme - 44,388 No. of farmers

Agricultural information communication

- Printing and distribution of "Govikam Sangara" - 32,000 No. of copies
- Printing and distribution of "Agtec - 28,800 No. of copies
- Broadcasting radio programmes – 3,488 No. of radio programmes, 3,036 No. of short messages
- Quiz programmes -720 No. of radio programmes
- Telecasting TV programmes - 100 No. of programmes
- Agricultural advisory service - replying 37,200 No. of farmer problems

Agricultural education

- No. of Diploma students - 480 (1st & 2nd years)

Training

33,087 No. of training programmes for officers, farmers, school students, and others on different agricultural subjects

Cadre post	No.
Act. Director	01
Deputy Director	01
Act. Deputy Director	02
Assistant Director	28
Agricultural Officer	13
Lecturer	61
Subject Matter Specialist	16
Mechanical Engineer	01
Agricultural Monitoring Officer	27
Programme Assistant	36
Media Assistant	03
Audio Visual Assistant	05
Agricultural Instructor	349
Research Assistant	02
Farm Machinery Instructor	01
Mechanical Officer	01
Agricultural Extension service Officer	01
Photographer	01
Composer	03
Mechanic (Audio Visual)	01
Artist	02
Bee Keeper	06
Bee Demonstrator	01
Machinist	02
Mechanist	05
Machine minder	03
Cinema Operator	04
Librarian	01
Administrative Officer	02
Management Assistants' Service	109
Translator (English)	01
Store Keeper	03
Book Binder (Press)	01
Farm Clerk	05
Office Work Assistant	15
Time Keeper	01
Steward	01
Cook	30
Watcher	60
Sanitary Labourer	09
Driver	71
Lorry Cleaner	04
Welder	01
Smith	01
Electrician	02
Painter	01
Earth Mover Operator	11
Water Pump Operator	01
Machine house Assistant	02
Labourer (Class 111)	250
Total	**1158**

4.1 ADMINISTRATION DIVISION

The role of the Administration Division can be briefly defined as the performance of various matters related to establishment matters of state officers from obtaining approval to fill vacancies, calling of applications in terms of specified criteria, conduction of relevant written tests/ interviews, selection of most suitable applicants for appointment, recruitment dealing with all areas pertaining to promotions, efficiency bar exams and disciplinary matters etc through personal files as well as communications related to policy decisions of the state and the Department. The Division also communicates with organizations such as Public Service Commission, Human Rights Commission, Attorney General's Department, Parliamentary Advisory Committee and the Office of the Commissioner of Parliamentary Affairs regarding various appeals and also with the other Ministries and Departments on administrative matters. Coordination of this overall process is in accordance with the guidance and instructions of the Ministry of Agriculture are vested with the Division.

BUDGET

Allocation received and expenditure incurred during 2010 are given in Table 4.1.1.

Table 4.1.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	5,020,000	4,819,244	96
Recurrent	10,938,535	10,255,934	94
TOTAL	**15,958,535**	**15,075,178**	**94**

PROGRESS

Appointments

Following appointments were made during 2010

Table 4.1.2: Appointments made during 2010

Designation	No. of appointments
Sri Lanka Accountants' Service	01
Sri Lanka Engineer Service	05
Translator	01
Agricultural Instructor	51
Research Assistant	70
Inspector of Works	05
Farm Machinery Instructor	05
Engineering Assistant	02
Engineering Foreman	01
Technical Officer	01
Public Management Assistants' Service – (Supra Grade)	02
Public Management Assistants' Service – Class III	02
Labourer	28
Total	**174**

Promotions

Following promotions were made during the year.

Table 4.1.3: Promotions during 2010

Designation	No.
Sri Lanka Agricultural Service – Class II	76
Sri Lanka Engineering Service - Class I	01
Sri Lanka Engineering Service - Class II	01
Agricultural Instructor - Special	22
Agricultural Instructor - Class I	135
Agricultural Instructor – Class II	55
Research Assistant – Special Grade	15
Public Management Assistants' Service - Class I	16
Public Management Assistants' Service -Class II	04
Driver – Class I	15
Driver – Class II	07
KKS – Class I	04
KKS - Class II	02
Total	**353**

Retirement from the Service

Following officers and employees retired from the service.

Table 4.1.4: Retirements during 2010

Designation	No. retired
Sri Lanka Agricultural Service	20
Sri Lanka Administrative Service	01
Sri Lanka Accountants' Service	02
Agricultural Instructor	24
Research Assistant	01
Research Sub Assistant	03
Engineering Foreman	01
Inspector of Works	01
Public Management Assistants' Service (Supra Grade)	03
Public Management Assistants' Service (Class I)	17
Public Management Assistants' Service (Class II)	05
Cartographer	01
Farm Clerk	04
Machine Operator	01
Earth Mover Operator	02
Time Machine Operator	01
Book Keeper	01
Machinist	01
Carpenter	01
Mason	02
Lorry Cleaner	01
Store man (Special Grade)	02
Driver	09
KKS – Class I	06
Watcher	12
Circuit Bungalow Keeper	01
Cook	02
Nurseryman	01
Painter	02
Sanitary Labourer	02
Labourer	02
Total	**132**

Table 4.1.5: Employees deceased while in service

Designation	No.
Sri Lanka Agricultural Service	01
Agricultural Instructor	03
Public Management Assistants' Service (Supra Grade)	01
Public Management Assistants' Service (Class II)	01
Farm Machinery Instructor	01
Driver	01
Farm Clerk	02
Watcher	01
Labourer	01
Total	**12**

Release of Officers to Other Posts

Agricultural Monitoring Officer - 01

Agricultural Instructor - 01

Programme Assistant (Agriculture) - 06

Public Management Assistants' Service – Class I - 01

Public Management Assistants' Service – Class II - 02

Public Management Assistants' Service – Class III - 01

Reinstatement in Service

Agricultural Instructor 01

Research Assistant 01

Seed Technician 01

KVSN 01

KKS – Class II 01

KKS – Class III 01

Vacation of Post

Programme Assistant (Agriculture) 02

Agricultural Instructor 02

Research Assistant 01

KKS – Class II 01

KKS – Class III 01

Resignation from Posts

Programme Assistant (Agriculture) 01

Legal Assistant 01

Agricultural Instructor 05

Research Assistant 01

Public Management Assistants' Service – Class III 01

Officers Absorbed from Provincial Councils

Agricultural Instructor - 01

Termination of Service

Agricultural Instructor - 01

Release on No Pay Leave for Employment Abroad

Agricultural Monitoring Officer 01

Public Management Assistants' Service – Class III 02

Officers Released for Service in Provincial Councils

Agricultural Instructors - 14

Disciplinary & F.R. 104 Inquiries

Details of inquiries conducted during the year are given in Table 4.1.6.

Table 4.1.6: Details of inquiries handled during 2010

Type	No. pending at the beginning of the year	No. initiated	No. completed	No. of inquiries pending as at 2010.12.31
Formal disciplinary inquiries	12	07	04	15
Preliminary investigations/ inquiries of petitions	08	47	12	43
F.R. 104 inquiries	548	64	72	540
Total	**568**	**118**	**88**	**598**

Loans and Salary Advances

Details of loans and salary advances granted are given in Table 4.1.7.

Table 4.1.7: Loans and salary advances granted during 2010

Type of loan	No. of vouchers approved/ Applications recommended	Amount paid (Rs.)
Distress loan	902	100,964,315
Bicycle loan	36	216,000
Property loan	80	85,800,000
Motor bicycle loan	37	3,700,000
Total	**1055**	**90,680,315**

'Agrahara' Insurance Scheme

- Value of bills submitted for reimbursement of hospital charges and spectacles – Rs. 8,230,294 (984 applications)
- No. of death claims – Rs. 600,000 (01 application)
- Benefits for natural death – Rs. 450,000
- Total amount of reimbursements and claims – Rs. 9,280,294 (9 natural death claims, accident death claims

Security Deposits

- Amount of security deposits released on retirement – Rs. 1,264,589 (89 persons)
- Amount credited to the Government Revenue Account – Rs. 53,481
- No. of security bond recommendations made to the Ministry for deposit of securities – 179

Pensions

Files received for payment of pensions are as follows.

Pensions - 223

Death gratuity - 13

Ex-gratia payment – 02

Remissions of pensions - 25

No. of payments made in the year 2010 are as follows.

Pensions - 251

Death gratuity - 02

Ex-gratia payment - 02

Revised pension payment - 23

Release of minority receipts - 07

Cases in hand to be completed - 39

Study Leave

Officers gone abroad for postgraduate Degree

For M.Sc.

Research Officers - 04

Lectureres - 01

For Ph.D.

Research Officers - 03

Officers returned after completion of postgraduate Degree

For M.Sc.

Research Officers - 01

Lecturers - 01

Release of Officers for B.Sc. & M.Sc. Degrees within the island

B.Sc.

Agricultural Instructors - 05

M.Sc.

Deputy Director - 03
Assistant Director - 02
Agricultural Instructor - 01
Lecturer - 01
Media Assistant - 01
Audio Visual Assistant - 01

Overseas Visits for trainings, Workshops and Other Conferences

Details of visits are given in Table 4.1.8.

Table 4.1.8: Overseas visits during 2010

Designation	No. of Visits
Director General of Agriculture	04
Director	12
Chief Engineer	02
Additional Director	03
Deputy Director	07
Assistant Director	05
Engineer	03
Agricultural Economist	04
Agricultural Officer	05
Research Officer	38
Subject matter Specialist	01
Agricultural Monitoring Officer	03
Programme Assistant	04
Agricultural Instructor	04

Local Trainings

- Workshop on maintenance of Personal files (for 80 Officers)
- Workshop on updating Pension files (for 100 Officers)
- Training on Transport management (01 Officer)
- Workshop to provide technical knowledge (03 Drivers)
- Training on store keeping (45 Officers)

- Programme on introduction of the citizens/ clients charter (60 staff grade Officers)
- Programme on introduction of the citizens/ clients charter (100 Officers)
- Programme on introduction of the citizens/ clients charter to minor employees (60 employees)
- Workshop on letter recording and drafting
- Training at the Sri Lanka Institute of Development Asministration (230 officers)

Recoveries

Total recoveries made from Government Officers who have breached agreements during the year is Rs. 5,995,058.

STAFF LIST

Cadre post	No.
Director General	01
Director (Administration)	01
Deputy Director (Administration)	01
Assistant Director (Administration)	02
Administrative Officer	06
Translator	02
Legal Assistant	02
Public Management Assistants' Service	112
KKS	19
Time Machine Operator	01
Driver	07
Watcher	07
Sanitary Labourer	03
Unskilled Labourer	29
Total	**193**

4.2 ENGINEERING DIVISION – PERADENIYA

The main functions of the Engineering Division include Civil Engineering work pertaining to maintenance and construction of buildings as well as mechanical activities in procurement of vehicles, machinery and equipment and disposal of unserviceable vehicles, machinery and equipment. The operation and maintenance of the drinking water supply scheme in Kundasale, maintaining records of DOA vehicles, acquiring and assigning of vehicles are other important functions performed by the Division. The Division also provides engineering advisory services to all Divisions of DOA.

In order to improve and expand the services of the Division, regional mechanical workshops were established in four stations during the year. Inspectors of Works were stationed in three regional offices in order to attend to civil engineering requirements efficiently. The working capacity, the efficiency and the performance of the Division were seriously affected due to lack of trained technical staff in the Division. There exist a number of vacancies in the cadres of technical staff. Owing to this constraint, numerous difficulties have been encountered in carrying out new civil engineering work as well as routine work such as operation of water supply scheme, Kundasale etc. At present, the Division does not have a sufficient number of Inspectors of Work, Building Overseers and Draughtsman to handle the work load in the Civil Engineering section.

BUDGET

The budgetary allocations and expenditure under different votes for year 2010 are given in Table 4.2.1.

PROGRESS

Civil Engineering Work

The progress of the year 2010 are categorized as follows:

- New constructions and repairs – This includes preparation of estimates, adherence to tender procedures and awarding contracts, work supervision and approval of payments
- Preparation of Estimates – In view of the limitations in handling total works by the Engineering Division, specially due to shortage of technical staff, estimates were prepared only on requests of the Directors.

Table 4.2.1: Annual Budget – 2010 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	6,476,200	2,411,256	37
Recurrent	6,180,140	5,668,051	92
Total	**12,656,340**	**8,079,307**	**64**

Table 4.2.2: The value of the civil Engineering work carried out during 2010

Division/ Description	Completed Value (Rs.)	Work in Progress Value (Rs.)
Administration	1,039,063	1,262,139
Finance	1,818,034	167,354
RRDI	214,368	214,368
SCPPC	2,875,677	1,042,881
Extension & Training	6,151,574	2,664,390
HORDI	1,494,168	2,553,330
SPMDC	3,397,005	2,791,509
Engineering	931,656	681,270
FCRDI	-	104,200
Total	**17,921,544**	**11,481,442**

The summary of the Civil Engineering works done by the Division are listed below.

No. of Requests Received

- Repairs : 305
- New constructions : 88

Progress of Electrical & Mechanical Engineering work

Procurement of Work

- Registering of workshops & service stations
- Registering of suppliers

Vehicle repairs and maintenance

Details of vehicles repaired and maintained are given in Table 4.2.3.

Table 4.2.3: Details of vehicle repairs during 2010

Location	Major	Minor	Recommendations	Total
Kundasale	9	76	2	87
Head office	8	150	160	318
Polonnaruwa	10	12	22	44
Angunakolapelessa	8	72	84	164
Total	**35**	**318**	**268**	**613**

The value of new machinery/ equipment procured by the Engineering Division for all the divisions of the DOA is given in Table 4.2.4.

Table 4.2.4: Value of New Machinery and Equipment procured by the Division

Division	Value (Rs.)
SPMDC	3,979,946
ETC	6,806,010
SCPPC	7,503,622
SEPC	655,540
HORDI	793,003
FCRDC	585,549
RRDI	609,470
Finance	559,788
Administration	369,550
NRMC	575,852
FMRC	1,690,740
Engineering	86,517
Total	**24,215,587**

Water Supply Scheme at Kundasale

This scheme pumps approximately 200,000 gallons of water from the Mahaweli river. The pumping station works 18 hours per day and the power consumption is 60Kw approximately.

Water is supplied to various institutions under DOA as well as non-DOA premises through this process. The scheme supplies chlorinated water for drinking and domestic usage throughout the year while non chlorinated water is supplied to the lake of the agriculture farm during drought periods depending on the requirement. List of beneficiaries of this water supply scheme is indicated below.

- School of Agriculture – Kundasale
- Seed Farm – Kundasale
- Poultry Farm – National Livestock Development Board
- Office of ADA (seeds)
- All government quarters within DOA premises
- Vivekananda Tamil school

Other Services

The Engineering Division assisted many Institutes, Centers and Units of the DOA by preparing estimates for building construction and repairs, supervising the work and scrutinizing and recommending of estimates for repair of vehicles, equipment and machinery. Inspection and valuation of condemned vehicles, machinery and equipment was also carried out by the Division. The Division actively participated in technical evaluation and provided advisory services to the tender boards.

PLAN FOR 2011

- Repairing of staff quarters
- Procurement of office furniture, equipment and machinery
- Land Improvement
- Training and capacity building of the staff

STAFF LIST

Cadre post	No.
Chief Engineer	01
Mechanical Engineer	02
Civil Engineer	03
Electrical Engineer	02
Engineering Assistant	02
Inspector of Work	07
Engineering Foreman	01
Farm Mechanical Instructor	03
Draftsman	01
Public Management Assistant	15
Driver	05
Mechanic	12
Electrician	04
Carpenter	02
Mason	01
Pump Operator	01
Welder	01
Tinker	01
Machine Operator	01
Store man	03
Special Store Labourer	01
KKS	01
Watcher	02
Labourer	12
Total	**84**

4.3 FINANCE DIVISION

There are 14 sections with 12 Accountants to achieve the following objectives of the Finance Division.

- Preparation of annual revenue and expenditure estimates.
- Provide annual and supplementary provisions for each project and programme.
- Collection of revenue and accounting
- Disbursement and reporting of capital and recurrent expenditure of the department
- Performing internal audit activities.
- Co – ordination of financial activities with local, and foreign, governmental and non - government Organizations
- Foreign disbursement related to the goods and equipment.
- Operation and maintaining of the farm advance account activities.
- Preparation of financial progress reports and monitoring the budgetary provision.
- Maintenance of Bank accounts.
- Conducting annual Boards of Survey and assets management.
- Preparation of final accounts including appropriation and Revenue accounts.
- Training of personnel on computer application and financial management

BUDGET

Financial allocation for the Division and expenditure incurred are given in Table 4.3.1.

Table 4.3.1: Annual budget – 2010 (Rs.)

Vote	Allocation	Expenditure
Capital	5,254,000	2,162,700
Recurrent	132,742,000	99,890,000
TOTAL	**137,996,000**	**102,052,700**

PROGRESS

Details of the funds utilization during the year 2010 are given bellow.

Table 4.3.2: Disbursement of Capital Expenditure – 2010 (Rs. '000)

Project	Project Description	Allocation	Disbursement	Progress as a %
285 – 1 – 1	Administration & Establishment Services	20,800	11,495	55
285 – 2 – 2	Agriculture Research & Development	178,000	67,597	37
285 – 2 – 3	Agriculture Extension & Training	96,100	84,984	88
285 – 2 – 4	Seed Certification & Plant Protection	256,460	616,481	84
Total		**551,360**	**380,558**	**69**

Table 4.3.3: Disbursement of Recurrent Expenditure – 2010 (Rs. '000)

Project	Project Description	Revised Estimate	Disbursement	Progress as a %
285 – 1 – 1	Administration & Establishment Services	201,972	185,800	92
285 – 2 – 2	Agriculture Research & Development	674,715	642,277	95
285 – 2 – 3	Agriculture Extension & Training	508,700	486,529	96
285 – 2 – 4	Seed Certification & Plant Protection	376,175	351,804	93
	Total	**1,761,562**	**1,666,410**	**94**

Table 4.3.4: Operation of Advance Account Activities – 2010 (Rs.'000)

Description	Approved limit	Actual Collection	Actual Expenditure
1. Operation of Farm Advance Account			
Maximum limit of Expenditure	300,000		296,427
Minimum limit of receipts	300,000	361,164*	
2. Public Officers Advance Account			
Maximum limit of Expenditure	180,000		179,409
Minimum limit of receipts	93,000	126,012	

***** with development subsidy (500, 000)

Table 4.3.5: Investments on Special Projects under DOA Votes (285) – 2010 (Rs.'000)

Index No.	Source of Funds	Name of the Project	Received Allocation	Actual Expenditure	Progress as a %
01	285–2 – 2 – 2 - 2502	Infrastructure development needs to improve rice research & development (RRDI)	90,000	23,222	26
02	28 – 2 – 2 – 3 - 2502	Development of Hybird, Rice,Maize, Fruit and Vegetables	9,000	6,664	74
03	285 - 2 - 2 - 4 - 2502	Small scale Agricultural research project (US)	3,886	3,886	100
04	285– 2 – 3 – 2 - 2105	Agriculture school farms	16,000	14,618	91
05	285– 2 – 3 – 4 - 2502	Media programme	18,000	17,314	96
06	285– 2 – 3 – 7 - 2502	Bataatha and Gannoruwa Agro Technology Parks	4,000	3,81	96
07	28 – 2 – 3 – 6 - 2401	Annual Symposium of Department of Agriculture (ASDA)	2,500	1,779	71
08	285– 2 – 4 – 1 - 2502	Seed Production & Purchasing programme	187,500	171,261	91
09	285– 2 – 4 – 2 - 2502	Germplasm Development project (USDA)	4,200	4,113	98
10	285– 2 – 4 – 4 - 2502	Implementation of the Seed Act	15,000	9,178	61

Table 4.3.6: Funds Received from Other Organization and Utilization of funds during 2010 (Rs.'000)

Vote	Activity	Allocation 2010	Actual Expenditure	Progress as a %
118 – 2 – 3 – 20 - 2502	Basic Seed Production Programme	20,000	6,060	30.3
- Do -	Seed and planting Material Development	5,750	3,998	9.5
- Do -	Seed and planting Material Development	2,480	1,459	58.9
- Do -	Home Gardening Development	6,000	5,804	6.7
- Do -	Training Programmes	1,566	1,556	100
- Do -	'Govi Sathiya'	7,500	8,347	11
- Do -	Bottling of Rambutan	45	34	7
- Do -	Construction of cold rooms	26,652	9,227	5
- Do -	"Api Wawamu Rata nagamu"	10,482	10,482	100
- Do -	Name Board for Ampara sales room	10	10	100
- Do -	Purchasing of colour sorter machine	6,496	2,013	31
- Do -	"Api Wawamu Rata nagamu" Special programme	4,095	4,441	108
- Do -	Preparation of Exhibition Ground for "Deyata Kirula"	1,000	1,305	131
- Do -	"Deyata Kirula" Orange cultivation Bibila	4,174	1,116	27
- Do -	"Deyata Kirula" Exhibition	4,800	5,466	114
- Do -	"Deyata Kirula" Plantain cultivation	525	525	100

Table 4.3.7: Collection of Revenue during 2010 (Rs.'000)

Revenue Heads	Category	Actual Receipts
20 – 02 – 02 - 99	Loan Interest	14,197
20 – 04 – 01 – 00	W & O.P	69,665
20 – 03 – 99 - 00	Other revenue	93,063
20 – 02 – 01 - 01	House Rent	17,747
20 – 03 – 02 - 18	Department Sales & Other charges	113,876
	Total	**308,548**

STAFF LIST

Cadre post	No.
Director (Finance)	01
Deputy Director (Finance)	05
Assistant Director (Finance)	06
Budget Assistant	02
Translator	01
Public Management Assistants' Service	83
K.K.S	9
Driver	5
Labourer	12
Total	**124**

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S. Satheeswaran	M.Sc., ADA – Seed (Kilinochchi)
A.V. Hemachandra	Dip. In Agric., ADA – Seed (Nikaweratiya)
H.M.J.K. Herath	M.Sc., ADA – Seed (Maha Illuppallama)
K.S. Thushara Perera	B.Sc., ADA- Seed (Ampara)
C.P. Sathyamoorthy	Dip. In Agric., ADA (Vavuniya)

SOCIO ECONOMIC & PLANNING CENTRE, PERADENIYA

T.H.C.S. Perera	M.Sc., Director, Agrarian Development & Technology Transfer, International Trade Negotiations
M.I.M. Rafeek	Ph.D., AE, Productivity Efficiency, Comparative Advantage, Policy Analysis
R.M. Herath	Ph.D., AE, Productivity Efficiency, Comparative Advantage, Policy Analysis
K.S. Karunagoda	Ph.D, AE, International Trade and marketing, Agriculture policy, Agri business, Food Security
R.D.D.P. Rajapaksha	M.Sc., AE, Agricultural Policy, Trade, Agricultural Marketing
Nirusha Ayoni	M.Sc., AE, Production Economics, Marketing, Environmental Economics
W.A.C.K. Chandrasiri	M.Sc., AE, Production Economics, Trade and Agriculture Policy

PROGRESS MONITORING & EVALUATION UNIT, PERADENIYA

K.A.N. Kurukulaarachchi	B.Sc., DD, Monitoring & Evaluation

H.U. Warnakulasooriya M.Phil., AE, Agricultural Economics

NATURAL RESOURCES MANAGEMENT CENTRE, PERADENIYA

W.M.A.D.B. Wickramasinghe Ph.D., Additional Director

M.A. Roonage M.Sc., RO, Water Management

R.S.K. Keerthisena Ph.D., RO, Soil Water Management

M.A.K. Munasinghe M.Sc.,RO, Land Resources Management

W.A.K. Karunathilaka M.Sc.,RO, Water Management

K.M.A. Kendaragama M.Phil., RO, Soil Fertility

B.V.R. Punyawardena Ph.D., RO, Agro-Meteorology

N.D.G. Hettiarachchi M.Phil., SMS, Soil Conservation

R.D. Chitranayana M.Sc.,RO, GIS & Remote Sensing

H.R.G.B. Erabadupitiya B.Sc (Agric.), AO, Water Management

W.R.W.M.S.N.P. Weerakoon B.Sc., AO, Soil Conservation

EXTENSION & TRAINING CENTRE, PERADENIYA

HEADQUARTERS, PERADENIYA

Jayanthi Abeygunasekara M.Sc., Act. Director, Extension

P.K.K.R. Perera Postgrad. Dip., DD, Extension

H.A. Atapattu M.Sc., ADA, Extension

S.K. Yasakethu M.Ed., ADA, Adult Education

H.V.C. Hewavitharana B.Sc., AE, Agricultural Economics

W.G.M.G. Dayawansa M.Ed., ADA, Adult Education

R. Samuel M.Sc., ADA, Extension

N.P.C. de Silva** M.Sc., ADA, Extension

S.S.W.M.A.P. Senanayake B.Sc., ADA, Education

R.S. Wijesekara M.Sc., ADA, Micro Irrigation

P.B.H. Chandralatha B.Sc., ADA, Communication

M.D.R. Tissera B.Sc., ADA, Education

S.A. Arunapriya M.Sc., ADA, Agricultural statistics & project formulation

J.P. Athapaththu Ph.D., ADA, Extension

S.B.S.K. Semasinghe** M.Sc., DD, Extension

H.M.J. Ilankoon Manike M.Sc., ADA, Extension

K.B. Gunaratne M.Sc., ADA, Communication

M.H.B.P.H. Madana M.Sc., ADA, GIS & RS

J.R. Sudasinghe M.Sc., ADA, Natural resource Management

W.J.K.V. Ranjith Ph.D., ADA, Extension

M.S. Mannapperuma B.Sc., ADA, Extension

H.M.T.B. Herath Dip. in Agric., AO, Extension

M.M. Weerakoon Banda** M.Sc., AO, Agricultural economics

B.M. Thilakaratne* B.Sc., Lecturer, Machinery

INTER PROVINCIAL EXTENSION, ANURADHAPURA

K.A.D. Athula Kithsiri B.Sc., Actg. DD, Agricultural Extension

I.W.K. Imbulgoda M.Sc., ADA, Soil fertility

	Management
M.D.S.A. Chandrasekera	M.Sc., ADA, Agricultural Extension

INTER PROVINCIAL EXTENSION, AMPARA

P.M.N. Dayaratne	M.Sc., DD, Extension
A.R.A. Latheef	B.Sc., ADA, Extension
M.S. Abdul Kalees	B.Sc., ADA, Extension
G.N.A. Arunathilaka	B.Sc., ADA, Extension

INTER PROVINCIAL EXTENSION, HAMBANTOTA

W.L. Hiran Peiris	B.Sc., Actg. DD, Field Crops
M.B. Weerasooriya	B.Sc., ADA, Horticulture
N.M.A. Dharmapriya	B.Sc., ADA, Economics

INTER PROVINCIAL EXTENSION, KANDY

G.A.P. Wimalarathna	M.Sc., ADA, Extension

INTER PROVINCIAL EXTENSION, MONARAGALA

A.B.M. Wijethunga	M.Sc., Actg. DD, Extension
H.D.K. de J. Sriwardhane	B.Sc., ADA, Extension

INTER PROVINCIAL EXTENSION, POLONNARUWA

P. Sisira Kumara	M.Sc., ADA, Agricultural Extension & Water Management
U.K.D.N.N. Ranathunga	M.Sc., ADA, Extension

AGRICULTURAL ENTERPRISE DEVELOPMENT & INFORMATION SERVICE, PERADENIYA

D. Abeysuriya	M.Sc., ADA, Extension

BEE KEEPING DEVELOPMENT UNIT, BANDARAWELA

A.M.D. Atapattu	Dip. In Agric., ADA, Extension

RUPAVAHINI & FARM BROADCASTING SERVICE (Colombo, Kandy, Rajarata, Ruhuna)

Hemantha Amarasinghe	M.Sc., OIC, Extension
D.N. de Silva	M.Phil., ADA, Development Communication
G.G.D. Lalani	B.Sc., AO, Communication
G.G.P.P. De Silva	B.Sc., Lecturer, Communication
Arundathi Valesivanadan	B.Sc., Lecturer, Nutrition
Ranjith Nanayakkara	Dip. in Agriculture, ADA, Extension

AUDIO VISUAL TRAINING CENTRE, GANNORUWA

R.R.A. Wijekoon	Ph.D., ADA, Communication
R.D. Siripala	M.A., SMS, Communication
J.K.A. Hettiarachchi	M.Sc., SMS, Communication
W.A.G. Sisira Kumara	M.A., SMS, Communication
M.M. Weerakoon Banda	B.Sc., AO, Agricultural Economics

AGRICULTURAL PRESS, GANNORUWA

S.Periyasamy	M.Sc., ADA, Communication

INSERVICE TRAINING INSTITUTE, ANGUNAKOLAPELESSA

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K.Seetha Violet B.Sc., Lecturer, Education

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M.A. Chandanie M.Sc., Lecturer, Education

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S. Kaileswaran M.Sc., ADA / Principal, Food Science

L Pirunthavaeswaran B.Sc., Vice Principle, Horticulture

K. Chandrakanthan B.Sc., Lecturer, Engineering

R. Sivaneshan M.Sc., Lecturer, Soil Science & Crop science

D.A. Palihawadana M.Sc., Lecturer, Agricultural Extension

S Senthilkumaran B.Sc., Lecturer, Crop Science

SCHOOL OF AGRICULTURE, WARIYAPOLA

N.C. Edirisinghe B.Sc., ADA / Principal, Farm Machinery

S.B.A.M.A. Maneldevi B.Sc., Lecturer, Food Science

SCHOOL OF AGRICULTURE, KUNDASALE

K.G. Sriyapala M.Sc., ADA / Principal, Education

P. Varatharajah M.Sc., Lecturer, Plant Physiology & Horticulture

H.S. Kuruwita M.Sc., Lecturer, Crop science

A.H.C. Bandara M.Sc., Lecturer, Crop science

W.T.G. Ranjini M.Sc., Lecturer, Plant Protection

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A. Manikrama M.Sc., Lecturer, Natural Resource & Sustainable Agriculture

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K.G. Ranjini B.Sc., Lecturer, Plant Breeding

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R.M. Gunawardhane B.Sc., Lecturer, Education

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I.S.M. Haleemdeen M.Sc., Lecturer, Agricultural EconomicsEconomics

PDOA- SABARAGAMUWA PROVINCE

M.B. Dissanayake M.Sc., PD

K.P. Karavita B.Sc., DD, Extension

W.A.H.B. Wirasagoda M.Sc., ADA, Food Technology

J.M.D.J. Bandara B.Sc., ADA, Plant Pathology

V.P. Wimalasena Dip. in Agric., ADA, Training

B.M.U.B.S. Chandrasiri Dip. in Agric., ADA, Training

Y.K. Bamunuarachchi BSc., ADA, Extension

PDOA, NORTH WESTERN PROVINCE

B. Wijeratne M.Sc., PD, Rural agricultural development

N.H. Nimalaratne B.Sc., PD, Acricultural extension

H.M. Sirimewan Herath B.Sc., DD, Extension

O.P. Kithsiri M.Sc., DD, Natural Resource Management

B.L. Gunathilake M.Sc., DD, Extension

D.M.M. Dissanayake B.Sc., ADA, Agronomy

W.A. Seelaratne Dip. in Agric., ADA, Extension

K.K. Jayasinghe Dip. in Agric., ADA, Extension

A.G. Karunarathna M.Sc., Lecturer, Paddy Cultivation & Sustainable Agriculture

H.A.V.T. Nawaratne Dip. in Agric., ADA, Extension

K.M.A. Sukur Dip. in Agric., ADA, Extension

J.A.R. Damayanthi B.Sc., ADA, Extension

A.M.K. Samarakoon B.Sc., ADA, Extension

A.H.M.B. Wadigamangawa B.Sc., ADA, Extension

H.V.A.T. Navarathne B.Sc., ADA, Extension

W.M.S. Wanninayake M.Sc., ADA, Extension

PDOA, WESTERN PROVINCE

R.P. Mahindapala M.Sc., PD, Training & Extension

R.V. Edirisinghe Dip. in Agric., DD, Extension

N.G.K.D. Pererea B.Sc., DD, Ag. Education

H.S.A.P. Peiris Dip. in Agric., DD, Extension

U.L. Wickramasinghe M.Phil., DD, Seed Technology

I.U. Mendis M.Sc., DD, Training

U. Lakshman M.Sc., ADA, Forestry

L.W.R.A. Nimal Shantha Dip. in Agric., ADA, Extension

K.V.A.U. Kumarasinghe Dip. in Agric., ADA, Extension

W.M.M .Warjirakanthi B.Sc., ADA

W.N.C. Weerakoon B.Sc., ADA

S.J. Liyanage B.Sc., ADA

PDOA, NORTH CENTRAL PROVINCE

A. Jayathilake M.Sc., DD, Irrigation & Water Management

P.B.L. Premnath M.Sc., ADA, Extension

B.P.S.W. Pathirana B.Sc., ADA, Plant Protection

A.M. Dharmasena B.Sc., ADA, Extension

A.M.D.N. Abesinghe B.Sc., ADA, Extension

PDOA, UVA PROVINCE

D.M. Nimal Banda M.Sc., PD, Extension

PDOA, NORTHERN PROVINCE

K. Subramaniyam M.Sc. (Agric.), PD, Agric. Extension

M. Jeganathan M.Sc. (Agric.), DD, Forestry

J. Jeganathan M.Sc. (Agric.), DD, Plant Protection

M. Kugathasan B.Sc. (Agric.), ADA, Agric. Extension

S. Sivakumar B.Sc. (Agric.), ADA, Agric. Extension

S. Anantharajah Dip. in Agric., ADA, Agric. Extension

R. Kokulathasan B.Sc. (Agric.), ADA, Agric. Extension

A. Selvarasa B.Sc. (Agric.), AO, Agric. Extension

K. Sribalasundaram Dip. in Agric., AO, Agric. Extension

V. Kamalanathan Dip. in Agric., ADA, Agric. Extension

PDOA, EASTERN PROVINCE

K. Pathmanathan M.Sc., PD, Extension

S.M. Hussain M.Sc., DD, Extension

A.S.M. Haris B.Sc., DD, Agric. Extension

P. Uganathan Dip. in Agric., DD, Agric. Extension

R. Hariharan M.Sc., DD, Agric. Extension

T. Vetharaniyam B.Sc., ADA, Agric. Extension

PDOA-CENTRAL PROVINCE

T.B. Herath M.Sc., PD, Extension

W.G.D.A. Wimalarathna M.Sc., Deputy PD, Extension

S.M.K.Dissanayake B.Sc., ADA, Crop Science

R.M. Nandasiri M.Sc., DD, Education

H.K.P. Jayalath B.Sc., ADA, Extension

W.S.C.Perera M.Phil., DD, Crop Science

P.R.P.Y. Pallemulla Postgrad. Dip., DD, Soil Science

P.K. Senewiratne B.Sc., ADA, Horticulture

S.M.B.Weerasekara Dip. in Agric., ADA, Extension

D.M.H.Dissanayake Dip. in Agric., ADA, Horticulture

M.P.K.Dodamwala B.Sc., ADA, Animal Husbandry

V.N.Egodawatta Dip. in Agric., ADA, FWAE

D.G.N. Sandamalee B.Sc., ADA, Extension

C.S.B. Udangamuwa B.Sc., ADA, Extension

PDOA-SOUTHERN PROVINCE

S. Rathnasiri B.Sc., Actg. PD, Extension

L.B. Nimalarathna B.Sc., DD, Extension

K.S. Sri Lal Dip. in Agric., DD, Extension

C. Nanayakkara Dip. in Agric., DD, Extension

R.H.U. Gunawardhana B.Sc., ADA, Extension

S.K.N. Rubasinghe B.Sc., ADA, Extension

Mahesh Subasinha Dip. in Agric., ADA, Extension

I.M.T. Pushpalatha Dip. in Agric., ADA

M.M. Senanayake Dip. in Agric., ADA, Extension

P. Abeysinghe Dip. in Agric., ADA, Extension

M.W.S.A. de Silva Dip. in Agric., ADA, Extension

ADMINISTRATION DIVISION

W. Gamage Wickramasinghe B.A.,Director (Administration)

L.A.D. Geetha Indrani B.A., Postgrad. Dip., DD, (Administration)

I.W.M.C.K. Illangakoon B.Sc., Asst. Director, (Administration)

ENGINEERING DIVISION

M.H.M.A. Bandara B.Sc., Pg.Dip., C.Eng., Chief Engineer

C.L. Rajapakse B.Sc., C.Eng., M.Phil., MIESL, Mechanical Engineer

K. Anpini B.Sc., C.Eng, MIESL, Civil Engineer

P. Rajapakse B.Sc., C.Eng, MIESL, Civil Engineer

B.M.W.L. Balasooriya B.Sc., AMIESL, Mechanical Engineer

A.K.S.P.S. Wijayasoma B.Sc., Electrical Engineer

J.G. Janath B.Sc., AMIESL, Electrical Engineer

J.A.D.K. Wanigaratne B.Sc., AMIESL, Civil Engineer

FINANCE DIVISION

A.M.I.B. Adikari B.A,HNDA,DPA,DPFM, Director (Finance)

C.K. Rajapathirana B.Com., PDAF, HNDA, DD (Finance)

M.F.M. Faiz B.Com., PDAF, DD (Finance)

K.M. Kularathna PDPM, IPFDA, DEP, ICASL(Lic), DD (Finance)

W.A.G. Weerasinghe B.Sc., PDPM, ICASL(Lic), IPFDA, DEP, DD (Finance)

K.L.P. Rajakaruna BSc., ICASL(Lic),PDAF, DD (Finance)

M. Sridharan PDPM, Asst. D (Finance)

U.G.C. Abeyrathna B.Sc., ICASL (Final), Asst. D (Finance)

E.M.R.S.H.K. Ekanayake B.Com., ICASL (Lic), Asst. D (Finance)

J.H.H. Chandani B.Sc., Asst. D (Finance)

H. Ranathunga B.Sc., Asst. D (Finance)

K.G.S.D. Weerakoon B.Sc., Asst. D (Finance)

- On study leave

** On no pay leave

7. TECHNICAL STAFF QUALIFICATIONS

(AS AT 2010.12.31)

Institute/ Centre/ Division/ Unit		Diploma	B.A.\L.L.B.	B.Com./ B.Ed./ B.L.s.	B.Sc.	C. Eng./ M.I.E.	Postgrad. Dip.	M.A./ MBA	M.Sc./ M.Ed.	M.Phil.	Ph.D.	TOTAL
FCRDI	FCRDI	24			5		2		13	3	3	50
	GLORDC	17	1		7				10		1	36
	RARDC/ ARL	7							4		2	13
	RARDC/VAV	5			2				6			13
HORDI	HORDI	38		1	11				21	4	9	84
	PVIC	12			10				5	1	2	30
	FCRDC	21	3		6				8	5	2	45
	FRU	6			2				4		1	13
	RARDC/BAN	28	1		16				5	1		51
	RARDC/MK	25	1		10					1	1	38
	ARS/SE	10			2				5		1	18
	ARS/TW	8			5				1		1	15
	ARS/GK	6			1				2			9
RRDI	RRDI	40	1		18				11	7	4	81
	RARDC/BW	36			20				7	4	2	69
FMRC		6			5							11
NRMC		11			5				6	2	3	27
SCPPC	SCPPC	1							6			7
	SCS	109			12				4	1	1	127
	PPS	9			4				1	1		15
	NPQS	14			7				10	1	1	33
	ROP	11			8				3	1		23
	PGRC	9			3		1		6	5	2	26
SPMDC		111			17				8		1	137
SEPC		2	15		3			1	6		3	30
PMEU			1		2				2	1		6
ETC		392			122		3	2	87	7	6	619
ADM		1	3		2		1					7
ENG					4	4						8

FIN		1	2	6		5					14
TOTAL	**959**	**27**	**3**	**315**	**4**	**12**	**3**	**241**	**45**	**46**	**1655**