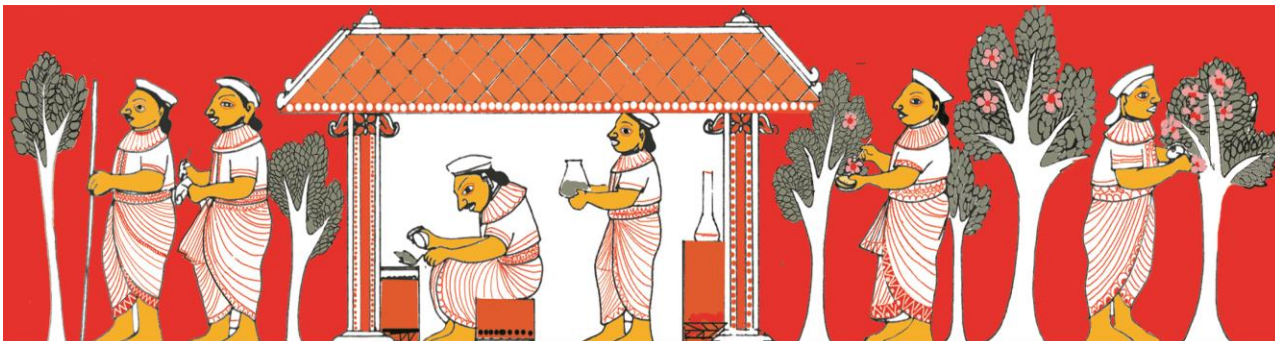
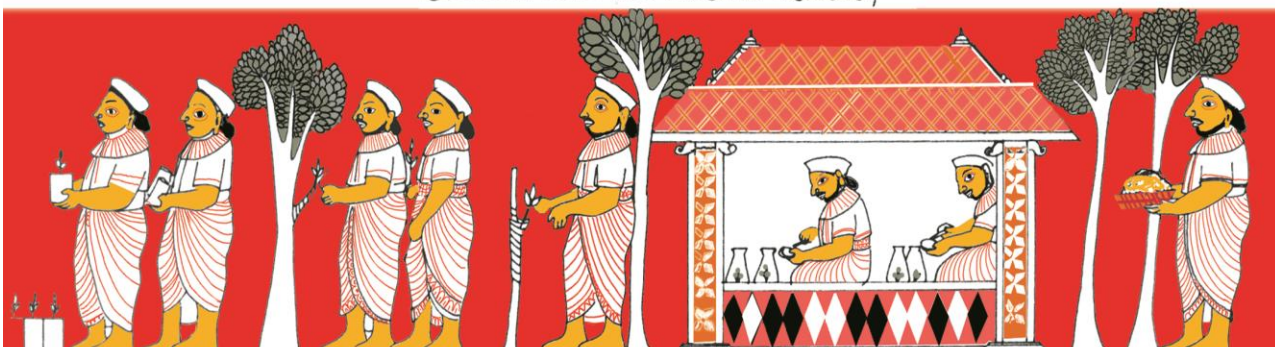




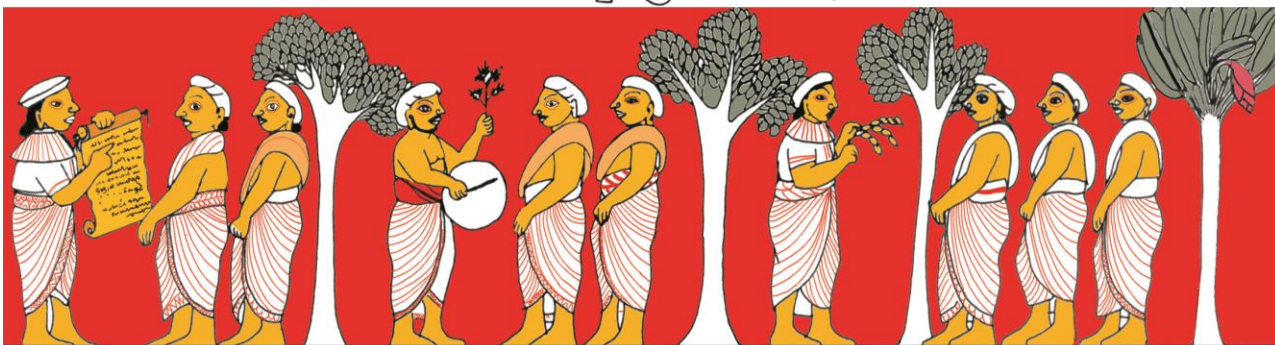
Annual Performance Report 2011



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**ANNUAL PERFORMANCE
REPORT
2011**

**DEPARTMENT OF AGRICULTURE
PERADENIYA
SRI LANKA**

**Published
by
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Peradeniya
Sri Lanka
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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

The commitments of DOA to the food agriculture sector of Sri Lanka during 2011 through programs executed by six technical divisions and three support service divisions are compiled and highlighted in this Annual Performance Report.

The vision of the DOA, to achieve excellence in agriculture for national prosperity, is incorporated in all research and development programs pertaining to rice, other field crops, fruits, vegetables and ornamentals and was implemented during 2011 to enhance the production and productivity of the food agriculture sector. The solutions for many farmers' most pressing problems - non-availability of quality seeds and planting materials, drought, floods, salinity, pest and diseases etc., for growing rice and other food crops are adequately addressed. The details of these and some other important research and development thrusts are highlighted in this report.

In addition to the routine programs for the enhancement of production and productivity of food crops, DOA has contributed to several other activities to increase availability of quality seeds and planting materials and to reduce post-harvest losses of perishables. While improving productivity of food crops, DOA will also focus its research programs on reducing the environmental footprint of agriculture.

During this year we were able to achieve self-sufficiency in rice and we are now geared to improve the quality characteristics of rice as well as to increase the production of other food crops with a view to restrict imports. DOA was able to promote growing mungbean as a 3rd season crop (sandwich cropping) covering 7000 ha with a yield of 4300 t. It is worthy to note that for the consecutive fourth year, this year too DOA's Agriculture exhibition site at '*Deyata Kirula*' Buttala won the first place. The two international awards i.e. 2011 E-world International award for ICT in Agriculture for the DOA website and UN affiliated WSA 2011 International award for e-agriculture education for the '*Wikigoviya*' web site, are testimonies of the international recognition for digital standards of DOA. Most importantly this year marks the promotion of Research-Extension-Farmer-Linkage, through the establishment of nine Agriculture Service Centers (*Krusha Seva Piyasa*) with the view to provide all the services necessary for farming community of Sri Lanka under one roof.

I am fully confident that DOA will continue to be successful and carry on its award-winning traditions to enhance agricultural productivity thereby to improve livelihood of our farming communities. I would like to take this opportunity to thank all the officers of the DOA for their unified efforts in achieving the success highlighted in this report and the officers contributed their tireless effort to complete this publication.

K.G. Sriyapala

Director General of Agriculture

ABBREVIATIONS & ACRONYMS

Ac	-	acre	ESCAP	-	Economic and Social Commission for the Asia Pacific
ADA	-	Assistant Director of Agriculture	FAO	-	Food and Agricultural Organization
Addl.D.	-	Additional Director	FSV	-	Farmer Services Vote
AE	-	Agricultural Economist	FTF	-	Farmer Trust Fund
AER	-	Agro Ecological Region	GAP	-	Granary Area Programme
AI	-	Agricultural Instructor	GM	-	Gall Midge
ANSOFT	-	Asian Network for Organic Farming Technology	GPS	-	Global Positioning System
AO	-	Agricultural Officer	HERP	-	High grade Eppawala Rock Phosphate
AVRDC	-	Asian Vegetable Research and Development Centre	ICRISAT	-	International Crop Research Institute for Semi Arid Tropics
AWRN	-	Api wawamu rata nagamu	IITA	-	International Institute for Tropical Agriculture
BL	-	Rice Blast	IL	-	Low Country Intermediate Zone
BLB	-	Bacterial Leaf Blight	IM	-	Mid Country Intermediate Zone
BPH	-	Brown plant hopper	INFORM	-	Information for Agricultural Research Management
BSV	-	Banana Streak Virus	INGER	-	International Network for Genetic Evaluation of Rice
Bu	-	bushel	IPM	-	Integrated Pest Management
CABI	-	Commonwealth Agricultural Bureau International	IPO	-	Intellectual Property Office
CARE	-	Cooperative Assistance and Relief Everywhere	IRFAON	-	International Rice Fine and Aromatic grain Observation Nursery
CARP	-	Council for Agricultural Research Policy	IRRI	-	International Rice Research Institute
CEC	-	Cation Exchange Capacity	IRSSTN	-	International Rice Soil Stress Tolerance Nursery
CIP	-	International Potato Centre	ISCAP	-	Implementation of Soil Conservation Act Programme
CLS	-	<i>Circospora</i> Leaf Spot	ISPM	-	International Standards on Phytosanitary Measures
CNLD	-	Chilli Narrow Leaf Disorder	ISTA	-	International Seed Testing Association
CRI	-	Coconut Research Institute	IU	-	Up Country Intermediate Zone
CRVT	-	Coordinated Rice Varietal Testing	IW/ CPE	-	Irrigation Water/ Cumulative Pan Evaporation
CZP	-	Crop Zoning Project	JICA	-	Japan International Cooperation Agency
DAS	-	Days After Sowing	KKS	-	Karyala Karya Sahayaka
DATC	-	District Agricultural Training Centre	KOPIA	-	Korea Photovoltaic Association
DD	-	Deputy Director	KVSN	-	Krushikarma Vyapthi Seva Niladhari
DDR	-	Deputy Director			
DL	-	Low Country Dry Zone			
DOA	-	Department of Agriculture			
DRF	-	Dependable Rainfall			
DUS	-	Distinctness, Uniformity and Stability			

LCWZ	- Low Country Wet Zone	ROIC	- Research Officer In Charge
LSVAT	- Large Scale Varietal Adaptability Trial	RSC	- Rooted Stem Cuttings
M.Ec.	- Master of Economics	RTWG	- Regional Technical Working Group
M.Sc.	- Master of Science	RYP	- Red Yellow Podzolic
MAI	- Moisture Availability Index	SLANRMP	- Sri Lanka Australia Natural Resources Management Project
mg	- Milli gram	SLUSDA	- Sri Lanka - United States Development Agency
ml	- Milli litre	SMS	- Subject Matter Specialist
mm	- Milli meter	SOA	- School of Agriculture SriLanKoRDAA - Sri Lanka - Korea Rural Development Administration Allium
MPET	- Medium density Poly Ethylene Terephthalate	t	- Metric ton = 10 ³ kg
mt	- Metric ton	TOT	- Training of Trainers
MYMV	- Mung bean Yellow Mosaic Virus	TSP	- Triple Super Phosphate
MYT	- Major Yield Trial	VAT	- Variety Adaptability Trial
NBPGR	- National Bureau of Plant Genetic Resources	WL	- Low Country Wet Zone
NCB	- Non Calcic Brown	WM	- Mid Country Wet Zone
NCRVT	- National Coordinated Rice Varietal Trial	WU	- Up Country Wet Zone
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		
PD	- Provincial Director		
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		
RO	- Research Officer		

1. WEATHER REPORT

Meteorological data collected from 13 agro-meteorological stations representing different agro-ecological regions in Sri Lanka during 2010/2011 Maha (September – February) and 2011 Yala (March – August) seasons have been summarized in this report. The report was prepared by the Natural Resources Management Center (NRMC) of the Department of Agriculture.

The cumulative seasonal rainfall of both seasons is given in the Table 1.1. The monthly rainfall and corresponding 10-year averages of 13 stations are given in Tables 1.2 and 1.3, respectively. Monthly mean values of other important agro-meteorological parameters, namely, potential evapotranspiration (estimated from open pan evaporation), temperature, relative humidity, bright sunshine hours and wind velocity are given in Tables 1.4, 1.5, 1.6, 1.7 and 1.8, respectively.

Low Country Wet Zone

Bombuwela (WL1b)

Cumulative seasonal rainfall of this region during 2010/2011 Maha season was up to the expectation, receiving over 20% compared to its long term average. However, rainfall during October was substantially below the expected amount which was compensated during the following month recording about 100% increase in the cumulative rainfall. The rainfall regime during 2011 Yala season remained closer to its usual pattern having only more than 5% of above

normal seasonal rainfall with a favorable monthly distribution which satisfied the crop water demand. However, rainfall during the month of June was considerably below the expected amounts due to weak southwest monsoonal conditions prevailed over the region. This situation may have favored cultivations in lands of the flood plains in this region which otherwise subject to flooding during this month under normal weather conditions

Mid Country Wet Zone

Peradeniya (WM2b)

Cumulative seasonal rainfall of 2010/2011 Maha season in this region was about 1,951 mm, which is over 100% increase compared to long-term average. This increase was mainly attributed to above normal rains experienced during the period of November through February. Increase of rainfall during conventional dry months for the region, namely, January and February was well over 300 per cent with catastrophic events reporting in several places. This unusual weather conditions badly affected the crop production in the region, especially depriving ideal situation for flower setting in tree fruit crops. Nevertheless, there was over 50% decrease in cumulative seasonal rainfall during 2011 Yala season in this region mainly due to the weak southwest monsoonal conditions prevailed in the region which deprived the expected rains during the period of May to July. Monthly cumulative rainfall during both June and July months was

not even sufficient to meet the evaporative demand of the atmosphere, a very rare agro-meteorological phenomenon to experience in this region during these months. However, other agro-metrological parameters recorded in this region, temperature in particular remained conducive for crop growth without approaching extreme high values despite dry weather conditions prevailed in the area.

Up Country Wet Zone

Sita Eliya (WU3)

Cumulative seasonal rainfall of 2010/2011 Maha season in this region was about 1,469 mm, which is over 37% increase compared to long-term average. This increase was mainly attributed to above normal rains experienced during the period of November through February in the central hills. The increase of cumulative monthly rainfall in January and February was about 100 and 200 per cent, respectively. This stormy weather condition prevailed at the later part of the season may have affected up-country vegetable cultivation in this region both in terms of quantity and quality. The maximum temperature during the season was ranged from 14 °C to 23°C.

The cumulative 2011 Yala season rainfall in this region was 460 mm, which is about 40% decrease over the long-term average. The decrease was mainly attributed to the below normal rains received during the period of May to August due to weak southwest monsoonal conditions prevailed over the region. Cumulative potential evapotranspiration during June and July

exceeded the total receipt of rainfall during these two months while merely meeting the requirement in August. As in the case of Mid country Wet zone, this is an extremely rare agro-meteorological phenomenon to experience in this region. The maximum temperature during the season was ranged from 16 °C to 23 ° while the minimum temperature was in the range of 8 °C to 17 °C.

Low Country Intermediate Zone

Batalagoda (IL1a)

The cumulative seasonal rainfall of 2010/2011 Maha season was about 68% increase compared to its long-term average with a favorable monthly distribution and was well in excess of the potential evapotranspiration throughout season. Nevertheless, overcast sky conditions prevalent during December through February may have interfered the grain filling of paddy cultivation in this region.

This region experienced an almost near normal cumulative seasonal rainfall of 697 mm during 2011 Yala season. This was mainly attributed to the fact that high rainfall received during the month of April. Otherwise, rainfall receipt during June and July was below the expectations attributing to weak southwest monsoonal circulation prevailed in the region during these months. Cumulative potential evapotranspiration was in excess of cumulative rainfall in each month of the season except in April. Hence, rainfed crops definitely may have exposed to soil moisture stress conditions. Similarly, water storage in minor tanks in the region may not

have sufficient to provide the irrigation water for the full command area throughout the season. Thus, drought injuries or complete crop failures of paddy cultivations in certain locations may have been a common feature during this season.

Low Country Intermediate Zone

Monaragala (IL1c)

The cumulative seasonal rainfall of 2010/2011 was a 22% increase over its long term average in this region due to receipt of above normal rains during November January and February. However, rainfall during October was 40% below the expected amount which made the season to become late. However, good rains received during the month of November compensated the deficit to advance with the season. The potential evapotranspiration remained well below the rainfall during each month of the season, assuring a favorable soil moisture conditions for rainfed upland crops. The state of the other agro-meteorological parameters during the season was also conducive for a good crop growth. The nighttime minimum temperature regime continued to remain at relatively lower values compared to other parts of the Low country Intermediate and Dry zone favoring citrus, sugarcane and other fruit crops.

The cumulative seasonal rainfall of the 2011 Yala season in this region was about 14% increase compared to its long-term average. This increase was mainly attributed to the highly active first intermonsoon rains during March and April. The situation would have favored water situation in tanks of this region. Rainfall receipt

during rest of the season was near normal. Nevertheless, the cumulative potential evapotranspiration of each month of the season was in excess of the rainfall except during March and April. Thus, cultivation of upland crops would not have been possible without supplementary irrigation. However, it can not be considered as an unusual weather condition for the region as this region hardly experience well distributed rains during active growing phase of the crops during Yala season.

Girandurukotte (IL2)

The region has experienced 33% above normal rains during 2010/2011 Maha season having greater than 100 mm of rains in each month of the season. Rainfall during both January and February was well above the expected amounts receiving more than 800 mm and 350 mm, respectively. This situation may have cut-off the receipt of photo-synthetically active radiation for maturing rice crop with subsequent yield reduction.

The cumulative rainfall during 2011 Yala season was only about 354 mm which is about 24% reduction compared to its long term average. Except during March and April, rainfall during all other months in the season was far below the atmospheric water demand with subsequent soil moisture stress conditions in rainfed upland crops. Generally, a rainfed Yala season usually does not exist in this region under a normal weather condition and it remains true for the current season too.

Mid Country Intermediate Zone

Kundasale (IM3a)

The cumulative rainfall of 2010/2011 Maha season was well above its long-term average with a fairly good distribution. Potential evapotranspiration values recorded in this region have also revealed that soil moisture stress was an unlikely event in crops grown in this region. However, overcast conditions prevailed during November and December, coupled with relatively high humid conditions and low temperature regime may have been a conducive environment for proliferation of pathogens.

In contrast, rainfall regime during 2011 Yala season was not conducive to raise any rainfed crop due to lack of good rains during the months of May through August. The cumulative seasonal rainfall was 285 mm, out of which over 40% was received during the month of April. March and April were the only two months during the season in which received rainfall was in excess of potential evapotranspiration. Therefore, it would have been impossible to raise a successful rainfed upland crop without supplementary irrigation.

Up Country Intermediate Zone

Bandarawela (IU3c)

As in the case of other parts of the central highlands, this region also experienced an above normal seasonal rainfall during 2010/2011 Maha season. The seasonal cumulative rainfall of 1,545 mm was about 52% increase compared to its long term average. The potential

evapotranspiration remained well below the rainfall of each month during the season. Meanwhile, overcast conditions coupled with rainy weather, low temperature and high humidity prevailed during the months of January and February may have been conducive for high occurrence of plant diseases. The maximum temperature during the season was ranged from 18 °C to 30 °C while the minimum temperature was in the range of 7 °C to 19 °C.

Cumulative rainfall of 2011 Yala season was a nine per cent decrease over its long-term average. Rainfall during May to August was not up to the expectation even though March and April received good rains due to enhanced convectional activity in the area. Potential evapotranspiration values were far below the rainfall receipt during entire second half of the season with possible soil moisture stress conditions unless supplementary irrigation is provided. Nevertheless, given the situation of atmospheric water demand and rainfall receipt during this period, availability of water in springs in this area for irrigation may have been a problem during this time of the season. The maximum temperature during the season was ranged from 21 °C to 30 °C while the minimum temperature was in the range of 10 °C to 19 °C.

Dry Zone

Maha-Illuppallama (DL1b)

The cumulative Maha season rainfall in the north-central part of the DL1b agro-ecological region was 1,524 mm, a value which is about 60% increase to compared to its long term

average. Even though, this region experienced comparatively less rains in October, it was counterbalanced in November and December enabling to commence a late season. Potential evapotranspiration values were remained well below the monthly rainfall during each month of the season including October. Nevertheless, higher rainfall received during the period of December through February may have resulted in overcast sky conditions with subsequent high occurrence of plant diseases and even may have interfered the grain filling of paddy and other grains cultivated in this region.

There was a 14% decrease of cumulative seasonal rainfall during 2011 Yala season compared to its long term average of 392 mm. This reduction was mainly attributed to late establishment of intermonsoonal weather conditions in March. As usual, April was the only month during the season which received rainfall in excess of the potential evapotranspiration. The rest of the season was continued with usual dry and warm winds which is common situation during this time of the year in this region.

Angunakolapelessa (DL1b)

In contrast, the southern part of the DL1b agro-ecological region, experienced only about 16 % above normal cumulative rainfall during 2010/2011 Maha season. The surplus was mainly attributed to the above average rainfall during December to February. Rainfall during October was only 74 mm which is about 50% decrease compared to its long term average. As in the case

of other parts of the Dry zone good rains received during November made it possible to commence late season cultivation. The cumulative monthly potential evapotranspiration of the season remained well below the monthly rainfall of each month once the season was commenced in November and thus, short-aged upland crops grown in this region may not have suffered any soil moisture stress conditions. Meanwhile, higher rainfall regime experienced during tail end of the season, in particular February was not as intense as in the north-central part of the Dry zone. Hence, any negative impact of such an abnormal weather condition may not have been so severe in this region compared to rest of the DL1b region.

The cumulative 2011 Yala season rainfall in this region was almost equal to its long term average, receiving 489 mm of rainfall to which the contribution of April and August rains were substantial. However, the potential evapotranspiration remained well above the monthly rainfall during the rest of the months of the season. Hence, rainfed upland crops may have suffered soil moisture stress conditions during their maturity phase unless supplementary irrigation was not supplied.

Aralaganwila (DL2b)

This region in the eastern part of the Dry zone experienced an above normal rainfall with a favorable distribution. Evaporative demand of atmosphere also remained well below the cumulative rainfall of each month during the season. Hence, there was hardly any chance of

developing soil moisture stress conditions in crops grown on highlands. However, extremely high rainfall experienced during last three months of the season (above 500 mm in each month) may have affected crop production due to flood, drainage problems, limited availability of solar radiation, high incidence of pathogens and interfering with harvesting activities.

As usual, Yala rains of this area was confined to customary convectional type rains in April and the rest of the season was extremely dry with scorching daytime temperatures and strong winds, a common weather pattern for the region during Yala seasons. Under a normal weather pattern, a Yala season usually does not exist in this region and it remained true for the current season too.

Weerawila (DL5)

As in the case of other parts of the Dry zone, onset of Maha rains in this region was also delayed until early November and then, continued with good rains with a favorable distribution until early February. Recorded cumulative seasonal rainfall of 915 mm was about 18% increase compared to its long-term average of 772 mm. Cumulative potential evapotranspiration of each month of the season was remained well below the cumulative rainfall of each month except in September and October. Thus, crops grown in this region may not have suffered significant damages due to soil moisture stress despite being the county's driest region.

In contrast, the amount and distribution of Yala rains in this region was not conducive to raise a

successful crop. The cumulative seasonal rainfall of the season was 236 mm which is a 26% decrease compared to its long term average. None of the month in the season, including April was not able to record a rainfall of 100 mm threshold value to designate as a Wet month. The cumulative potential evapotranspiration of each month of the season was much in excess of the cumulative rainfall. A high temperature regime was prevailed throughout the season along with intense radiation and high-speed winds. However, being the driest region of the country it is not an uncommon weather situation in this region during this time of the year.

Table 1.1: Total rainfall (mm) of 2010/2011 Maha & 2011 Yala seasons

Agro-met Station	Agro Ecological Zone	Maha 2010/11 Sep-Feb	Maha Ten Year Average (2000-09)	Yala 2011 Mar-Aug	Yala Ten Year Average (2000-09)
Bombuwela	WL _{1b}	1838.1	1516.5	1520.6	1454.8
Peradeniya	WM _{2b}	1951.4	963.4	595.3	928.1
Sita-Eliya	WU ₃	1468.8	1070.2	459.9	776.5
Bathalagoda	IL _{1a}	1739.7	1033.8	697.1	692.3
Makandura	IL _{1a}	1279.8	1048.5	705.5	921.4
Moneragala	IL _{1c}	1528.2	1250.6	665.6	582.5
Girandurukotte	IL ₂	2209.8	1657.6	353.6	461.0
Kundasale	IM _{3a}	1476.7	808.6	284.9	599.7
Bandarawela	IU _{3c}	1545.4	1018.1	560.3	615.8
Maha-Illuppallama	DL _{1b}	1524.0	956.5	337.9	392.2
Angunakolapellessa	DL _{1b}	855.2	734.2	489.4	438.6
Aralaganwila	DL _{2b}	2390.1	1478.6	324.4	395.9
Weerawila	DL ₅	914.8	772.4	236.3	317.7

Table 1.2: Monthly total rainfall 2010/11 (mm)

Agro-met station	2010				2011							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwela	390.4	284.6	678.2	259.3	132.2	93.4	237.7	382.4	412.2	155.9	131.4	201.0
Peradeniya	122.8	245.9	560.9	408.9	354.7	258.2	75.7	243.7	87.5	56.1	58.2	74.1
Sita-Eliya	178.0	184.8	329.9	213.0	337.0	226.1	102.5	153.9	78.5	36.6	47.2	41.2
Bathalagoda	149.3	237.8	574.2	361.9	236.3	180.2	58.6	418.7	84.1	49.4	19.0	67.3
Makandura	209.6	162.0	568.8	255.3	46.2	37.9	18.5	217.4	171.0	116.5	33.8	148.3
Moneragala	188.6	173.3	491.5	138.7	290.8	245.3	207.9	300.9	67.0	11.8	66.1	11.9
Girandurukotte	112.5	161.3	280.2	469.6	807.6	378.6	165.6	125.0	32.2	0.0	5.7	25.1
Kundasale	88.1	145.6	391.4	308.1	280.8	262.7	15.7	165.0	51.1	15.9	24.2	13.0
Bandarawela	177.1	141.4	345.0	277.9	298.8	305.2	207.5	204.9	90.7	8.0	23.4	25.8
Maha-Illuppallama	204.4	187.7	301.1	254.5	304.3	272.0	42.1	238.1	47.5	4.0	2.4	3.8
Angunakolapellessa	42.1	73.7	214.0	233.8	191.0	100.6	125.8	135.6	64.0	9.3	17.4	137.3
Aralaganwila	112.2	127.6	383.0	539.1	660.8	567.4	72.2	142.7	60.3	0.0	9.4	39.8
Weerawila	38.9	40.1	230.7	276.6	235.5	93.0	69.1	61.6	0.0	2.4	0.0	103.2

Table 1.3: Monthly average Rainfall in mm (2000-2009)

Agro-met station	Month											
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwela	289.6	468.9	339.8	205.3	141.0	107.9	153.6	266.9	415.9	257.4	168.9	189.0
Peradeniya	138.8	254.0	272.5	179.7	80.7	59.2	159.0	284.1	118.0	140.3	126.3	100.6
Sita-Eliya	151.5	232.6	262.9	209.9	176.4	76.7	109.1	166.5	141.9	129.4	123.6	105.9
Bathalagoda	119.3	325.2	285.1	170.9	86.9	74.1	125.0	248.0	85.2	89.5	63.9	80.7
Makandura	186.2	372.5	258.5	102.2	82.9	73.1	153.5	246.9	172.0	158.4	83.9	106.7
Moneragala	97.6	288.6	367.4	254.8	180.7	104.0	91.2	246.1	86.8	33.0	51.6	73.8
Girandurukotte	78.5	184.3	447.4	469.2	355.6	163.5	124.6	172.2	47.8	16.6	33.0	67.0
Kundasale	80.6	178.8	224.8	183.9	91.3	69.3	124.2	184.5	74.2	80.9	62.0	73.9
Bandarawela	116.2	285.6	268.3	185.7	132.4	67.4	119.3	215.6	121.0	48.3	46.0	65.6
Maha-Illuppallama	83.9	250.9	280.8	187.4	100.0	87.1	91.9	177.6	51.7	21.7	19.5	29.8
Angunakolapellessa	96.0	146.1	239.1	133.1	84.5	58.2	109.8	104.2	79.3	45.8	44.2	55.1
Aralaganwila	55.3	242.7	405.6	395.7	277.7	138.5	92.5	140.3	49.0	25.2	35.5	53.4
Weerawila	45.9	158.0	279.9	157.9	95.2	58.6	80.1	120.3	46.3	15.0	16.4	39.5

Table 1.4: Monthly Potential Evapotranspiration (mm) - 2010/11

Agro-met station	2010				2011							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwela	60.0	76.9	60.0	59.5	62.0	56.0	81.8	88.8	86.8	74.4	69.4	71.9
Peradeniya	62.4	71.9	55.2	52.1	59.5	67.2	104.2	69.6	79.4	67.2	62.0	62.0
Sita-Eliya	55.2	*	*	32.2	57.0	65.0	71.9	76.8	71.9	69.6	*	47.1
Bathalagoda	74.4	76.9	62.4	52.1	59.5	65.0	96.7	79.2	99.2	93.6	96.7	94.2
Makandura	79.2	91.8	74.4	81.8	86.8	80.6	79.4	74.4	81.8	86.4	86.8	94.2
Moneragala	76.8	89.3	55.2	52.1	54.6	62.7	84.3	79.2	101.7	115.2	96.7	119.0
Girandurukotte	*	84.3	*	*	*	*	81.8	91.2	106.6	*	*	*
Kundasale	67.2	74.4	55.2	52.1	52.1	65.0	91.8	81.6	96.7	91.2	91.8	79.4
Bandarawela	60.0	74.4	45.6	47.1	47.1	51.5	67.0	72.0	86.8	96.0	76.9	86.8
Maha-Illuppallama	74.4	74.4	45.6	37.2	37.2	60.5	74.4	76.8	99.2	103.2	*	114.1
Angunakolapellessa	110.4	119.0	79.2	69.4	81.8	78.4	104.2	105.6	124.0	122.4	121.5	111.6
Aralaganwila	110.4	114.1	67.2	52.1	47.1	62.7	86.8	91.2	121.5	151.2	153.8	156.2
Weerawila	112.8	116.6	69.6	67.0	67.0	65.0	79.4	79.2	119.0	136.8	138.9	124.0

* - Data Not Available

Table 1.5: Maximum and Minimum air temperature (OC) – 2010/11

Agro-met station	2010												2011											
	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
Bombuwela	30.1	24.6	30.5	24.4	30.4	23.5	29.9	23.0	29.9	22.3	30.4	23.1	31.5	23.3	31.4	24.4	31.4	25.6	30.9	25.9	30.3	24.9	30.3	24.7
Peradeniya	29.4	21.1	29.3	20.6	29.5	20.3	27.5	20.0	27.2	18.9	28.8	19.7	32.1	19.5	31.4	20.3	30.6	21.7	29.3	22.1	28.6	22.0	28.6	21.6
Sita-Eliya	*	13.4	19.3	12.8	19.6	12.5	18.0	*	17.7	*	19.3	*	20.1	11.7	21.0	12.0	21.4	13.5	19.5	13.5	18.5	13.5	18.8	13.5
Batalagoda	31.2	23.2	30.7	23.2	30.5	22.4	28.1	21.7	27.8	20.1	29.7	21.1	32.8	21.6	32.6	22.6	32.0	23.8	30.9	23.8	30.7	23.2	31.1	23.0
Makandura	32.1	24.0	30.9	24.1	30.8	23.6	29.6	*	30.0	22.6	31.0	22.6	33.7	23.6	32.6	23.4	32.0	24.2	31.4	24.2	31.1	24.3	31.3	23.6
Moneragala	33.6	21.8	33.0	22.1	31.3	22.1	28.9	21.9	29.5	20.1	30.5	21.7	32.3	20.5	33.0	22.2	34.3	22.9	35.7	22.1	35.0	22.2	35.7	22.7
Girandurukotte	34.6	23.2	33.7	23.1	31.6	23.4	28.8	22.8	27.6	21.4	30.2	22.3	32.7	23.0	33.9	22.6	35.6	24.3	36.5	24.0	35.7	24.1	36.3	23.7
Kundasale	29.4	20.4	29.2	19.6	29.1	21.8	27.2	19.5	26.7	17.9	28.5	18.9	31.4	19.3	31.4	22.2	31.3	21.1	30.9	21.4	29.9	21.5	30.4	21.2
Bandarawela	26.4	16.2	26.7	15.8	24.7	16.0	23.3	16.0	22.6	15.2	24.0	15.2	25.7	15.0	26.7	15.9	27.7	16.4	28.2	15.9	27.4	16.6	27.5	16.7
Maha-Illuppallama	32.1	23.7	31.4	23.5	30.6	22.7	28.2	21.9	28.0	20.7	30.1	21.6	33.4	22.0	33.4	23.2	33.1	24.8	32.9	25.1	32.9	24.8	33.3	24.5
Angunakolapelessa	32.5	24.2	33.0	24.1	31.7	23.4	30.8	22.7	30.3	21.9	30.9	22.6	32.4	23.1	32.3	23.8	33.3	25.2	33.4	25.2	33.4	25.0	32.4	24.3
Aralaganwila	34.6	22.2	34.1	22.8	32.0	22.7	29.3	21.9	28.3	20.5	30.4	21.1	33.6	21.0	35.0	22.5	36.1	23.2	35.3	23.8	34.5	23.9	35.2	23.0
Weeravila	34.4	24.5	34.0	24.0	32.6	23.5	31.3	23.0	30.0	22.3	31.3	22.8	33.0	23.4	33.1	23.8	34.2	24.9	34.5	24.9	34.7	24.0	33.3	23.4

* - Data Not Available

Table 1.6: Relative Humidity (%) – 2010/11

Agro-met Station	2010												2011											
	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
Bombuwela	87	80	82	76	84	79	88	77	86	75	89	81	86	74	84	77	85	78	83	78	86	77	85	78
Peradeniya	82	77	81	76	90	94	86	81	87	78	87	71	83	71	84	83	87	83	87	81	88	83	90	84
Sita-Eliya	91	89	85	87	85	89	93	94	91	91	82	87	81	86	82	86	87	85	91	88	95	92	90	90
Batalagoda	86	77	85	73	90	79	89	81	88	78	89	67	84	60	84	71	84	70	82	73	83	73	83	72
Makandura	81	83	88	84	89	87	90	85	91	83	90	79	85	77	86	79	88	80	85	79	83	76	85	77
Moneragala	86	71	84	70	89	88	88	83	88	79	88	74	86	76	88	67	81	74	76	54	81	60	73	58
Girandurukotte	80	67	76	64	90	75	92	77	91	84	91	74	88	64	85	69	81	60	71	53	69	*	74	*
Kundasale	78	72	77	69	85	76	86	79	87	76	87	68	82	55	80	71	77	66	74	65	75	64	74	64
Bandarawela	74	72	68	68	84	83	85	79	89	79	86	73	81	70	77	74	74	72	73	59	69	60	69	61
Maha-Illuppallama	85	66	83	67	91	78	93	82	95	82	93	68	89	55	85	61	82	63	81	62	80	60	77	59
Angunakolapellessa	79	70	77	69	81	75	85	79	88	78	88	78	85	76	83	78	80	73	79	69	80	68	81	71
Aralaganwila	71	55	69	62	83	73	87	79	91	79	88	68	83	64	82	69	73	53	61	50	64	51	65	49
Weeravila	70	62	62	62	80	74	86	78	85	76	87	74	72	71	80	71	76	71	76	63	75	59	78	68

M - Reading at 8.30 hours

E - Reading at 15.30 hours

* - Data Not Available

Table 1.7: Bright Sunshine Hours – 2010/11

Agro-met station	2010				2011							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwela	5.1	7.0	5.6	4.0	5.0	5.6	7.7	6.9	7.4	7.3	6.5	6.7
Peradeniya	4.2	5.3	3.6	2.0	3.5	4.5	7.0	5.3	6.8	6.1	3.6	4.4
Sita-Eliya	3.3	4.6	2.7	1.1	2.5	3.5	5.0	5.1	6.5	7.6	3.6	5.1
Batalagoda	5.5	6.1	4.5	2.9	4.3	5.7	8.4	7.1	8.5	7.5	6.1	7.3
Makandura	*	*	*	*	*	*	*	*	*	*	*	*
Moneragala	*	*	*	*	*	*	*	*	*	*	*	*
Girandurukotte	5.0	6.7	4.0	*	2.1	4.2	6.3	6.6	7.5	6.8	5.4	7.5
Kundasale	4.9	5.2	4.6	4.1	5.0	6.1	7.3	6.3	7.1	5.2	4.7	5.3
Bandarawela	4.6	5.9	2.9	2.5	3.1	4.6	5.7	6.2	7.1	8.3	5.9	6.7
Maha-Illuppallama	6.2	7.1	4.6	2.7	3.3	6.1	8.2	7.5	9.8	9.2	8.3	9.0
Angunakolapellessa	*	*	*	*	*	*	*	*	*	*	*	*
Aralaganwila	7.2	7.9	5.0	2.8	3.0	5.1	8.0	7.8	9.4	9.5	8.7	9.0
Weeravila	7.0	8.3	5.4	4.9	5.4	5.6	7.3	7.2	9.1	8.6	7.2	8.1

* - Data Not Available

Table 1.8: Wind Velocity (kmph) – 2010/11

Agro-met station	2010						2011					
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwela	*	4.5	3.1	2.6	2.8	3.2	3.1	3.7	4.5	4.1	3.7	3.8
Peradeniya	*	*	*	*	*	*	*	*	*	*	*	*
Sita-Eliya	*	*	*	*	*	*	*	*	*	*	*	*
Batalagoda	5.8	6.7	3.6	4.1	4.6	4.4	4.0	3.8	6.9	8.3	8.3	8.5
Makandura	5.5	6.3	6.2	4.1	5.2	5.3	4.0	3.9	2.9	4.3	4.2	4.6
Moneragala	0.9	1.0	0.9	1.5	1.8	1.8	1.2	1.1	1.4	1.5	1.6	2.8
Girandurukotte	*	*	*	*	*	*	*	*	*	*	*	*
Kundasale	*	*	*	*	*	*	*	*	*	*	*	*
Bandarawela	3.3	4.0	2.4	3.3	3.2	3.1	3.2	3.1	3.1	4.6	4.8	5.1
Maha-Illuppallama	5.6	6.1	2.9	3.4	3.9	3.7	3.3	3.3	6.8	8.6	*	*
Angunakolapellessa	5.8	6.2	4.3	3.9	4.3	3.6	4.8	4.2	6.5	6.5	6.8	5.9
Aralaganwila	3.7	4.5	2.3	2.4	2.9	2.5	2.3	2.3	3.0	5.8	5.6	4.7
Weeravila	6.8	6.4	2.3	2.5	2.5	2.0	2.0	2.4	5.5	7.5	7.7	7.5

* - Data Not Availab

2.1 FIELD CROP RESEARCH AND DEVELOPMENT INSTITUTE - MAHAILLUPPALLAMA

Field Crops Research and Development Institute, Mahailuppallama and its satellite stations are responsible in developing varieties and other associated technologies and dissemination of the same to its stake holders. In addition, it has the responsibility in producing adequate quantities of nuclear seeds of all crops under its purview. Other Field Crops (OFC) include condiments(chilli and onions), grain legumes(Mung beans , cowpea, black grams), oil seeded crops(ground nut, soy beans, sesame and Sun flower) and coarse

grains(maize, finger millet, sorghum and other millets). It also caters to the enhancement of the productivity of regionally important rice, fruits and vegetables. FCRDI system comprises the main research station at Mahailuppallama, Grain Legumes and Oil Crops Research and Development Center (GLORDC) at Angunakolapellessa, Regional Agriculture Research Centers at Aralaganwila Kilinochchi, Thirunelvely and Vavuniya.

BUDGET

Allocation received and expenditure under different vote and projects are given in the table 2.1.1

Table 2.1.1: Annual budget - 2011(Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	11,943,000	9691,416	82
Recurrent	27,218,300	24,348,791	90
Projects			
‘Api Wawamu Rata Nagamu’	7,375,000	6,179,871	83
Enhancement of Organic Fertilizer Production and Utilization	1,740,000	944,570	54
Hybrid Variety Development, Seed Production of Local Maize Hybrid ‘Sampath’	625,000	565,603	90
NARP Projects	7,353,400	5,215,501	71
Model Village	200,000	130,185	65
Total	56,454,700	47,075,937	83

PROGRESS

CROP IMPROVEMENT

Condiments

Chilli

Crop improvement programme was conducted with the objective of development of high yielding varieties with good quality pods and resistant/tolerant to pests and diseases.

- Two green chilli varieties, MICH-03 and MI-Waraniya-01 were released by the DOA for national cultivation.
- Two promising chilli lines, PC-01 (a selected line from locally grown land race in Batticaloa district) and ICPN Selection 18-7 (a selected line from ICPN – AVRDC) were nominated for NCVT in chilli.
- Twelve parental inbred lines were selected based on their yield and other agronomic performances for hybrid breeding programme in chilli.
- 140 crosses were tested and 6 of them were identified as promising for further evaluation.

Onion

The onion crop improvement programme was conducted to develop varieties with the characteristics of high yielding, good seed setting, resistant to pests and diseases and good keeping quality.

- Two exotic big onion varieties, Red Star F₁ and Rawana were tested for field performance in yala 2011. Results revealed that the yield of Rawana (18 t/ ha) was lower than that of the recommended variety Dambulla Selection (25 t/ ha) and the cultivar Galewela Light Red (28 t/ ha). Red Star F₁ didn't produced bulbs under local climatic conditions. The experiment will

be repeated during *yala* 2012 to confirm the results.

- 7 seed setting cluster onion lines were developed during past 3 years and they were evaluated for the bulb yields in yala 2011. Three lines (MICLO-09-01, MICLO-10-03 and MICLO-10-05) gave higher bulb yields (16 - 17 t/ ha) than the check variety, Vethalan.
- Two lines, MICLO-10-03 and MICLO-10-6 reached their physiological maturity stage within 75 days after transplanting and it was earlier than Vethalan and the other tested lines which took 85 - 95 days for physiological maturity. All those lines will be evaluated for true seed yield during *maha* 2011/12.
- 10 new improved big onion lines selected during past 3 years were evaluated in yala 2011 to select promising lines. Among the tested lines MIBO-10-02 and MIBO-10-03 which matured in 90 – 105 days after transplanted gave higher bulb yields (27 - 28 t/ ha) than that of the recommended variety Dambulla Selection (24.5 t/ ha). Two lines, MIBO-09-E1 and MIBO-09-E2 reached their physiological maturity stage in 80 - 82 days after transplanting and it were 10 -12 days earlier than that of Dambulla Selection. However, the yield was 19 - 20 t/ ha, which was lower than that of Dambulla Selection.
- Riverstone, located in Matale district is having a cooler climatic conditions and it is located near to major onion growing areas. Therefore, studies were conducted to find the effect of climatic conditions in Riverstone on vernalization of big onion mother bulbs. The temperature during the end of November to early January was 18.5 - 19.6 °C of Riverstone area was favorable for big onion vernalization.

Coarse Grains

Maize

The maize crop improvement programme was continued to achieve high yielding varieties with high quality seeds with resistance to abiotic and biotic 'stresses'.

- Three promising quality protein maize hybrids, KH 74, KH 76 and KH 157 were evaluated in VAT. These promising hybrid contains around 4 % lysine and 1 % tryptophan which is about 3-4 times higher in comparison to normal maize and recorded average yield was about 4.5-5.5 t/ ha.
- Seven promising maize hybrids developed from local inbred lines and CIMMYT maize inbred lines were selected for NCVT. These hybrids gave average yield of about 4.5-5.5 t/ ha.
- Eighteen exotic maize hybrid varieties were tested for adaptability under local conditions. These exotic hybrids showed significantly higher or similar yields between 5.5 - 6.5 t/ ha over to the local hybrid variety Sampath and performed appreciably well under local condition.

Finger millet

- Four promising finger millet accessions (3- 3 ½ months) Ac 10326, Ac 11352, Ac 11369 and Ac 8630 selected from the local germplasm were evaluated in NCVT. These accessions showed an average yield of about 2-2.5 mt/ ha.

Grain Legumes

Mung Bean

Experiments were carried out to develop high yielding varieties with desirable quality seeds and resistance or tolerance to pests and diseases.

- One hundred single plants of F₆ Mungbean seeds of the back crosses, (MIMB 101 X V 2709) X V 2709 and (MIMB 101 X V 2709) x MIMB 101 were selected on the basis of yield and other desirable agronomic performances.
- Mungbean lines, MIMBCP 111, MIMBCP 113, MIMBCP 5913 and MIMBCP 539-17 were tested in VAT at farmer fields. Lines MIMBCP 111 and MIMBCP 114 performed well and gave 15 % and 12.5 % yield increase respectively over the check variety MI-6. Out of seven promising mungbean lines tested in NCVT, accession 8452 had a very low percentage of hard seeds (< 0.01 %).

Cowpea

- MICP 01, short durational (70 - 75 days), cream seeded, high yielding (> 2 t/ ha), large seeded cowpea line was released by the DOA for general cultivation.
- Two promising cowpea lines having white seeds with small black hilum and giving yields of > 2 t/ ha were submitted to the Seed Certification Service for the Distinguished, Uniformity and Stability (DUS) Test.

Black Gram

Three blackgram lines were tested in NCVT and none of these lines was superior to the check varieties Anuradha and MI 1.

Oil Seeded Crops

Soy Bean

- A high yielding (> 3 t/ ha) large seeded (12 - 13 g/ 100 seeds) and cream colour soybean line with a maturity period of 80 - 90 days was submitted to the Seed Certification Service for the DUS test.

Groundnut

- Four large seeded medium duration lines, (ICGV 97045, ICGV 97049, ICGV 98396 and ICGV 98704) were given to Seed Certification Service for DUS test. The highest farmer preference was observed in ICGV 98704 due to its yield and ICGV 97045 due to its both yield and seed characters.

Dry Zone Vegetables

Okra

- The okra line, OKS-1 was selected to submit for the DUS test. OKS - 1 has the pod characteristics of MI - 5. However, it has a higher degree of virus tolerance compared to MI - 5. Therefore, OKS - 1 could be used to replace MI - 5, which is highly susceptible for yellow vein mosaic virus.

Fruits

Grapes

- An experiment was conducted to identify low cost vine training system for grapes. Four varieties of grapes were trained on four different training systems namely Pandol, Double Guyot (DG), Geneva Double Curtain (GDC) and Tatura. The average yield of Israel Blue was best in GDC system (8 kg/ vine) compared to the other training systems (1.43, 2.0 and 7.4 kg/ vine in Pandol, DG and Tatura respectively).

The average yield of Muscat MI in Pandol and GDC systems was 4.0 kg/ vine and that was 7.7 kg/ vine in Tatura system. The average yield of French MI was 41.4 kg/ vine in Tatura system and that was around 11.0 kg/ vine in rest of the systems.

Wood Apple

- A study was conducted to identify suitable high yielding wood apple variety/ ies for the Dry Zone. Locally collected 8 accessions were tested. Accession number 06, which was collected from FMRC, Mahailuppallama showed promising characters over the others.

The average number of fruits/ tree was 573 with a fruit weight ranging from 180 - 380 g/ fruit. The percentages of small, medium and large fruits of the accession were 23 %, 29 % and 48 % respectively.

AGRONOMY

- A bud clipping technique was tried to increase chilli yield through increasing fruiting points per unit area with chilli seedlings of 30 and 50 days old. The clipping had no effect on yield but 50 days old seedlings gave higher yields compared to 30 days old seedlings.
- Four NCRVT of three different age classes (3, 3½ and 4 - 4½ months) were evaluated for their regional adaptability. The following lines performed well compared to the respective check varieties.
- Three months category; At - 09 - 854 and BG - 11 - 139
- Three and half months category; BW - 05 - 1805 and At - 08 - 1078

CROP PROTECTION

Pathology

- Experiments were conducted to find out the possibility of reducing the disease incidence of leaf curl virus during Yala 2010. The results showed that application of shade (30 % light reduction) treatment for chilli leaf curl virus reduced the disease severity because the vector movement is lower in the shade condition and it increased the chilli yield by 160 kg/ ha in Yala season.
- Local hybrid maize variety 'Sampath'(F₁ hybrid) and the parents showed the Seedling blight and retardation of seedling growth disease symptoms. Isolation of pathogens from the diseased seedlings predominantly yielded a species of *Penicillium* and it had no effect on seed germination but caused poor seedling emergence and blighting after emergence. The embryo of the living seed was the most

susceptible part to infection by *Penicillium* sp. The disease incidence increased with increased initial seed moisture content. Therefore, the seeds with < 13 % moisture content should be used for storing.

- Seed samples of 9 maize varieties obtained from Malaysia were tested for culturable pathogens. These seeds had been infected with *Colletotrichum* sp., the causal organism of anthracnose in maize which has not been recorded in Sri Lanka. All the seed samples were destroyed to prevent spreading of the disease further.
- Forage sorghum varieties introduced and cultivated by Department of Animal Production and Health at Peradeniya, as an animal feed were evaluated for possible quarantine diseases. There was no quarantine diseases observed. Depending on the time of harvesting and considering the need for such forage sorghum varieties, these lines could be considered for large scale testing in farmer fields.

Entomology

- Chilli leaf curl complex is one of the major pest problems in chilli cultivation. experiment was conducted to identify alternative insecticides with different mode of actions to control the problem. Two insecticides namely Spinosad 45 SC and Imidacloprid 70 % WG were identified as effective to reduce the leaf curl damage in chilli.
- The severity of leaf curl damage was significantly low (severity index: 10) in combination of seed treatment with foliar insecticide applied plots up to 6th weeks after transplanting. However, there was no significant difference between the treatments during 8th to 12th weeks after transplanting.
- Farmers use very high doses of nitrogen fertilizers to increase the yield of maize.

However, the practice could have a negative impact on overall crop performance. Especially in the insecticides free plots, severity of stem borer damage increased by around 85 % while the yield increasing with 200 kg/ ha by increasing the nitrogen at about 80 %.

- Abamectin 1.8 EC was recommended to control leaf curl complex in chilli. A new formulation type (N-Methyl 2 pyrrolidane - Butyrolactone (NMP free abamectin) having same strength of recommended product was tested for bio-efficacy of the new formulation. There was no significant difference between NMP free abamectin and abamectin 1.8 EC in controlling in leaf curl complex in chilli.
- Experiments were conducted to test the effectiveness of new formulation of Acetamiprid 18 SL against whitefly and leaf hoppers in okra and Brinjal. It was found new formulations of Acetamiprid (Acetamiprid 18 SL) also effective in controlling whitefly and leaf hopper in brinjal and okra.

Weed Management

Due to the very limited number of recommended herbicides available for field crops, new herbicides are being evaluated continuously at Mahailuppallama.

- Weed control efficacy of Quizalop-p-ethyl 50g/ l EC on chilli and groundnut was investigated. Three rates were tested as 1.0, 1.5 and 2.0 l/ ha on chilli and groundnut. The new herbicide was successful only for controlling grasses.
- An experiment was conducted to test weed control efficacy of Halosulfuron-methyl 75 WG on maize. Three rates of the new herbicide were tested as 60, 80 and 100 g/ ha on maize. It was found that the herbicide was able to control only sedges.

- A research was done to observe the rain fastness ability of Trigger [Carfentrazone-ethyl 6.5g/l + glyphosate (a.e.) 179 g/ l CS]. This information will be helpful as non selective herbicide application in *maha* season could be a problem during heavy rains. The Trigger was tested with Glyphosate and Paraquat using simulated rains. There was no any rain fastness ability found in any of the tested herbicides.
- Weed control efficacy of Imazethapyr on legumes was investigated. Three rates were tested as 600, 700, 800 ml/ ha on mungbean as pre emergence and post emergence applications. Promising results were given in pre emergence application and further evaluation will be conducted.
- In addition to the above, six new herbicides were evaluated on rice in Maha 2010/11 season under the national coordinated herbicide screening programme and the data were submitted to the Rice Research and Development Institute, Bathalagoda.
- High Grade Eppawala Rock Phosphate (HERP) and Eppawala Single Super Phosphate (ESSP) are locally produced Phosphorus fertilizers. But their suitability on OFC cultivation is not known. Hence, as an initial step, these fertilizer products were tested in maize cultivation in a pot experiment. ESSP was found to be suitable as a substitute for Triple Super Phosphate (TSP) for maize whereas HERP was not suitable. The experiment will be continued at field level to confirm the results and to give a recommendation.

WATER MANAGEMENT

- A study was initiated to evaluate soil water distribution pattern in RBE soil under drip irrigation system in order to develop a drip irrigation package for chilli. Investigations showed that chilli plants could be established up to 25 cm from the laterals without a decrease in green chilli yield. Soil moisture contents (around 20 % - gravimetric moisture content) and salt concentrations (< 0.15 dS/ m) maintained at desirable levels in the root zone of the tested plant spacing.
- An investigation was carried out to find out the optimum irrigation water requirement of hybrid maize, Sampath, grown in RBE soil. Irrigation Water (IW)/ Cumulative Pan Evaporation (CPE) ratio is one of the parameters used for the determination of irrigation water requirement of a crop. Thirteen IW/ CPE ratio combinations were tested during the three months period of a maize crop of Sampath. All the tested, Irrigation Water (IW)/ Cumulative Pan Evaporation (CPE) ratio combination of 1.15, 1.15 and 0.70 for the first, the second and the third months of the growth period did not show any significant difference in growth or yield of the maize crop in Yala 2011. Therefore, any of the tested

SOIL FERTILITY

- Integrated Plant Nutrient System (IPNS) is one of the methods that are adopted to increase fertilizer use efficiency in crop production. An experiment was conducted to identify the suitable organic manure for IPNS of maize. Four types of organic manures (gliricedia leaves, compost, Sunhemp and vegetable cowpea) were tested with 25 % reduced DOA recommended inorganic fertilizer rates of N, P and K. The results revealed that the application of gliricedia or quality compost at the rate of 10 t/ ha with 75 % of DOA inorganic recommendation or in-situ application of sunhemp (seed rate – 20 kg/ ha) or vegetable cowpea (seed rate - 25-30 kg/ ha) with 75 % inorganic recommendation of DOA gave similar yields to that of 100 % inorganic fertilizer recommendation of DOA.

combination could be used to determine irrigation water requirement of hybrid maize, Sampath in RBE soil. The experiment will be repeated to verify and confirm the results.

FOOD TECHNOLOGY

- Four cowpea varieties tested for soaking time, boiling time, and overall sensory acceptability. Variety MI - 35 required longer time and higher water content for boiling. Variety Dhawala was the highest acceptable variety, possibly due to its soft texture and taste.
- Five cowpea varieties were tested for crude protein content. Waruni (21.5 %) and MICP - 01 (21.9 %) showed higher protein contents than Dhawala (19.3 %), MI - 35 (19.53 %) and MICP - 03 (19.53 %).
- Four soybean varieties/lines were tested for crude fat and crude protein contents. There were no significant difference in crude fat contents (19 - 20 %), while crude protein content of two new accessions were similar to Pb - 01 ranging from 32.7 to 39.1 %.
- Proximate composition of hybrid variety 'Sampath' and its parental lines were evaluated. No significant difference was found in crude protein, crude fat and fiber or ash contents.
- Newly released tomato variety Kc - 01 was tested for food processing quality and basic chemical properties. The variety has acidity of pH = 5.63 with reference to expected acidity of a tomato (generally below 4.6 pH). Variety could be successfully used in production of sauce and ketchup.
- Newly developed soft seeded guava line was tested against popular variety for physical, chemical and sensory properties. Fruits of soft seeded variety were larger with less percentage of seeds which are softer. Peel thickness was higher in this line and peel colour was more uniform (Yellow group: 144 B - 144 C IN BHS colour chart).
- Seven QPM parental lines, 9 promising QPM hybrids, 2 normal maize hybrids (Pacific 984 & Sampath) were tested for seed crude protein and tryptophan contents. There was no significant difference in protein or fat contents of the seeds, which ranged from 7.2 - 9.7 % and 3.4 - 6.4 % respectively. Tryptophan contents of inbred lines were 1.09 - 0.84 % while it was between 1.16 - 0.92 % in QPM hybrids. Sampath and Pacific 984 had significantly lower tryptophan contents than most of the QPM inbred lines and QPM hybrids. Hybrids KH 156, KH 74, KH 76 and KH 157 showed tryptophan contents above 1 %.
- Three Aloe vera products (beverage, jelly and osmotically dried snack) developed was tested for sensory quality. Overall acceptability was above the category 'like very much' for all the products.
- An experiment was conducted to identify suitable pre treatments for extending shelf life of Aloe vera jelly. Results revealed that jelly prepared by adding 120 ppm Potassium Metabisulfite before boiling and stored in refrigerator preserve the product for 36 days.
- Proximate chemical composition of coarse grain flour (maize, finger millet, sorghum) and wheat flour were analyzed. Results revealed that coarse grain flour is high in protein (6.6 - 6.3 %), fat (2.7 - 5.7 %) fiber (0.3 - 2.0 %) and ash (1.6 - 2.5 %) compared to that of wheat flour where, protein, fat and ash contents were 3.2 %, 0.6 % and 1.4 % respectively. Wheat flour contains only traces of fiber. Biscuit and cake prepared from coarse grain flour had acceptable sensory qualities but acceptability was less than wheat flour products.

- Maize flour can be incorporated only up to 20 % in wheat bread. Pre-gelatinization of maize flour increased textural properties.
- Silver skin onion has less acceptability in culinary due to its low pungency, which is used in pickling worldwide. Possibility of pickling silver skin onion and red onion were tested with 5 processing methods. Pickling in 2

% and 5 % salt solutions produce acceptable sensory qualities.

SEED PRODUCTION

Breeder and Certified/ Commercial Seed Production

Following quantities of breeder and certified/ commercial seeds were produced and supplied to SPMDC and other relevant organizations by FCRDI Maha Illupalama (Table 2.1.2).

Table 2.1.2: Quantities of breeder and certified/ commercial seeds produced at FCRDI during 2011

Crop	Variety	Breeder seed production (kg)		Certified/ commercial seed production (kg)
Maize	Parental lines of hybrid maize variety Sampath	Male	288.0	-
		Female	438.0	-
	Ruwan	89.0	-	
Finger millet	Rawana	9.5	-	
	Oshada	5.5	-	
Chilli	MI Green	-	110.0	
	Galkiriyagama Selection	8.0	-	
	MI 2	1.2	-	
Mung bean	Ari	24.0	232.0	
	MI 5	47.5	-	
	MI 6	39.5	280.0	
Big onion	Dambulla Selection	Mother bulbs	280	790.0
		True seeds	0.7	-
Black gram	MI 1	33.8	-	
	Anuradha	28.5	-	
Soy bean	Pb 01	113.0	-	
Cowpea	Dhawala	27.0	-	
	MI 35	11.0	-	
	Waruni	14.5	-	
	Bombay	22.0	-	
Okra	Haritha	58.5	-	
	MI 5	7.5	-	
Bitter gourd	MC 43	3.8	-	
Drumstick	Dwarf variety	11.0*	-	

* Sufficient for producing seedlings for cultivation of around 25 ha

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.

- Over 120 training programmes on OFC production for farmers and for school, university and technical college students with a total number of participants over 3000 were participated.
- FCRDI scientists participated in various programmes as resource personnel,
 - Over 40 field demonstrations
 - 2 field days
 - 7 plant clinics
 - 2 national exhibitions at ‘Govi Sathiya’ and ‘Deyata Kirula’
- Technical advices were provided for over 600 clients who visited the institute and on the telephone.
- About 1500 of leaflets on technical information were distributed.
- Around 1500 seed samples of OFCs issued free for farmers and other institutes.
- Three students from technical colleges and one university student completed their in plant training at the institute. One undergraduate student competed the final year research project at the institute.

TV/ Radio Programmes

- Four radio programmes were broadcasted with the participation of FCRDI scientists.

Newspaper Articles

- Two newspaper articles were published during the year.

OTHER PROJECTS/ SERVICES

Enhancement of Production and Use of Organic Manure

Eighty tons of organic manure and 1500 kg of compost inoculum were produced and distributed. Forty kg of Sunhemp (*Crotalaria juncea*) seeds were also produced and being used in seed multiplication activities and as a green manure at the Institute.

‘Model Village’ Programme

Practical training programmes and special field day programme were conducted on compost production and fruit crop pruning in Eppawala, Nallamudawa village. A special field day programme was conducted and 44 farmers were participated.

Quality seed materials of 15 varieties were distributed among 4 farmers for multiplication in maha 2011/ 12 season. Five hundred dwarf type drumstick plants, 1250 kg of compost inoculum and 250 rakes were distributed among 250 farm families in Nallamudawa village.

Soil Testing Programme

Fifty six (56) 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 given.

Other programmes

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

PLAN FOR 2012

RESEARCH

Condiments

Chilli

Development of open pollinated and hybrid chilli (dual purpose) varieties for rainfed & irrigated conditions

- Production of new crosses for chilli hybrids/ OP varieties and evaluation of newly developed hybrids
- Evaluation of chilli germplasm, selection, purification and seed multiplication of promising lines and regionally important chilli land races
- National Coordinated Varietal Trial for promising chilli breeding lines
- Varietal Adaptability Trials for promising chilli breeding lines
- Evaluation of exotic chilli hybrids

Onion

- Evaluation and selection of bulb crop of improved big onion lines
- Evaluation and selection of seed crop of improved big onion lines
- Evaluation of exotic big onion varieties for off - season cultivation
- Improvement of new big onion lines suitable for true seed production under prevailing low temperature conditions in maha season
- Hybridization and selection of onion
- Evaluation of improved cluster onion lines raised from seedlings
- Seeds and bulbs multiplication of promising onion lines and selected accessions

Grain Legumes

Mung bean

- Hybridization and selection programme for mungbean
- Evaluation and selection of mungbean germplasm
- National Coordinated Varietal Trial for promising mungbean breeding lines
- Varietal Adaptability Trials for mungbean promising lines

Black gram

- Germplasm evaluation of blackgram
- Hybridization and selection programme for blackgram

Cowpea

- Hybridization and selection of cowpea
- Varietal Adaptability Trial for Cowpea
- National Coordinated Varietal Trial for Cowpea

Soy bean

- Evaluation of vegetable soy bean germplasm received from AVRDC
- Seed multiplication of promising soy bean lines
- Seed multiplication of promising varieties of chickpea

Oil Seeded Crops

Groundnut

- Seed multiplication of promising lines of groundnut
- Varietal Adaptability Trial for Medium duration promising groundnut lines

- Varietal Adaptability Trial for Bud necrosis

Mustard

- National Coordinated Variety Trial for Mustard

- Varietal Adaptability Trial for Mustard

Coarse Grains

Maize

- Development of inbred lines of maize from population 'Hybrid Mix' - Generation advancement
- Evaluation of promising hybrids developed with local inbred lines in NCVT
- Evaluation of QPM maize hybrids in VAT
- Evaluation of exotic sweet corn and maize hybrids
- Seed production of promising hybrids and parent lines
- Evaluation of Indonesian OPV maize in AYT
- Seed multiplication of Indonesian OPV maize varieties
- Development of variety screening technique for sheath rot of maize

Finger millet

- Evaluation of finger millet accessions in NCVT and VAT
- Evaluation of new finger millet accessions in PYT

Other Dry Zone crops

- Maintenance of promising Meneri germplasm
- Maintenance of promising Foxtail millet germplasm
- National Coordinated Varietal Trial

Vegetables

- Varietal improvement of okra for resistance/ tolerance to yellow vein mosaic virus (YVMV) with high yield and acceptable fruit quality

- Evaluation of okra germplasm received from PGRC

- Varietal Adaptability Trial for Promising lines of okra

Mae/ Vegetable cowpea

- Evaluation of vegetable cowpea germplasm received from PGRC and selection of better lines for crosses and varietal improvement
- National Coordinated Varietal Trial for Mae
- National Coordinated Varietal Trial for Brinjal

Fruits

- Maintenance of grapes & mango germplasm
- Evaluation of wood apple germplasm
- Evaluation of soft seeded guava varieties
- Maintenance of mother plants of three grapes varieties
- Evaluation of grape vine training systems
- Maintenance of a demonstration block of dragon fruit
- Study on effect of time of pruning on yield and quality of grapes
- Identification of plants suitable for time structures for grapes vine training
- Application of gibberic acid on grapes for quality improvement
- Maintenance of a demonstration block of drumstick

Entomology

- Effect of different nitrogen levels on leaf curl complex and yield of chilli
- Screening of insecticides against chilli leaf curl complex
- Screening of insecticides to control thrips in onion
- Effect of seed treatments to control thrips in onion
- Assessment of yield loss caused by leaf miner in cowpea

- Testing of insecticide seed treatments to control pest in maize

Pathology

- Studies on effect of shade on development of chilli leaf curl virus
- 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
- Identification of management practices for Ascochyta blight disease in legumes
- Screening of fungicides for major fungal diseases of maize
- Management of seedling blight in maize

Agronomy

- Testing of an integrated soil management approach to enhance the growth and yield of chilli
- Development of a cluster seed establishment method for legumes grown under rainfed conditions
- Identification of reasons for tip burning in big onion in major onion growing areas
- Preliminary feasibility studies for mother bulbs production during off season
- Effect of foliar application of urea, potassium and salicylic acid on growth and yield of mungbean

Weed Management

- Weed control efficacy of Quizalop-p-ethyl 50 g/ l EC on chilli and groundnut

- Weed control efficacy of Halosulfuron-methyl 75 WG on maize
- Rain fastness ability of Trigger [Carfentrazone-ethyl 6.5 g/ l + glyphosate (a.e.) 179 g/ l CS]
- Weed control efficacy of Imazethapyr on legumes
- Weed control efficacy of Saflufenacil 70 % WG
- Residual effect of Saflufenacil 70 % WG
- Weed control efficacy of Nicosulfuron on maize
- Weed control efficacy of Oxyfluaefen 480 g/ l (a.e.) on onion

Soil Fertility, Fertilizers and Environment

- A study on the response of maize in relation to application of HERP and ESSP
- Identification of suitable organic manure for integrated plant nutrient (N) management system of maize
- Comparative effect of prilled urea and granular urea on growth and yield of chilli
- Appropriate time of K fertilizer application for maize
- Long Determination of N requirement of maize by leaf colour chart
- Soil testing programme
- Response study of biofilm bio fertilizer on maize

Water Management

- Determination of the optimum basin size for bedded basin surface irrigation layout in RBE soil (NARP Project)

- Determination of soil moisture depletion patterns in bedded basin surface irrigation layout in RBE soil (NARP Project)
- Effect of irrigation interval on growth and yield of chilli in well drained drainage class of Rhodustalfts in DL1b agro-ecological region (NARP Project)

Food Technology

- Quality evaluation of varieties/breeding lines of OFC/fruits/vegetables submitted by breeders
- Value addition using cereal and legume using composite flour
- Determination of post harvest losses during post harvest operations of coarse grains and legumes
- Quality evaluation of fried snaks produced using coarse grains and legumes.
- Evaluation of green chilli quality of chilli varieties
- Evaluation of proximate composition of recommended OFC varieties

Breeder Seed Production

- Breeder seed production of recommended varieties of chilli (MI-Green and MI 2), maize (Badra, Ruwan, Parental lines of Sampath and Sampath), finger millet (Oshadha and Rawana), mung bean (MI 5, MI 6 and Ari), black gram (MI 1 and Anuradha), cowpea (Dhawala, MI 35, Waruni and Bombay), soybean (PB 1), vegetable cowpea (BS 1), tomato (KC 1), okra (Haritha) and bitter gourd (MC 43).
- Breeder mother bulbs and seed production of recommended variety of onion (Dambulla selection)

Technology Dissemination

- Publishing research findings in research articles
- Exchanging information through PTWG meetings and other seasonal review meetings
- Technology dissemination by training programmes, lectures, workshops, field demonstrations, plant clinics, field days, exhibitions, technical advices and through mass media by newspaper articles and TV and Radio programmes

STAFF LIST

Designation	No.
Director	01
Deputy Director	02
Research Officer	30
Agricultural Economist	01
Programme Assistant - Agriculture	04
Research Assistant	16
Agricultural Instructor	01
Research Sub Assistant	09
Public Management Assistants' Service	16
Office Assistant (KKS)	01
Driver	05
Budder	01
Storeman	01
Circuit Bungalow Keeper	01
Tractor Operator	04
Watcher	08
Labourer	142
Labourer (Contract)	224
Total	467

2.1.1 GRAIN LEGUME AND OIL SEED CROP RESEARCH AND DEVELOPMENT CENTRE (GLORDC) - ANGUNAKOLAPELESSA

Grain legumes and oil crops Research and Development Centre is located at Hambantota district, is given main responsibility for developing technologies for grain legumes and oil crops and other regional mandatory fruit crops and vegetable crops.

Goals of the centre are development of high yielding other field crops with acceptable quality characters, – especially oil crops and grain legumes adaptable to irrigate and rain-fed environment of

the dry zone of Sri Lanka, development of plant protection strategies to minimize crop losses due to pest, diseases and weeds, development of improved agronomic practices to raise crop and land productivity while reducing the cost of production, development of improved soil and water management and conservation methods for the dry zone crop growing environment and testing the adaptability of new improved varieties and technologies.

BUDGET

Table 2.1.1.1: Annual budget – 2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	10,980,000	8,786,669	80
Recurrent	14,001,200	13,593,178	97
Projects -			
Improvement of cowpea varieties for tolerance of moisture stress	755,000	753,608	100
Present states of sulphur in soils of ground nut growing areas of Southern and Uva province	460,000	234,817	51
Development of mung bean varieties suitable as catch crop	315,000	305,198	97
Identification of most effective preventive measures on suppressing the mosaic virus emergence in mung bean	613,800	611,661	100
Development of high yielding and white seeded sesame variety	609,500	467,013	77
Development of high yielding, large seeded Groundnut varieties	348,000	328,592	94
Mustard Variety improvement programme	1,420,000	1,112,750	78
Citrus varietal evaluation	100,000	80,888	81
Vegetable – cowpea programme	75,000	75,000	100
Pumpkin Development programme	400,000	360,659	90
Variety development seed production and improvement of local maize hybrid Sampath”Variety	300,000	305,106	102
Organic crop production	1,000,000	906,744	91
Hybrid Seed Production	228,350	214,013	94
Model Villages programme	100,000	48,780	49
Land Development Programme (AWRN)	7,000,000	6,958,835	
Total	38,705,850	35,143,511	91

PROGRESS

RESEARCH

Plant breeding (Crop improvement)

Oil crops

- VAT of bud necrosis disease tolerant varieties.- 2 lines selected for VAT, 2 trials completed at 6 locations
- VAT of medium duration groundnut varieties.- 5 lines selected for VAT, 2 trials completed at 5 locations
- VAT of red testa groundnut variety -2 trials completed at 6 locations
- Basic seed production of groundnut variety walawa, Indi, Tikiri and Tissa -20kg per each variety
- Line evaluation of large seeded groundnut varieties.- 15 lines characterized, selected 7 lines
- Line evaluation of medium duration groundnut -10 lines selected
- Breeders seed production of groundnut variety Walawa, Indi, Tikiri and Tissa - Walawa 101.7kg,Tikiri 130kg,Indi139kg andTissa190.3kg
- Seed multiplication of 04 groundnut accessions for future seed need -20kg per each line
- Line evaluation of black seeded Sesame. - 6 lines selected
- Breeders seed production of Sesame variety Uma - Produced12.7kg seeds of Uma variety
- Seed multiplication of 7selected mustard lines - Produced 2kg seeds per each lines

Grain legumes

- Hybridization and advancement of 16-F1 generations -16 lines selected for F2
- PYT of selected simultaneous maturity mungbean lines-7 lines selected
- MYT of selected mungbean lines-7 lines selected
- Seed multiplication of released varieties- Trials Established
- Hybridization program -ii (heterosis and heritability of selected mungbean crosses)- Trials Established
- Identification of pinna mung germplasm for quality protein- Trials Established
- Evaluation of cowpea germplasm under field conditions for yield and pest ,disease tolerance-3 lines selected
- Selection of better performing medium duration cowpea varieties (MYT)- Selected 10 lines under field evaluation
- Selection of better performing medium duration cowpea varieties (PYT)- Selected 15 lines under field evaluation
- Development of high yielding short/medium (60-75 days) cowpea variety with better plant structure (Evaluation of F3 generation) - F3 generations of 10 crosses under field evaluation
- Development of suitable medium duration cowpea variety For rain fed *Maha* season- Hybridization program - Ten crosses were made
- Seed multiplication of NCVT nominated cowpea lines- Selected 6 lines under field evaluation in7 locations-14 lines under field evaluation

- Germplasm evaluation of Horse gram- Selected 5 lines under field evaluation in 7 locations
- Seed multiplication of NCVT nominated horse gram lines

Agronomy

- Evaluate the effect of planting density on crop performances for bambara groundnut - optimum planting density range is found
- Ascertain the Recommendation of planting density for new varieties of cowpea- Optimum planting density is found, results should be confirm in next year
- Evaluate the effect of planting density on crop performances for mustard - A trial completed for one season, results should be confirm in next seasons
- Cowpea Variety evaluation (NCVT)- A trial established
- Variety evaluation - Finger millet (NCVT)-1st trial completed, 2nd Trial established
- Variety evaluation – horse gram (NCVT)- A trial established
- Variety evaluation – chili (NCVT)- 1st trial completed, 2nd Trial established

Biotechnology

- Evaluation of indigenous medicinal plants for use as botanical pesticides- Selected 4 plant species (Ath thora, Ehela, bogavillea & Kumbuk) from 13 plant species. Selected plants under evaluation
- Studying the botanical product efficacy to control the *Sclerotium rolfsii* in groundnut

- (*in – vitro* study)- Evaluating the antifungal activity of the above selected plant species
- Development of papaya ring spot virus resistant papaya variety/s with good quality and quantity yield & characters
- Collected locally available papaya cultivars with PRSV tolerance characteristics & Established stock for evaluation
- Development of protocols for micro propagation of virus tolerant Banana and spine gourd- Experiments established (On going)

Pathology

- Identification of the best method for control *Sclerotium rolfsii* using *Trichoderma harsiana*- Research to be continued to confirm the results
- Study the plants parts efficacy to control the *Sclerotium rolfsii* in groundnut- Research to be continued for confirm results
- Line screening of Sesame for Stem and root rot disease- Research to be continued. 6 sesame lines selected having tolerant properties

Entomology

- Identification and management of major pests associated with mustard cultivation
- Research in data collecting work on faunal diversity under non-sprayed condition
- Identification of optimum heat or cold stress condition for controlling *Callosobruchus maculates* under storage conditions - Research on going
- Evaluation of the influence of other cultural practices on suppression of mosaic virus incidences

- Identification of an effective management package for controlling mosaic virus emergence in Mung bean -7 packages screened, two better combinations of practices selected
- Evaluation of mung bean germplasm for mosaic virus resistance - 6 combination tested, one combination identified

Soil Science

- Identification of present sulphur status and sulphur recommendations - Established two trials and 350 samples analyzed
- Nutrient requirement of other field crops under different farming situations-5 Zn levels tested, There was response up to 2kg Zn per ha

Vegetable Improvement

- Crop improvement and production programme of Thumba
- Hybrid okra varietal development programme- Produced 72 hybrids
- Hybrid Pumpkin varietal development programme - Collected 46 Germplasm
- Bambara' groundnut development programme - Produced 650 Kg / ha
- Varietal Development programme of vegetable cowpea - Selected 3 lines
- Varietal Development programme of Brinjal - Selected 2 lines

PLAN FOR 2012

Plant Breeding – Oil Seed crops

- Varietal Adaptability testing of ground nut bud necrosis disease tolerant varieties

- Varietal Adaptability testing of medium duration ground nut varieties
- Varietal Adaptability testing of red testa groundnut variety.
- Preliminary Yield trials of large seeded ground nut varieties
- Preliminary Yield trials of medium duration ground nut varieties
- Basic seed production of groundnut variety Walawa, Indi, Tikiri and Tissa
- Breeders seed production of groundnut variety Walawa, Indi, Tikiri and Tissa
- Seed multiplication of 4 groundnut accessions for future seed need.
- Preliminary Yield trials of black seeded sesame
- Breeders seed production of Sesame varieties Malee & Uma
- Seed multiplication of selected mustard lines

Plant Breeding – Grain Legumes

- Hybridization and advancement of 16-F1 generations of Mung bean
- Preliminary Yield trials of selected simultaneous maturity mung bean lines.
- Major Yield trials of selected mungbean lines
- Multiplication of seeds (recommended varieties of Mung bean)
- Hybridization program (heterosis and heritability of selected mungbean crosses)
- Identification of pinna mung germplasms for quality protein
- National Coordinated Varietal Testing trials of selected mungbean lines

- Varietal Adaptability testing of selected mungbean lines
- Evaluation of cowpea germplasm for yield and pest ,disease tolerance
- Major Yield trials of selected medium duration cowpea lines
- Preliminary Yield trials of medium duration cowpea lines
- Development of high yielding short/medium(60-75 days) cowpea variety with better plant structure (Evaluation of F3 generation)
- Hybridization program for medium duration cowpea variety For rain fed *Maha* season-
- Seed multiplication of National Coordinated Varietal Testing for nominated cowpea lines
- Germplasm evaluation of Horse gram
- Seed multiplication of NCVT nominated horse gram lines

Agronomy

- Evaluate the effect of planting density on yield of bambara groundnut
- Ascertain the Recommendation of planting density for new varieties of cowpea
- Evaluate the effect of planting density on crop performances for mustard
- National Coordinated Varietal Testing trials of selected Cowpea lines
- National Coordinated Varietal Testing trials of selected Finger millet lines
- National Coordinated Varietal Testing trials of selected green chilli lines
- National Coordinated Varietal Testing trials of selected Kollu lines

- Effect of in situ rain water harvesting on sustainability of rain fed cowpea
- Study the rain fed agriculture system in southern dry zone (DL1b, DL5)
- The effect of supplementary irrigation in rain fed mungbean cultivation to combat drought stress on mungbean grain
- Find out the optimum planting time for Sesame
- Effect of water stress on different growth stages, Yield, Nutritional Composition of Groundnut (*Arachis hypogaea* L.)

Weed science

- Study the effect of weeds on yield of groundnut and determine the critical crop – weed competitive period for groundnut

Soil Science

- Effect of Nitrogen and Zinc on growth and yield of hybrid Maize (Var. Sampath)
- Influence of different organic materials on total & available soil N
- Fertilizer recommendation for Bambara groundnut
- Fertilizer recommendation for Thumba karawila (Spine gourds)

Water Management

- Determination of the optimum basin size for different surface irrigation layouts for different dry zone soils in Sri Lanka (*NARP Project*)
- Determination of Crop Co-Efficient and Crop Water Requirements of MungBean DL1b and DL5Agro Ecological Regions of Sri Lanka

- Determination of Crop Co-Efficient and Crop Water Requirements of MungBean D11b and DL5Agro Ecological Regions of Sri Lanka
- Development of Soil Salinity Map to the Angunakolapellassa farm field

Biotechnology

- Evaluation of indigenous medicinal plants for use as Botanical Pesticides
- Study the botanical product efficacy to control The *Sclerotium rolfsii* in groundnut
- Development of Papaya Ring-Spot Virus resistant papaya variety/s with good quality and quantity yield characteristics
- *In-vitro* mutagenesis of banana for *Fusarium* wilts disease resistance / tolerance
- Development of a suitable micro propagation technique for Spine-gourd (*Momordica dioica*)

Pathology

- Identification of the best method for control *Sclerotium rolfsii* using with *Trichoderma harsiana*
- Study the plants extract efficacy to control the *Sclerotium rolfsii* in groundnut
- Line screening of Sesame for Stem and root rot disease

Entomology

- Identification of possible management package for controlling mosaic virus infection in Mung bean
- Comparison of effect of different integrated techniques on suppression of mosaic virus incidences in mungbean

- Screening of mungbean germplasm for mosaic virus tolerance
- Identification of faunal diversity and development of an effective controlling package for major pests associated with mustard cultivation
- Identification of optimum heat or cold stress condition for controlling *Callosobruchus maculatus* under storage conditions

Food science & technology

- Evaluation of Nutritional status of the Mungbean varieties grown in Sri Lanka

Division of Horticulture- Division of Vegetables

- Establishment and maintenance of Female plant stocks of recommended Thumba varieties.
- Maintenance and conservation of Thumba germplasm
- Planting material production of recommended thumba varieties.
- Germplasm collection, evaluation and selection of pumpkin
- Hybrid okra varietal development programe
- Hybrid development programe of Pumpkin
- Feasibility testing of Bambara groundnut
- National Coordinated Varietal Trial of Vegetable cowpea
- National Coordinated Varietal Trial of Brinjal. Hybrids

Division of Horticulture- Division of Fruits

- Collection, Establishment and Evaluation of wood apple germplasms from dry and intermediate zones in Sri Lanka.
- Collection, Establishment and Evaluation of lime germplasms from dry and intermediate zones in Sri Lanka.
- Collection, Establishment and Evaluation of pomegranate germplasms from available zones in Sri Lanka.
- Breeders seeds production of papaya variety Rathna Collection,
- Establishment and Evaluation of Embul banana germplasms from available zones in Sri Lanka.
- Isolated banana garden for the production of disease free mother plants for the island wide tissue culture programme
- Collection, Establishment and Evaluation of Guava germplasms from available zones in Sri Lanka.
- Collection, Establishment and Evaluation of water melon germplasms from available zones in Sri Lanka

STAFF LIST

Designation	No.
Additional Director	01
Research Officer	17
Administrative Officer	01
Programme Assistant	01
Agricultural Instructor	07
Management Assistants' Service	06
Farm Clerk	01
Research Assistant (Special Grade)	01
Research Assistant	11
Research Sub Assistant	03
KKS	01
Driver	08
Earth Mover Operator	02
Storeman	01
Welder	01
Circuit Bungalow Keeper	01
Watcher	10
Unskilled Labourer	60
Total	133

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

Regional Agricultural Research and Development Center, Aralaganwila has responsibilities to develop relevant technologies and placing them in to practice in the mandated regions of the Mahaweli Systems B, C, D & G, Eastern province

and inter-provincial areas. Research program is executed under different disciplines such as Agronomy, Genetics and Plant Breeding, Plant Pathology, Entomology and Soil & Water Management.

BUDGET

Table 2.1.2.1: Annual budget -2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	9,896,710	8,735,482	88
Capital	3,775,000	2,553,098	68
Projects			
Development of efficient water management packages for chilli and onion in the Dry zone soils - NARP	701,900	651,891	93
Banana NCVT programme 2011- Under NARP	40,000	40,000	100
Model village establishment programme	100,000	74,920	75
Hybrid seed production of Maize	250,000	221,493	89
Subsidiary crops seed production programme	202,460	190,885	94
Production of fruit plants (Papaya)	400,000	337,992	84
Establishment of B- onion and cluster onion in off season newly cultivated areas	650,000	586,630	90
Experimenting on Compost production and utilization	1000,000	959,352	96
Total	17,384,220	14,351,742	83

PROGRESS

RESEARCH

Agronomy

Rice

National Coordinated Variety Testing (NCVT) - Five entries belong to 2.5 month age class was tested , Six entries of 3 months age class were evaluated , Seven entries of 3.5 months class were evaluated.

Brinjal

Successfully completed evaluating six entries with Amanda & BW 11

Cowpea

Seven entries were evaluated with standard checks of Dhawala and Waruni.

Chilli

Four chilli entries were evaluated with standard checks of KA 2 and MI Green.

Thibbotu

Different agronomic measures were tested to control hard wood borer incidence in Thibbotu. However, none of the treatments showed promising results.

Maize

- Successfully completed maize based intercropping trial. Among the trials, Maize + Okra intercrop combinations reported the highest profit.
- F₁ hybrid seeds - 300kg of seeds (variety Sampath) were produced.

Genetics and Plant Breeding

Onion

Morphologically characterized 119 lines including 4 new entries, Selected 6 lines for preliminary yield trial and 4 for advanced yield trial based on data of characterization during year 2008, advanced to F₂ generation of 2 lines from 19 selfed 19 progenies, breeder planting materials (sets) of 119 lines were produced for research purpose.

Cluster (Red or Small onion)

Eleven lines were selected for preliminary yield trial and 5 for major yield trials, NCVTs were conducted with 8 entries under seeding and non seeding varieties.

Other

Introduced and acclimatized several varieties of exotic crops of chili, cowpea, green gram, black gram, chick pea, brinjal, tomato, amaranthus, cucumber, bitter gourd, luffa, wing bean, wheat and barley.

Underutilized crops

Collected and seed multiplied pulses; Bambara groundnut, cowpea, leafy vegetable for evaluation.

Tibbatu

Maintained the field gene bank of thibbatu and produced breeder seeds.

Spine gourd

Breeder seed (Planting material) production was continued in order to establish mother vines for assurance of quality planting materials.

Horticulture

Banana

Four entries of banana with check variety Parakum were evaluated under NCVT, Rath kesel accession was selected for NCVT.

Papaya

Ratna papaya field was established to produce 1 kg of breeder seed

Dragon fruit

Two methods of multi shoot techniques for rapid multiplication were tested and developed.

Guvava

Four hybrids were evaluated under NCVT

Mango

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

Plant Pathology

Onion

Source of resistance in bulb rot, tip burning and purple blotch were identified.

Rice

Screening of fungicides for grain discoloration in rice

Soil and Water Management

- The field structure dikes and ditches viz, vegetables on dikes and paddy on ditches was found as good land management technique to utilize poorly drained lands in irrigable uplands in the Mahaweli System B area.

- Field trial was conducted to determine the soil erosion under NCB soil, results revealed that highest soil erosion under fallow condition while mulching recorded the lowest.
- Field trial was conducted to determine the irrigation water requirement of red onion using different IW/CPE ratios with mulching and organic manure application.

Weed Science

Effect of density of Aswawaliga (*Leptochloa chinensis*) in rice fields in System B was evaluated.

PROJECTS

NARP

- Development of efficient water management packages for chilli and onion in the Dry Zone soils
 - Banana NCVT programme 2012 under NARP
- ### **Organic fertilizer production, utilization and development**
- Evaluated effectiveness of available materials and effectiveness of products. The total of 56 tons of compost was produced during the year 2011.

Other Activities

- Model village establishment programme
- Subsidiary crops seed production programme
- Production of fruit plants (Papaya)
- Establishment of B- onion and cluster onion in off season in new areas.
- Experimenting on Compost production and utilization
- Banana Planting material production program was conducted for seeni and ambul varieties

PLAN FOR 2012

- Dragon fruit Planting materials were produced in white flesh variety
- Tibbatu (*Bindu* variety) 4350g of Breeder seed were distributed among farmers.

TECHNOLOGY DISSEMINATION

Leaflets

Papaya

542 leaflets on Papaya management practices, Thibbotu cultivation and Thumba karavila cultivation were prepared and distributed.

Field days and Trainings

- Minister of Agriculture, Hon Mahinda Yapa Abeiwardana and the Director General of Agriculture made a field visit to Research Centre, Aralaganwila
- **Field days:** Three field day programs were conducted to farmers and agriculture officers of the Department of Agriculture and Mahaweli authority. Over 300 farmers and officers were participated.
- **Training programmes:** Training programmes conducted for AOs, FAs, farmers and school children.
- **Crop clinics:** 8 crop clinics were held.
- Protection issues were based on field visits and many more based on sample analysis.

Soil testing

Analyzed 632 soil samples and recommendations were given accordingly.

Agronomy

Rice

- Identification of isolation distance and cross pollination rate to control wild rice problem with the objective of the development of rice variety with high competition with weeds

Mango

- Development of canopy management practice to improve accessibility for harvesting.

Dragon fruit

- Performance evaluation on NCB under dry and intermediate moisture conditions
- Further development of large scale planting material production technique identified by the Aralaganwila Research Centre.

Guava

- Evaluation of hybrids for pruning and training under dry and irrigated conditions.

Papaya

- Further evaluation of drainage system for papaya.

Onion

- Evaluation of the Fertilizer requirement of red onion under NCB soil
- Development of alternate suitable method for seed production of onion

Spine gourd

- Evaluation of the effect of different shade levels on growth and yield of spine gourd

Entomology

Brinjal

- Evaluation of available resistant Solanum species for shoots and pod borer damage under system B condition.

Chilli

- Management of sucking pests; thrips management in chilli under system B condition

Onion

- Management of thrips in onion under system B
- Varieties resistance for thrips.

Genetics & Plant Breeding

National Coordinated Varietal Trials

- Maize, Mustard, Chilli, Cowpea, Horse gram, Banana

Variety Adaptability Trials

Groundnut

Onion

- Characterization of germplasm
- Development and improvement of cluster onion variety suitable for vegetable
- National Coordinated Varietal Trial of Cluster onion
- Varietal Adaptability Trial of Cluster onion
- Introduction of pest and disease tolerant high yielding red onion variety.

- Development of hybrid cluster onion variety.
- Development of salad type white color cluster onion variety.

Papaya

- Production of breeder seeds of Rathna variety

Banana

- Evaluation of existing banana germplasm

Mango

- Evaluation of existing mango germplasm

Fruit crops

- Development of rapid multiplication technique for fruit crops
- Evaluation of package and practices to obtain fruits in off seasons

Underutilized fruit crops

- Exploration, characterization and evaluation of underutilized fruit crops in dry zone.

Rice

- NCVTs and NCHSTs coordinated by RRDI

Spine gourd

- Breeder seed (planting material) production

Soy bean

- NCVT for evaluation of advanced breeding lines.

Tibbatu

- Breeder seed production

Cowpea

- NCVT of vegetable cowpea for evaluation of yield potential, fruit quality, pest & diseases & other desirable agronomic characters.

Plant Pathology

Cluster onion

- Evaluation of Varietal Resistance

Onion

- Screening of fungicides for bulb rot
- Development of diseases control measures for cluster onion.

Rice

- Development of control measures for grain discoloration

Spine gourd

- Development of mass production technique
- Development of field tolerance technique for wilt caused by fungi

Soil and Water Management

Rice

- Effect of Long term application of chemical fertilizers and organic matter on crop productivity and soil fertility (ex-situ).
- Effect of Long term application of chemical fertilizers and organic matter on crop productivity and soil fertility (in-situ) under rice, legume crop rotation
- Evaluation of the effect of different organic materials with reduced dose of N, P and K on growth and yield of rice.
- Development of suitable water management package for different drainage classes of paddy fields in mahaweli system.
- Development of suitable water management package for different drainage classes of paddy fields in mahaweli systems.

Guava

- Development of suitable irrigation package under NCB condition

Other

- Evaluation of the effect of micro nutrients on growth and yield of vegetables
- Evaluation of the soil erosion and runoff under different soil conservation measures (Vetiver strips, contour drains, ridge and furrow, fallow) under NCB soils
- Introduction of suitable water management techniques for NCB soil.

STAFF LIST

Designation	No.
Deputy Director (Research)	01
Research Officer	08
Research Assistant	03
Agricultural Instructor	04
Research Sub Assistant	01
Administrative Officer (Acting)	01
State Management Assistant	02
Store Keeper	01
Driver	04
Electrician	01
Watcher	10
Tractor Operator	03
Carpenter	02
Blacksmith	01
Mason	01
Circuit Bungalow Keeper	01
Budder	01
Labourer	50
Labourer (Contract)	39
Total	134

2.1.3 REGIONAL AGRICULTURAL RESEARCH AND DEVELOPMENT CENTRE (RARDC) - KILINOHCHI

The mandate of the Regional Agriculture Research and Development Centre, Kilinochchi including its satellite stations located at Thirunevely, 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 affiliated to the FCRDI, Mahalluppalama.

Presently, the all satellite stations are functioning except Adaptive research station, Mullaitivu. The

preliminary research and development activities have been 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, Thirunevely, Agriculture Research Station, Murunkan, Regional Agriculture Research and Development Centre, Kilinochchi and Rice Research Station Paranthan.

BUDGET

Table 2.1.3.1: Annual budget -2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	3,350,000	3,328,038	99
Capital	1,875,000	728,770	39
Organic Manure Production and utilization	1,250,000	80,000	6
Total	6,475,000	4,136,808	64

PROGRESS

CROP IMPROVEMENT

Red onion

Red onion shallot type, variety –Thirunelvely Red, 320 kg breeder seed bulb produced for lateral spread. Maintained selected 3 hybrid multiplier (MH) onion for high yield and other traits. Three multiplier lines selected namely TMV-1, TMV-2, TMV-4 included in the NCVT programme.

Chilli

Eight chilli lines were evaluated to develop against thrips incidence with the varieties MI -2 and KA-2 as check. TVC- 5 gave the highest yield of 5.9 t/ha- 6.0 t/ha. Line TVC -1, TVC-3, TVC-5, and TVC-9 performed well in Jaffna district and it can be promoted for NCVT program.

Groundnut

Six lines were tested form select promising lines for different agro ecological regions. ICGV 97049

and ICGV 98396 were performed well during *Maha*2010-2011.

Blackgram

Five lines were tested for testing. Anuratha only was performed well than others in the period of *Maha*2010-2011.

Mustard

Six lines were tested with check AP26. But, check was performed well compare to other lines during *Maha*2010-2011.

Rice

Variety Adaptability Trials, NCRVT, Multi-Location and Technology Adaptation Trials

Varieties of 2½ months, 3 months and 3½ months age groups were tested in RRS/ Paranthan, ARS/ Vavuniya and ARS/ Murunkan under both rain-fed and irrigated conditions. In addition, the local variety called “Attakkari” has also been tested for the performance.

Purity Maintenance

Seventeen Land races and lines of shallot and multiplier types onion were maintained.

The following crops were cultivated to maintain their purity of the variety.

Table 2.1.3.2: Purity maintenance of crops

Crop	Variety
Brinjal	Thirunelvely purple
Bitter gourd	Thirunelvely white
Snake Gourd	Thirunelvely long
Tomato	KC - 1
Long Bean	Hawari Mea
Blackgram	Anuratha

Seed Production

The following amounts of seed were produced under Api Wavamu Rata Nagamu project.

Table 2.1.3.3: Seed production during 2011

Crop	Variety	Amount
Maize variety	Ruvan	250 kg
Finger millet	Oshada	300 kg
Green gram line	MIMB	65 kg

Breeder Seed Production

Produced the following amount of breeder seeds.

Table 2.1.3.4: Breeder seed production during 2011

Crop	Variety	Amount
Bitter Gourd	Thirunelvely white	5.6 kg
Tomato	KC-1	100g

Certified Seeds in Paddy

4387 kg certified paddy seeds were produced from Bg300 variety.

AGRONOMY

Paddy

Three age groups of the paddy were tested in the farmer field. Three months group variety At 07-800 & At 307 yielded 4.5, 4.4 t/ha respectively. Farmers' preference is for red pericarp rice.

Two salinity resistant lines, 11-139, 5-110 tested with check At 362. Salinity level was very high of 2.67ds/m & lines also performed well & yielded 2-2.5t/ha.

Vegetables

Conducted NCVT programmes on vegetables of Mae, Luffa, Amaranthus, Cucumber and Potato.

Mae

Five varieties of mae namely CM1, CM2, TVU2852, Polon Mae, Hawari Mae were tested. CM1 gave the highest pod yield 15.5t/ha & the pod length is also long, 67cm, Consumer preference is also high.

Luffa

Seven lines 10020 x In 17, 10656 x 9895, In 192338 x 10014, La 33 x TD, Naga, LA 33 were tested. Naga recorded the highest yield 69 t/ha

Amaranthus

Four lines Rathuthampala, Diyalpalagoda, Pure green & DOA green were tested Highest yield 32 t/ha recorded in line Diyalpalagoda at 4 weeks after planting and it had highest stem leaves ratio 3:2.

Cucumber

Four lines H 31, H 41, H 18,E2 with Check varieties KW and champion were tested. H 41 gave the highest yield of 25t/ha. But line H 31 had high consumer preference.

Potato

Varieties of Arnova, Golden star, AIDA, Atlas, Cal White, Red Lassoda Red, YP-03-107, Rossana, Arnova (Local) were tested. Cal White and Red lassoda were high yielders. Highest yield 456 g/plant - recorded in Cal white.

PLANT PROTECTION

Assessment of disease incidence in the heat tolerance potato varieties in the Jaffna District

Potato varieties Arnova, Golen star, AIDA, Atlas, Cal white Red lassoda, YP-03-107, Rossana were tested. Incidence of late blight disease was low in the Cal white and Red lassoda

Management of onion disease by using organic manures

Poultry manure, Goat manure, Cow dung, Gliricidia leaves. Neem leaves and inorganic fungicide Homai were tested along with control treatments. Lowest number of bulbs affected by diseases and the highest marketable yield obtained in the poultry manure.

Assessment of Little leaf Disease in Brinjal by using organic manures under Gliricidia alley cropping

Poultry Manure, Goat Manure Compost & Cow dung were tested Under alley cropping LLD was low compared to the normal cultivation, With poultry manure treatments the incidence of Little Leaf Disease was low and high in the without organic manure.

Poultry Manure, Goat Manure Compost & Cow dung were tested Under alley cropping LLD was low compared to the normal cultivation, With poultry manure treatments the incidence of Little Leaf Disease was low and high in the without organic manure.

SOIL SCIENCE

Performance of Bio Phos on Brinjal

Bio phos as an organic fertilizer compared with inorganic fertilizer in brinjal. Overall performance of the crop in the Bio-phos treatment was good and it showed highly significant in yield and 50% of the inorganic P fertilizer could be replaced by organic phosphorous.

IPNS in Chili

Chili crop was planted under the Gliricidea alley cropping and incorporated Gliricidea green manure at the rate of 25t/ha, 18.75 t/ha & 12.5t/ha with 50 & 75 % of inorganic fertilizer. Recommended inorganic fertilizer from 50 to 75 % with 50 to 75 % green manure treatment performed well in growth parameters & pod yield.

Organic fertilizer Production & Use

Produced 20 tons of compost and issued at the rate of 10 kg compost bag inoculum to 250 farmers in the Jaffna Peninsula, on free issue. 30 % of the compost utilized for research purpose 200kg sun-hemp seeds produced.

Established Green manures Gliricidia and Ipil-Ipil for green manure and compost production.

Testing of soil & water samples

Soil and water samples collected from salinity affected areas & tested for pH & EC, and remedial measures given to farmers based on the salinity level.

Soil samples collected from Agrarian Service Centre wise for fertility evaluation.

Water sample analysis was carried out in Vaddakkachchi farmers field tube well and DATC, Kilinochchi to test the suitability for irrigation.

Soil and water management

A study was done to determine the optimum basin size for Calcic Red Yellow latasol soil. Basin sizes 2m x 1m showed higher moisture of 12% at 0-20cm depth and 3mX2m size showed higher moisture % of 11 and 13.3 at 20-40cm and 40-60 cm respectively.

PURITY MAINTENANCE OF THE LOCAL VEGETABLES

Brinjal (Thirunelvely purple), Bitter gourd (Thirunelvely White), Snake Gourd (Thirunelvely

long) Tomato (K C-1) & Long Bean (Local) were maintained for purity.

MAINTENANCE OF THE FRUIT GERMPLASM

Mango (3 Villard, 3 Karuthagolumban), 14 Jak, (Local collection) 20 Banana, (Kathali, Kappal, Monthan, Emban (Ash, Green), Itharai, Cavandish Lime (Local) Sweet Orange (Bibile)

Pomegranate (Soft seeded varieties -Nimali, Daya) was maintained.

Produced 500 pomegranate seedlings & handed over to DD (Extension) to issue the farmers who settled in Kilinochchi area.

ADVISORY SERVICES

Plant samples for pest & disease received from farmers, which were diagnosed and remedial measures were given to them. Visited field problems areas and identified the problems in the spot and solutions were given.

3000 students, 250 teachers from 25 schools visited to the station & got knowledge about agric. research activities.

Established a sale unit for Departmental publications.

School from up country visited & got information's about soil testing and laboratory work

Exhibition

Conducted Agricultural exhibition at Agric Research Station/ Thirunelvely link with Agric Extension for one week

Issued seed material to other institutions for research study purpose & farmers

Chili MI Green - 3 kg

Okra TV 8 - 3 kg

Onion TV Red - 75 kg

Organic Manure production and Utilization Programme

We received the following equipment directly from the Ministry of Agriculture Development & Agrarian services under the above programme for the development of Soil Laboratory at Regional Agriculture and Development Centre, Vavuniya during the year 2011. Oven, Orbital shaker, Kjeldhal unit, Water bath, pH meter, U.V Spectrophotometer

PLAN FOR 2012

- Population dynamics evaluation against major pest of chilli
- Performance of crops under alley cropping on chilli.
- Genetic variability and association studies of Blackgram lines
- Evaluation of Blackgram lines under rainfed and irrigated conditions
- Breeder seed production of Tomato KC 1.
- Breeder seed production of Bittergourd Thinnavelly white
- Performance of Tomato inter crop with different density of cabbage
- Performance of crops under alley cropping of Tomato
- *In-situ* conservation of Onion germplasm
- Development of appropriate technology for the management of nematodes for onions
- Evaluation of botanical pesticides against the pest on Bitter gourd
- Evaluation of botanical pesticides against the pest on mae
- Breeder seed production of Thinnavelly white – Bitter Gourd
- Purification of rice land races
- Testing of salinity problem soils in rice fields
- Testing of soils & water samples, for salinity collected from problem areas of the farmers cultivating areas
- Testing of local cultivars of brinjal under farmer field condition in Jaffna Peninsula to select a suitable cultivar for high yielding & resistance to shoot & fruit borer
- Performance of crops under alley cropping of Brinjal
- Comparison of the herbal P with TSP on Brinjal
- PYT of thrips resistance chilli lines.
- Efficacy of botanical pesticides for thrips in chilli
- Intercropping of water melon with local melon.
- Performance of crops under alley cropping of cucumber
- Performance of crops under alley cropping of Red onion
- A study on weed infestation at ARS/ Field

STAFF LIST

Designation	No.
Deputy Director (Research)	01
Research Officer (Act. DDR)	02
Research Officer In Charge	01
Research Officer	04
Agricultural Instructor	10
Research Sub Assistant	02
Pump Operator	01
Watcher	02
Labourer	40
Total	62

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

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

The mandate of HORDI is to undertake demand-driven research on horticulture crops, which will be productive, eco-friendly, sustainable, economically viable and socially equitable. The research and development programs conducted by HORDI are aimed to accomplish this mandate. Other responsibilities include training of farmers, agriculture undergraduate and diploma students and conducting awareness programmes to disseminate the new technologies developed to the farming community and other stake holders.

BUDGET

Table 2.2.1: Annual Budget -2011(Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	13,072,765	13,131,601	100
Recurrent	60,572,700	57,442,972	95
Projects			
Planting material Production Programme	10,000,000	8,761,716	88
Hybrid Seed production for fruit and Vegetables	4,100,000	3,499,911	85
Production and Promotion of Organic fertilizer usage	7,527,470	9,737,587	129
ANSOFT	840,000	635,719	76
Accelerated Vegetable Production (FTF Funds)	1,108,600	918,082	83
Infrastructure Development	5,000,000	3,036,159	61
National Agricultural Research Plan NARP	10,000,000	7,483,425	75
Model Village Programme	4,100,000	2,860,091	70
Total	116,321,535	107,507,263	92

PROGRESS

PROJECTS

Hybrid Seed Production of Vegetables and fruits

Research for development of superior quality Hybrid vegetable and fruit varieties and

maintenance of parental lines of recommended varieties and production of hybrid seeds are the main activities under this program. Research have been conducted for vegetables namely tomato, brinjal, luffa, capsicum, cucumber, yard long bean, bitter gourd and fruits (Papaya).

Planting Material Production

Horticultural Crop research and development institute has its own frames and all of these have mother plant orchard of recommended fruit crop planting materials. Apart from these root and tuber crops, leafy vegetables and home garden seeds were produced under the project.

Table 2.2.2: Planting material produced during the year 2011

Fruit	Amount (Planting materials)
Rambutan	36,750
Orange	21,154
Durian	4,150
Mango	10,884
Pineapple	112,000
Pears	3,240
Mandarin	6,500
Grapes	1,972
Pomegranate	15,350
Total	212,000

Production & Promotion of Organic fertilizer

The aim of the project was to promote the usage of organic fertilizer among farmers in Sri Lanka. The main activity of the project was to produce large quantity of 'muhun' and distribute among farmers in order to initiate organic manure production in their own farm fields. By the same project, analysis of organic manure samples and raw materials used for compost making were also carried out. At the same time Integrated Plant Nutrient System (IPNS) trials were conducted to develop new packages for different crops on efficient usage of the organic manures.

Table 2.2.3: Physical out put of Organic project

Activity	Progress
No of Trainees	6178
Compost Production	445 mt
IPNS	16
Analysis of soil samples	1372
Cultivation green manure	3

Model village programme

Main objective of this program is to enhance farmer livelihood by increasing farmer awareness on best management practices on crop production and to increase their awareness on recommended crops, pest and disease identification and management practices.. Farmers at 41 villages in the districts of Kandy Kurunegala, Matale, Colombo.Kalutara, Monaragala, Nuwara Eliya, Kegall, and Matara districts were supplied with seed & planting material of vegetables and fruit crops at subsidiary rates. Farmers in these villages were exposed to the awareness programmes on updated crop production technology packages giving emphasis on vegetables and fruit crops. More than 800 farmers participated at the programme.

ANSOFT project

ANSOFT project is to promote traditional, sustainable and small organic farms in Asia. In order to strengthening the organic farming activities in Sri Lanka already identified a working group under the ANSOFT project. Steps are been taken to collect an exciting organic farming technologies among farmers and so on for compiling. Development of new technologies in relation to vegetable and fruits production in the field of organic farming mainly nutrient management and Pest and disease management are in progressing.

Accelerated Vegetable Production (FTF

Funds)

Main objective of this program is to enhance farmer livelihood by increasing vegetable production .Actually used this funds to incensed vegetable seed production in uncultivated lands at research stations under HORDI

Farm Development Project

Farm development project was conducted in Pasyala and Walpita Research Farms to develop existing cultivation and improve infra –structure facilities of the farms.

Walpita Research Farm - 2 ha mango plantation were rehabilitated, Coconut plantation (3 ha) was fertilized, exiting two net houses were repaired, establish one poly –net house, established two irrigation systems one for home garden one for root and tuber crop cultivation, pruning of existing 2 ha rambutan and mango cultivation, coconut plants were fertilized and purchase farm equipment

VEGETABLE DIVISION

The activities centered on breeding vegetable varieties for quality and yield while ensuring pest resistance. Though priority was on hybrid development, conventional breeding approaches were also utilized. Agronomic studies were

conducted as required for benefiting from the new genotypes. Development activities included the production of basic seeds in addition to dissemination of technology via various modes.

Luffa

- Identified two promising hybrids
- Genetic purity of six parental lines were maintained.
- Ten hybrids were made and seeds were obtained. (Seeds of 10 hybrids were obtained from 10 crosses)
- National Coordinated Varietal Testing (NCVT) trials were conducted at four locations.
- Varietal Adaptability Testing Trials (VATT) were conducted in three districts.

Bean and Winged bean

- NCVT trials were conducted at three locations.
- VATT trails were conducted in four districts.
- Breeder seeds of Krishna (8 kg) and SLS 44 (4 kg) Winged bean varieties were produced
- Winged bean line “M selection” was purified.
- One pole Bean Variety, “Gannoruwa Green” was nominated for varietal release.

Mae

- One Mae Variety, “Gannoruwa hawari Mae” was nominated for varietal release. Five locally developed lines were selected for adaptability studies.
- 13 hybrids were advanced to major yield trials and three have been identified as high yielders.

Brinjal

- One high yielding lenairi brinjal hybrid was nominated for release and the hybrid was released under the name of “Lenairi 1”
- Three hybrids were selected for adaptability studies

Tomato

- Seeds of Cherry tomato variety “Lanka Cherry” released recently were multiplied and distributed among interested farmers in addition issuing as breeder seeds for further multiplication.
- Further testing of the promising hybrid variety HF3 as well as the promising mutant variety M127 was undertaken to verify their adaptability.
- Exotic Tomato introductions Mongal, TM 701, F1 15043, Star 9062 and Star 9064 were identified as acceptable for commercial introduction. Two other prospective tomato varieties were deemed unsuitable for commercial importation based on field tests.
- Selection was practiced within and among lines in four segregating populations for high yield, resistance to pest and diseases and acceptable fruit characteristics in order to develop superior inbreds.

Capsicum

- Further testing of the promising hybrid variety HCA1 was undertaken to verify its adaptability.
- Evaluation of exotic varieties - Capsicum introductions 21348, HP210, FST 403 and the Jalapeno types Perfecto and Magnificio were identified as acceptable for commercial introduction. Five other prospective tomato varieties were deemed unsuitable for commercial importation upon field testing.

Cucumber

- Two cucumber F1 hybrid varieties were nominated to DUS test.
- Genetic purity of seven parental lines were maintained
- Eight F1 hybrid single crosses were made and obtained seeds.

- Following characteristics were identified as Maturity indices of salad cucumber-
- Fruit colour change from green to yellow
- Optimum fruit , circumference and fruit weight
- Fruit harvesting 11-14days after flowering
- Reduction of spine prominence

Bitter gourd

- Two bitter gourd F1 Hybrid varieties are in NCVT position
- Seven parental lines genetic purity were maintained
- Seeds were obtained from eleven F1 hybrid single crosses
- Eight Bitter gourd exotic F1 hybrid varieties evaluated

FRUITS AND TISSUE CULTURE DIVISION

Fruits

Banana

From the Banana accession evaluated for high yield good quality and Panama tolerance, three Seeni Kesel accession and one ash plantain accession were selected for further evaluation. One Embul Kesel Accession and one Seeni Kesel accession are evaluating in NCVT. The collected 37 Embon accessions were evaluated during the year. Growth and yield characters were recorded. Evaluation is in progress.

Papaya

Third generation of selected papaya accessions were evaluated and most promising 12 plants were selected for inbred production.

Hybrid seeds of papaya were produced for evaluation of the performance in dry and intermediate zones. The excessive rains damaged the crop. Planting material production was started for the evaluation in 2012.

Citrus

Fifteen local and exotic varieties were evaluated and two promising accessions were identified for further testing.

Rambutan

Effect of Calcium was studied for reducing fruit drop of Rambutan. Results showed the reduction of fruit drop when apply calcium with sulphur at flowering stage. Studies are continued.

Durian

Evaluation of durian varieties was continued. Evaluated 14 accessions and vegetative part characterization was done in 2 accessions. Five accessions produced flowers and 5 different crosses were made to find out the better cross combinations giving quality fruits. Fruit quality data was recorded in these crosses and evaluation work is going on.

Uguressa

Evaluation of the collected accessions continued during the year. One accession produced few fruits during this year since other accessions are still not started flowering and data collected on that. Further evaluation is in progress.

Mango

Different combinations of rootstocks and interstock varieties of mango is evaluating at Ulpothagama farm. Data were collected on their vegetative behavior. Some trees produced few fruits at the first bearing. Data collection is in progress-

Dragon fruit

Evaluation of different numbers of red fleshed and white fleshed dragon fruit plants per post was started. Some plants produced flowers and fruits during this year. Growth and yield performance was recorded and evaluation work is in progress.

Tissue Culture

Plant regeneration Systems

Vegetables

Tomato (*Lycopersicon esculentum*)

New callus formation media is being tested for the anther culture of tomato (var. Thilina). Experiments are being continued to haploid plant regeneration from anther derived callus.

Fruits

Banana

Development of in-vitro techniques for banana, kolikuttu

Experiment was conducted to increase the multiplication rate of kolikuttu banana under in-vitro conditions. Results showed that more than 500 plantlets could be produced from an explant.

Development of in-vitro techniques to produce pathogen-free foundation stocks of banana by meristem culture

Meristems of banana could be used for the multiplication and however the rate of regeneration is not sufficient to introduce into the production system. Further experiments are necessary to increase the rate of multiplication of banana meristems.

Grapes

Grape var. Thompson seedless was introduced to in-vitro propagation. Shoot multiplication could be observed and different hormone regimes were tested to identify proper hormone combinations. Multiplied shoots were introduced to rooting media to regenerate the complete plantlets.

Citrus

Experiments revealed that in-vitro propagation is feasible for Citrus variety Arogya with shoot tips and nodal cuttings. However, shoot formation rate was very low and experiments are continued.

Belli

Experiments are being continued to increase the in-vitro rooting efficiency of belli var. Supun.

Field evaluation of tissue cultured plantlets

- Tissue cultured Nethrampalam were established in the field for field-testing. Evaluation is in progress.
- Tissue cultured Pineapple (var. Mauritius and Kiwi) plants were established in the field for testing as some problems are raised with the taste and quality of the fruits produced from the tissue cultured planting materials. Evaluation is being continued.

ENTOMOLOGY DIVISION

Performances of a locally synthesized Neem insecticide in controlling cabbage leaf eating caterpillars.

A locally synthesized neem product that had been given the trade name as “Sithumina” was tested against cabbage leaf eating caterpillar complex along with present DOA recommendations and an untreated control. The neem product was found to be significantly effective in reducing the leaf eating caterpillar number on the cabbage crop over the untreated control and also its insecticidal performances were not significantly inferior compared to the present recommendations i.e. chlorfluazuron and neem seed water extract.

Evaluation of exotic luffa varieties for yield performances and pest and disease resistance

Eight exotic luffa hybrids were evaluated along with open pollinated DOA variety LA 33 and a popularly grown exotic hybrid variety “Naga”. Some of these varieties were tested for two seasons and some were only for one season as they were new entries. The varieties Bonanza, Sunny and 041044 have been tested for two seasons ; *yala* and *maha* and during both seasons they were identified as higher yielders. Also, they were tolerant to pests and diseases especially to virus diseases and melon fly damage compared with the recommended variety LA33. When compared the performances of above three varieties with the performances of the widely grown exotic hybrid variety “Naga” there were no considerable differences. Hence above three varieties were recommended for granting permission to import commercial seeds.

Host range identification of Horsegram Yellow Mosaic Virus (HGYMV) disease

Four vegetable legumes and six grain legumes that play a major role in Sri Lankans’ meals were selected for the study. Selected vegetable legumes were common bean (*Phaseolus vulgaris*), yard long bean (*Vigna unguiculata* sub sp. *sequipedalis*), bushitao (*Vigna unguiculata* Walp) and winged bean (*SPhocarpus tetragonelobs*) and the grain legumes were green gram (*Vigna radiata*), black gram (*Vigna mungo*), cowpea (*Vigna unguiculata*), soy bean (*Glycine max*), ground nut (*Archis hypogaea*) and horse gram (*Marcrotyloma uniflorum*). Laboratory reared white flies were used to transmit the disease to healthy crops grown in pots that have been kept inside of insect proof cages. The study showed that common bean, soy bean and horse gram were susceptible to HGYMV disease and common bean was the most preferred

legume crop by white flies. The order of preference among the susceptible crops was common bean, then soy bean followed by horse gram.

Screening of insecticide in controlling sucking pests: white flies (*Bemisia tabaci*) and leaf hoppers (*Amrasca sp.*) on brinjal and okra

Three new formulations of already recommended insecticide molecules were evaluated along with a recommended formulation (Acetamiprid 20SP), an untreated control and farmer practice against the sucking pests of brinjal and okra in two separate experiments. According to the observations of the experiments all three new formulations namely Acetamiprid 20 SL, Thiamethoxam 75 SG and Imidacloprid 70WG were significantly effective in controlling white flies (*Bemisia tabaci*) and leaf hoppers (*Amrasca sp.*); both were major sucking pests of the two crops, tested over the untreated control. However, as Thiamethoxam 75 SG and Imidacloprid 70WG have been tested only in one season (*yala*), they have to be tested in another season (*maha*). Since Acetamiprid 20 SL had been tested for two seasons (*yala* and *maha*) it can be recommended for the control of white flies and leaf hoppers.

Screening of homoeopathic natural pesticide/fertilizers for the control of bean yellowing caused by horse gram yellow mosaic virus

None of the test compound was effective in controlling the horse gram yellow mosaic virus. Also there were no considerable yield differences among the treatments including the untreated control.

Management of pests and diseases of grapes & fruit size of the variety "Thompson seedless" (NARP)

A survey had been conducted to identify the existing pests and diseases. The diseases identified were reported under the discipline of pathology.

The major pests identified were red banded thrips (*Selenothrips rubrocinctus*) and red spider mites (*Tetranychus urticae*). Effective insecticides were identified for the control of these two pests. A lepidopteron moth was emerged from the damaged ripen fruit samples collected from a grape cultivation in Kalpitiya area. However, identification of the moth up to genus/species level is yet to be done. Moreover, farmers reported that birds especially "mina" and "poloskottoruwa" were also pests of fruits of grapes.

ARS Kalipinya reported that about ten grape vines died due to unknown reasons. No pest or disease association was observed with those grape vines and therefore, investigations to find out the causal factor are being carried out. Moreover, observations on the effect of soil amendments made to get recovered the vines are being recorded. Multiplications of the planting materials of the variety "Thompson seedless" are also being carried out at HORDI, Gannoruwa to establish a new crop at ARS Kalpitiya for the above project work.

Identification of causal factors and management of passion fruit stem bulging

Nesidiocoris tenuis and two forms of suspected to be phytophagous Collembolans (Isotomidae, Oncopoduridae) were identified in association with affected passion fruit vines during the survey. Fungal pathogen ie. *Fusarium Spp.* was found in diseased plants. However, disease symptoms could not be developed by artificial inoculation with

isolated pathogen. Also, the affected plants could not be cured with the chemical treatments tested.

Laboratory evaluation of some organic preparations and plant extracts:

Under this project 21 laboratory bioassays (Aphids-4, diamond back moth (DBM)-14 and *Crociodolomia*-3) using 20 plant extracts and organic preparations were carried out. The results indicated that aqueous extract of neem leaf, japaala seed kernel (*Croton tiglium*) and sweet flag rhizome caused mortality and feeding inhibition effects on DBM larvae.

IPM compatible Insecticides and IPM packages

The following IPM compatible insecticides were nominated for recommendation based on the results of bio efficacy studies of insecticides.

- Rynaxypyr (Coragen 18.5 SC) at the rate of 1.9 ml/10 l for the control of brinjal shoots and pod borer which has not been controlled by most of the DOA recommended insecticides.
- Rynaxypyr (Coragen 18.5 SC) at the rate of 1.5 ml/10 l and Bristifuran 10EC at the rate of 15 ml/10 l for the control of cabbage leaf eating caterpillars.
- Rynaxypyr (Coragen 18.5 SC) at the rate of 1.9 ml/10 l, Vertako (69-108 g/ha; 1.5 g/10 l and spinosad (137-216 ml/ha; 3 ml/10 l for the control of bean podborers
- Tracer 45 SC (Spinosad 450 SC at 3 ml/10 l; 129-210 ml/ha), Bristifluron 10EC at 15 ml/10 l; 645-1050 ml/ha), Virtako 40 WG at 1.2 g/10 l; 52-84 g/ha Flubendiamide WG (Belt) at 2g/10 l; 86-140 g/ha and Rynaxypyr (Coragen 18.5 SC) at 3 ml/10 l; 129-210 g/ha was

nominated for recommendation against tomato fruit borers

To develop an IPM package for the control of citrus pests, initial survey was carried out to find out economically important pests. Leaf miners, leaf eating caterpillars, aphids, fruit flies were the most important pests. However fruit piercing moth, scale insects and mites emerged as economic level in some areas. Varietal evaluation against citrus pests indicated none of the tested varieties have resistance to aphids, leaf miners and leaf eating caterpillars.

Results of the study on the effect of adult age on attractancy of melon flies to protein bait, LakGro Bait indicated that 4-10 days old adults are highly attractive to protein bait while adults over 13 days are not. Therefore, when implementing DOA recommended IPM package for the control of melon flies, protein bait application should be initiated at the beginning of the flowering to obtain successful control.

A natural commercial insecticide, 'Gannoruwa Palibodha Palakaya' was tested against mushroom pests and found it's effectiveness in controlling mushroom mites as low.

Identification of causal factors and development of control measures for the new pumpkin virus disease

Leaf samples of the diseased pumpkin crop at Wariyapola and Makandura (Wayamba Province) were negative for five viruses, PRSV, ZYMV, TRSV, ToRSV and CGMMV.

Leaf samples of the diseased crop at Gannoruwa (Central province) were positive for PRSV and negative for six viruses CMV, WMV, ZYMV, TRSV, ToRSV and CGMMV. Further testing for other viruses will be done in 2012.

A field experiment was done at RARDC, Makandura to test the existing IPM package for cucurbits against pest and disease control in pumpkin, in comparison with control treatment, DOA recommendations for normal cultivation practices. The crop was heavily infested with whiteflies while thrips, aphids and cucumber beetle populations were at very low level. The existing IPM package was found less effective in reducing the virus infection in pumpkin crop.

Use of reflective polythene mulch was found as an effective control technique to reduce whitefly infestation and virus infection in pumpkin crops. In addition, reflective polythene mulch could delay the onset of virus infection. Effectiveness of yellow sticky traps alone was low.

Imidacloprid 70%WS was found as effective alternative for seed treatment in pumpkin to protect the crop from early infestations by whiteflies, aphids, thrips and hoppers. Further studies to confirm the results will be done in 2012.

Testing candidate insecticides for registration purpose

The test insecticide, Thiamethoxam 25%WDG from a new source was found effective in controlling aphids, whiteflies and thrips causing leaf curl complex in capsicum. The insecticide, Acephate 75%SP when used against leaf hoppers was found less effective and increased the population of a non-target insect pest, thrips. Further studies to confirm the results will be done in 2012.

One laboratory experiment was conducted to develop a protocol to test banana cultivars/varieties for resistance against banana weevils. Experiment is in progress.

Identification of causal factors and development of control measures for a new pest problem of ginger

A new pest, Ginger rhizome fly, *Mimegralla coeruleifrons* was identified causing heavy damage to ginger crops in Sri Lanka. A complex situation was observed in the damaged fields as soil fungi, nematodes and mites were also associated with the rhizomes that damaged by the pest which eventually resulting the rhizomes to be rotten. Five insecticides, imidacloprid, carbosulphan, chlorpyrifos, novaluron and etofenprox were tested against the pest in farmers fields. None of the test insecticides were effective in controlling the crop damage.

New pest damages diagnosed

- A new pest of ginger, Ginger rhizome fly, *Mimegralla coeruleifrons* was identified damaging ginger crops in Sri Lanka for the first time.
- A thrip species damaging mushrooms was observed at Bambaradeniya. This is the first report of thrips damage on mushrooms in Sri Lanka.

PLANT PATHOLOGY, MICROBIOLOGY & MUSHROOM DIVISION

Major activities of this division are identification of plant diseases, development of integrated disease management packages, fungicides screening, seed and plant health test, advisory service for disease control and development of improved technologies for oyster, straw and milky mushrooms. New technologies are disseminated by training classes, plant clinics, leaflets, research papers published.

Screening of exotic hybrids for resistance to bacteria wilt

Twenty one tomato, twelve brinjal and three capsicum hybrids imported from various countries were screened for resistance to bacteria wilt caused by *Ralstonia solanacearum*. Some exotic varieties of tomato, brinjal and capsicum showed moderate resistance to bacterial wilt disease are further being tested for their adaptability and yield performance prior to recommendation for local cultivation.

Inspection and laboratory testing of seed potato consignments

Diseases such as black scurf caused by *Rhizoctonia solani*, silver scurf caused by *Helminthosporium solani* and common and netted scab caused by *Streptomyces* species were observed on tubers of seed potato lots where as rubbery rot caused by *Geotrichum candidum* observed rarely. However, all seed lots were accepted for cultivation in farmers' field as disease incidences did not exceed the permissible limits.

Disease diagnosis and advisory service for disease management of crops

Over 375 disease affected plant samples including fruit crops, vegetables, tubers, condiments, spices, ornamentals and other field crops received from farmer fields and private farms through different sources were clinically tested for diagnosis of any disease associated with samples. Among the fungal diseases, root rot, leaf spots, mildew and anthracnose were commonly observed in fruit and vegetable cultivations in many locations. Bacterial wilt disease caused by *Erwinia tracheiphila* of bitter gourd was reported in several locations. Leaf blight of cabbage caused by *Xanthomonas campestris* was identified as severe problem of all varieties of cabbage in most of the cabbage

cultivating areas. Powdery scab caused by *Spongospora subterranean* was reported in seed potato farms in Nuwaraeliya. Among the virus diseases, cucurbits virus complex (CMV, PRSV, CGMMV) Bean mosaic virus, Papaya ringspot virus were commonly observed in most of the locations. Exotic varieties of luffa and bitter gourd hybrids were severely infected with CMV, CGMMV and leaf curl viruses observed in Hambanthota District.

Virus detection by ELISA test

ELISA test was performed for precise identification of viruses in imported hybrid seeds and planting materials, seed health test and virus control strategies for crop cultivation. Out of 75 ELISA tests, two tests were found positive for CGMMV in cucurbit samples.

Evaluation of bio-efficacy of new fungicides against Banana sigatoka disease

Three new fungicides were evaluated and compared with currently recommended fungicides Chorothonil 500g/l SC (Daconil) and Tebuconazole (Folicur) against banana sigatoka disease. Three fungicides, Flutrifol 25 SC at 10ml/10 l, Kaligreen at 40g/10l and Amister at 10ml/10 l were effective in controlling banana sigatoka disease.

Evaluation of bio-efficacy of new fungicides against blight diseases of tomato

Two systemic fungicides were evaluated and compared with currently recommended fungicide RidomilMZ 72WP against blight diseases of tomato. Two fungicides Moltovin (tribasic copper sulfate 345g/L+ cymoxanil 35 g/L) and Topsin (thiophanate methyl 70% wp) were effective in controlling blight diseases of tomato.

Evaluation of bio-efficacy of new fungicides against capsicum anthracnose

Six different new fungicides were evaluated and compared with reference fungicide Thiophanate - methyl 70% WP against capsicum anthracnose under natural infections.

Four fungicides, Amistar (at the rate of 10ml/10l), Nativo 75 WG (at 6g/10l), Cabriotop (at 20g/10l) and Fluzinam 500g/1SC (at 10ml/10l) can be effectively used to control anthracnose of capsicum and were recommended for pilot scale testing for further evaluation.

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

The two new fungicides were evaluated along with the reference fungicide (Ridomil MZ 72 WP) in cucurbits growing areas at Walewela, Matale during October – December 2011. Both Cabriotop (Metiram 55%+pyraclostrobin5%) and Amistar were equally effective with recommended fungicide, Ridomil (Mancozeb64% WP + Metalaxyl 8%).

Management of Grape diseases

Field survey and laboratory tests indicated that anthracnose disease caused by *Collectotriehum sp.*, downy mildew caused by *Plasmopara sp.*, powdery mildew caused by *Uncinula sp.*, rust disease caused by *Puccinia sp.*, stem blight caused by *Phomopsis sp.* and root rot caused by *Fusarium sp.* are the major diseases associated with grape cultivations in the dry zone of Sri Lanka.

Management of stem bulging disease of passion fruit

Field survey and laboratory test indicated that fungal pathogen *Fusarium sp.* was associated with the stem-bulging disease of passion fruit.

Technology for low cost method for spawn production

Low cost method comprising of sugar instead of glucose, rice bran instead of paddy grains has been developed for spawn production. It was introduced to spawn producers. Technical leaflet has also been completed.

Technology for oyster mushroom cultivation using paddy straw substrate

Technology has been developed for cultivation of oyster mushroom using paddy straw as substrate which is readily available and cheap. Technology was transferred to 642 farmers.

New Disease reported

Spread of new disease through dragon fruit plants imported into Sri Lanka

Special technical committee investigated the above problem and submitted a report with necessary recommendations for the disease control. New disease was identified as stem spots of dragon fruit caused by fungal pathogen *Botryosphaeria dothidea* in all the tested samples. *Botryosphaeria dothidea* is difficult to control by presently recommended fungicides. Several diseased plants showed bacterial symptoms caused by *Xanthomona sp.* and another fungal disease caused by *Colletotrichum sp.* It was observed that the disease incidence was severe and 100% infestation was noticed in majority of the cultivations. It is suspected that the disease was carried through the planting material imported from Thailand by a private company. Therefore it is necessary to strictly implement the plant quarantine measures and to prevent the unauthorized importation of planting materials.

Bacterial wilt of Cucurbits

Bacterial wilt disease caused by *Erwinia tracheiphila* of bitter melon was reported at several locations. This disease is transmitted by several cucumber beetle species and there is possibility of spreading of the diseases and becoming epidemic in future.

Research Projects Conducted in 2011

Effect of irradiated chitin (chitosan) on growth of pathogenic fungi

Chitosan is a natural polymer derived from chitin, a structural component of fungi, insect and crustaceans. Some chitosan molecules, which ranged 70 KDa – 250 KDa molecular weights have antifungal activity against pathogenic fungi and other oligomers have plant growth promoting ability. The objective of the studies was to investigate the diseases controlling and yield improvement ability of locally produced chitosan compounds. Research revealed that application of some chitosan molecules control most of the plant pathogenic fungi species. Seed treatment and alternative spraying (optimum concentration 300ppm) of selected chitosan molecules controlled diseases leaf spot diseases and increased yield of tomato in the field.

Efficacy of *Trichoderma* as a bio control agent and the production of inoculum

The objectives of this project activities were identify effective bio control agent of *Trichoderma* and development of inoculum production technology to produced *Trichoderma* inoculum in commercial scale for controlling fungal diseases in organic agriculture systems. Two isolates of

Trichoderma were identified as effective bio control agents for soil and foliar fungal pathogens and 100 packets of inoculum were prepared in talc based carrier medium for continuation of the studies in year 2012.

AGRICULTURAL CHEMISTRY DIVISION

Main functions of the chemistry division are conducting research on soil fertility, plant nutrient management and organic farming. In addition chemistry division promotes farmers on soil test based fertilizer application for horticultural crops. Further, it provides analytical services on request for soil, plant, water, chemical fertilizer manures and provides advices on the use of the same. The division also undertake training programme in relation to soil and fertilizers, organic farming and other soil fertility related topics for farmers, extension workers and interested public personals.

Nutrient Management of Organic Vegetable Crops

The effect of different nutrient management practices on organic vegetable yield was tested. Highest fruit yield of capsicum (10.7 t/ha) was reported in Green manure + Compost + compost tea spray treatment and followed by Green manure + compost application treatment. Highest total yield of (49.6 t/ha) cabbage in Yala season was found in Green manure + Compost application. Application of green manures at the rate of 21 t/ha in addition to compost is beneficial in organic farming. The application of Burnt Rice Husk in addition to the compost and Green manure failed to improve the crop yield.

Continuous Application of compost

During the period of 23 seasons, different vegetable crops continuously grown in large plots treated with recommended NPK fertilizers, 40t/ha

compost and recommended NPK + 40t/ha compost respectively. Integrated use of compost + NPK fertilizer gave higher yield than compost only application. Application of inorganic fertilizer alone gave the lowest yield indicating the value of adding organic manure together with inorganic fertilizers. Integrated use of organic manure with inorganic fertilizer may be attributed not only nutrients supplied but also to the many beneficial effects that organic manure are known to impart to the soil – plant system.

Different nutrient sources on organic vegetable yield

The effectiveness of different types of nutrient sources (Cattle manure, Poultry manure, vermicompost, compost and DOA recommended NPK) were tested on vegetable yield in mix cropping (Cabbage, Bush Bean and Beet Root). Poultry manure @ 20t/ha, proved the most effective source on vegetable yield while compost @ 40t/ha was equivalent. Crop yield obtained using Vermicompost @ 20 t /ha was lower to recommended NPK treatment.

Comparison of nitrate content in organically and conventionally grown leafy vegetables

Nitrate contents of some leafy vegetable crops grown under organic and conventional farming systems were tested. Results showed that the nitrate content of Gotukola grown under two systems were statistically comparable both on fresh and dry weight basis. However, kangkung and mukunuwenna showed significantly higher NO³⁻ contents when grown in conventional system than in the organic farming system. However, all levels were within accepted limits. Continuous monitoring and advising farmers accordingly on proper fertilizer management practices will help to maintain the nitrate levels in leafy vegetables within acceptable limits.

Study on heavy metal status in Phosphate fertilizers use in Sri Lanka

Heavy metal contents in phosphate fertilizers imported from different countries were tested. Phosphate fertilizers from different countries contained appreciable amounts of certain heavy metals (Fe, Cu, Mn, Zn, Cd, Pb. and Cr) as impurities. Highest concentration of Fe and Cu was found in samples imported from Emirates. Samples from Lebanon showed highest Zn content and TSP from Egypt showed highest Mn content. Highest concentrations of Cd, Pb and Cr was found in samples imported from Lebanon while the lowest concentration of those elements were found in samples from Emirates. This study will be continued.

Study on secondary and micro nutrient status of green manures

This study was conducted to determine secondary and micro nutrient contents in commonly use green manures in Sri Lanka. Different green manure samples from different areas in Sri Lanka were tested. Results showed that highest Fe content was found in Grithilla leaves and followed by Mara leaves (*Samania saman*). With respect to the Cu content stems of the Kekuna (*Aleurites moluccana*) plant gave highest concentration while Wetaenderu (*Jatropha curcus*) leaves ranked next best. Keppetiyia (*Croton laccifer*) leaves gave highest Mn concentration and next were Gahala leaves (*Mikania cordata*). Naththasooriya (*Tithonia diversifolia*) leaves gave highest Zn content. This study will be continued for further sample collection and analysis with more samples.

Study on micronutrient status of soil in different cropping systems

Micronutrient contents in soils from different cropping systems (Rice-Rice, Rice – Vegetable and Intensive vegetable cultivation systems) were

studied. Results of soil from three locations showed that soils from Marassana area (Rice-Vegetable) contained the highest amount of available micronutrients while the lowest contents were found in Matala area (Rice- vegetable). This study will be continued.

ROOT & TUBER CROPS, FLORICULTURE AND HOME GARDEN DIVISION

Root & Tuber

Sweet potato

- Selected sweet potato varieties (Malaysian, Pallepola, HORDI C-5 and Gannoruwa red) were evaluated in two consecutive seasons in replicated yield trials and the new variety Malaysian out yielded the HORDI C-5 and all the other varieties. It gave high yield (> 35t/ha) with good quality with attractive red skin colour, white flesh and short age. A NCVT programme has been started in six locations with this variety.
- CIP lines with high dry matter content were evaluated. CIP 440186 had given significantly high yields with good quality.
- Out of the eleven salt tolerant CIP lines three salt tolerant CIP lines namely 199076-1, 440262-1 and 440183 had given high yields in varietal screening trial. These lines will be evaluated in replicated yield trial in saline areas to select the promising lines suitable for saline areas.

Cassava

A new variety HORDI 6 having high yields and marketing qualities such as well developed root tuber with long stalk and attractive skin colours

(brown outer skin and pinkish inner skin) This variety was released officially with the name HORDI Mu 1 by the Varietal Release Committee in Jan 2012.

Floriculture & Home Gardening

Floriculture program of HORDI is focused on addressing problem related to floriculture in various discipline. The Home garden research and development program is conducted to develop cultivation techniques for home garden crops which can be adapted to general public (mainly to who are no traditional farmers) and to identify adaptable crops to home garden conditions. In addition, knowledge dissemination on home gardening, Conservation and multiplication of specific crops for home gardens and distribution of planting materials of them are among the objectives of home gardening program of HORDI.

- Ornamentally potential wild flora were collected and maintained. Two new wild ornamentals and 4 exotic Gerbera hybrids were added to the collection.
- A growth medium that developed using crushed *Pinus* leaves was successfully used in Gerbera and tomato cultivation in poly tunnels for three consecutive years. Findings are ready to publish in 2012.
- Fifteen crops which were already identified as suitable crops for home gardens were multiplied and seeds were stored for distribution. The crops and seed quantity produced as follows.

Table 2.2.4: Quantities of seeds produced during 2011

Crop	Seed quantity
Giant Spinach	4.5 kg
Brinjal –Akurassa Batu	2 kg
Brinjal- Bittara Batu	3.4 kg
Brinjal- Sudu thalana batu	2.5 kg
Brinjal- Ahas Batu	1.6 kg
Wing Bean- purple	4.5 kg
Alanga	2.5 kg
Wing Bean- Green	1.25 kg
Wing Bean- October	0.5 kg
Okra- Gewathu ath dala	4 kg
Okra- Red	6.5 kg
Yoda Sudu Kochchi (<i>Capsicum fruticens</i> - white)	2.2 kg
Yoda Kola Kochchi (<i>Capsicum fruticens</i> - green)	1.75 kg
Amaranthus	2.5 kg
Gewathu Chilli	3.1 kg

- A cultivation technique to produce Savandera (*Chrysopogon zizanioides*) roots for hair oil industry through Hydroponic culture were developed and published in ASDA 2011.(Please see the publications list).
- Study of effect of Plant growth regulators (Cloromaquat chloride 750ppm) on the yield and seed number of determinate and semi determinate type tomato varieties were conducted. According to the results yield of

semi determinate tomato (Thilina) has increased in 8-10% and effect to seed number was not significant.

- Cultivation method of sweet potato for home garden situation in Poly sack bags was studied. The yield in sweet potato cultivated in bags (with the support for climbing) was six times higher than the conventional ridge cultivation method.
- Five new crops were introduced to home garden crop collection as two lab bean varieties, two lima bean varieties and one Canavalia species.
- Suitability of new chili hybrid variety which was given by a commercial seed importer was evaluated for poly tunnel growing. The given variety gave 310g /month/ plant yield but showed 40% susceptible to bacterial wilt.

EXTENSION, ECONOMICS AND DATA MANAGEMENT DIVISION

This division is responsible for coordinating / conducting of technology transfer activities and research and development activities related to information technology including data management, economics, GIS and remote sensing.

Research Activities

Geographic Information Systems (GIS) for Exploration and Consecration of Under-Utilized Fruits in Sri Lanka

High agro-ecological diversity of Sri Lanka has resulted high biological diversity in fauna and flora. Each geographic area is eco-geographically unique and provides a unique range of constraints that define patterns of genetic diversity associated with particular geographic locations. For evaluation of present status and map potential areas of under-

utilized fruit species, 3219 location of 30 fruit species collected through field investigations, data recorded by different authorities and herbarium records were utilized. Ecological Niche Modeling (ENM) using BIOCLIM model was performed with DIVA GIS and Flora Map software for development of potential area maps. The potential area map gives the probable distribution of each fruit species as a probability score. The map pair generated through both software showed comparable probability values for most fruit species. The information can be used to find priority exploration regions for further investigations, conservation and utilization planning and also provide better input for future promotion of underutilized fruits in Sri Lanka.

Technology Adoption and Profitability of Potato Cultivation in Nuwara Eliya Sri Lanka: an Index Based Approach

This study was planned to evaluate the farm level technology adoption and problems associated with potato cultivation in Nuwara Eliya district. Further, attempts were extended to evaluate the profitability of potato cultivation. The data were collected from 55 potato farmers and 13 extension officers by using two separate questionnaires during May to June 2011. Both descriptive and inferential statistics were used to analyze the data. Composite Recommended Technology Adoption Index (RTAI) was used for evaluating technology adaption level which ranged between 0.58 and 0.79 revealing that the technology adoption was more than 50% for potato farmers in the study area and still there is room for expansion. To determine the profitability of potato cultivation in Nuwara Eliya district, Benefit Cost Ratio (BCR) was evaluated and it was not profitable for 48% of the farmers.

The study found a significant correlation between technology adoption level and the potato yield.

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

The spatial distribution of crop cultivated area is vital requirement for national as well as regional level agriculture planning. The objective of this study is to evaluate the ability of time series satellite data for delineation of land under different crops and evaluation of cropping patterns. Initially, low resolution free downloadable satellite data will be used to test ability of using different types of vegetation indices for this purpose. Satellite data (10-day interval MODIS data (1km resolution) for 2009 and 2010 (72 Island coverage images) were evaluated. The results found that 1km resolution satellite data is good for crops cultivated in large spatial coverage (ex paddy in Ampara and Polonnaruwa district).

Problems associated with the adoption of recommended agriculture practices in vegetable cultivation in Nuwara Eliya district of Sri Lanka

Although there are many recommended technologies, there is a considerable gap between average and potential yield. The poor adaption of the recommended technologies was considered

as one of the reasons for this yield gap. This study was carried out in Nuwara Eliya district which covers three climatic zones to find out the adoption level of recommended agriculture practices and evaluate the technical economical and social problems associated with vegetable production. Recommended Technology Adaption Index (RTAI) was developed for evaluation of technology adaption levels. The study was focused

on Carrot, Beet, leek and cabbage According to the RTAI the average technology adaption level were 0.56, 0.599, 0.61 and 0.599 for the carrot, beet, leek and cabbage respectively. The up country wet zone had the highest technology adaption level. The positive significant correlation between RTAI and farmer yield was found. Proper interventions to increase farmer knowledge on improved technology may lead to increase vegetable production and farmer livelihood in Nuwara Eliya district.

Evaluation of Agrochemical use patterns of Vegetable Farmers in Matale District

Indiscriminate use of pesticides and fertilizers in vegetable farming has been reported in Sri Lanka and many other countries during the recent past. However, the information on the quantitative evidence on chemical and fertilizer usage levels in vegetable production is meager. This study was planned to evaluate the level of chemicals and fertilizer usage taking DOA recommendations as the reference. The study was conducted using pre-tested questionnaire with 140 vegetable farmers belongs to 8 Agrarian divisions of Matale District. Results indicated that farmers apply fertilizers at levels higher than recommended dosages. Urea is over dosed more than TSP and MOP. Farmers overuse fertilizer for imported varieties in particular. Although, farmers applied excess dosage of pesticides on imported varieties, high priced agrochemicals had fewer tendency to be over used. Over dosage application of agrochemicals was low with in large-scale farmers with an extent > 1ha in the Study area.

Undergraduate Students' Research Projects

Two undergraduate students from the Wayamba University have completed their final year research projects

Agriculture Museum

The agriculture museums keep open during 8.30 am to 4.15 pm on every office day and government holydays on request. The exhibits include traditional agriculture equipments & implements, models of traditional storage structures. In addition displaying the exhibits, the museum provides information on traditional agriculture. In 2011, 2113 leaflets on "Kamath Bashawa" and words used in traditional Sri Lankan agriculture were distributed. A wide range of visitors of different interests visits the agriculture museum daily.

Number of visitors came to agriculture museum

School children - 53165

School teachers - 4218

Farmers - 15017

Government officers - 1824

University students - 817

Foreigners - 51

Other – 1953

CENTRAL LIBRARY

Main Agriculture Library of Sri Lanka Holds old and new Publications of several local and foreign journals, book-related to many agricultural fields and have literature retrieval facility with CD-ROM.

- More than 251 foreign periodicals were received thought the year as complimentary copies and on exchange basis. In addition Library paid 5000 Sterling Pounds as annual

subscription to Commonwealth Agricultural Bureau International (CABI).

- More than 980 users visited the library to acquire information. About 810 books were circulated among library members. Regular reader services and 26 Inter Library Loan Schemes were provided.
- Over 48 retrospective searches were made as the request of the Research Officers. About 28 searches were done through the assistance of CARP. User seminar was held for the research officers of the department.
- About 150 Research Officers obtained information using Internet facilities. AGRIS CD-ROM System also helped them to get current information and we have succeeded to update WEBAGRIS database with the latest Sri Lankan agricultural information of Annals of the Sri Lankan Department of Agriculture Journal and Tropical Agriculturist Journal articles. In addition, we are able to export agricultural data to National Agricultural Bibliography of 2011.
- AGRINET Content Pages Service (SDCP) was continued and more than 120 Content Pages were distributed among department users.
- The Central Library distributed the Tropical Agriculturists Journal to local and foreign institutions during 2011 (Vol. 157,158) and provided inputs as more than 800 articles and 2800 books to the PURNA database.

DEVELOPMENT & TECHNOLOGY TRANSFER ACTIVITIES

VEGETABLE DIVISION

Evaluation of exotic vegetable varieties

A large number of vegetable varieties forwarded by commercial seed importers as prospective commercial introductions were evaluated. The following numbers of varieties were found acceptable or unacceptable with regard to pest and disease tolerance and quality and quantity of yield.

Table 2.2.5: Exotic vegetable varieties evaluated

Crop	No. Accepted	No. rejected
Brinjal	2	2
Capicum	8	5
Tomato	5	2
Luffa	4	1
Cucumber	3	7
Water Melon	-	3
Musk Melon	-	1
Bitter gourd	4	-
Pumpkin	1	-
Pole bean	1	1
Bush bean	1	-
Carrot	-	2
Cabbage	4	1
Lettuce	4	-
Radish	2	-
Beet	1	-

Breeder seed production

- Breeder seed of Tomato varieties Ravi and Lanka Cherry and radish variety Beeralu were produced. Parental varieties required for hybrid seed production of tomato varieties Bathiya and Maheshi were also provided to Private Seed Companies.
- Pure seeds of Polon mae 20.5kg and Hawari mae 4.25 kg were handed over to the seed division

Other activities

- Model village programme – Contributed to the model village programmes at Marassana, Galewela and Kambiliwewa by way of conducting demonstrations, supplying seeds of improved varieties, conducting adaptability trials and farmer training.
- Training- Contributed to eight officer training programmes on vegetable production as resource persons. In-plant training was provided on vegetable research to two 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 (100 beneficiaries), replying farmer inquiries by letter or over telephone (100), leaflets (2) and contributing to agricultural exhibitions (2). A large number of seed samples of newly released tomato and capsicum varieties have been distributed among farmers (150).
- Permanent Crop Clinic Committees programme
 - Crop clinic committees were established in 3 districts with 36 crop clinic committees

- About 200 crop clinics have been conducted

- Undergraduate Student's Research Projects - 07
- Agriculture diploma Students Training - 09

Technology Transfer Activities

- 02 research publications
- 10 paper articles
- 57 farmer and officer trainings
- 12 special presentations
- 75 farmer problems solved
- 1 field day conducted
- Participation for two exhibitions
- Established four model villages- Pitiyegama and Diyagama in Gampaha District and Walpita and Meevitiya in Gampaha District.

Planting material production programme of HORDI Farms

Conducted 5 training programmes for 100 officers, 4 training programmes for students, 10 training programmes for 500 farmers

Supervised 2 university students and 1 diploma student for their research projects.

Conducted 1 radio programme – Kandurata FM

Development activities

Purchasing of Laboratory equipments for mass scale planting material production.

Renovation of tissue culture laboratory and new culture room was established with whole facilities

Net house was constructed for planting material production

**FRUITS AND TISSUE CULTURE
DIVISION**

Production of Basic Planting Materials

by in-vitro propagation

Number of basic planting materials produced by in-vitro propagation is inditing in table 2.2.6

Table 2.2.6: No. of planting materials produced

Crop	Variety	Plants		Total
		In-vitro	Plant House	
Banana	Ambun	246	305	551
	Dwarf Ambun	87	-	87
	Pulathisi	12	27	39
	Rathambala	200	46	246
	Seeni kesel	--	05 (mother plants)	05
	Nethrampalam	1000	67	1067
	Kolikuttu	800	-	800
Pineapple	Mauritius	1500	2000	3500
	Kew	160	106	266
Beli	Supun	420	-	420

Training

- Supervised projects 4 (1 university student and 3 NDT)
- Farmer training -300 farmers
- Advisory services- 152 personnel
- More than 150 cultivation problems solved and gave necessary advice for the farmers visited and over the telephone

2 months training for 2 NDA students

Exhibitions:

Supplied exhibits for two exhibitions for Deyata kirula.2011 at Buttala and Kundasala.

Extension works

One day training programs & advisory services – (for 40 persons)

Lectures – 02 lecture for university students.

Advisory services –52 persons

Supervised projects – 01 completed (with university students). One paper was published on micropropagation of kolikuttu in Research symposium – 2011 of the University of Uwa Wellassa.

**ROOT & TUBER CROPS
FLORICULTURE**

**Planting material production project –
Root and tuber crops**

Main objective of this program includes increase the availability of high quality planting material of the recommended (new improved) varieties of the root and tuber crops.

Under this project root and tuber crops have been planted accordingly to meet the target of this project. Already more than 35,000 basic planting material have been distributed to different clients.

Model village Project

Contributed to the model village programmes by establishing five demonstration blocks in Kegalle and five demonstration blocks in Dambulla by supplying inputs and by conducting farmer training classes.

Two exhibitions were conducted

Dayata Kirulla- Buttala

Govi Sathiya - Vavuniya

Radio programme and Training

Programmes

A radio programme was conducted in SLBC National Service (Tamil) on Root and tuber crops

cultivation on 14-10-2011. Two pre seasonal training programmes were conducted in ISTI, Gannoruwa and ISTI, Rajawake.

Other communication related activities including inspection of farmer fields and advice on better cultural practices, replying farmer inquiries by letter or over the telephone etc were conducted (beneficiaries 200).

Prepared a guideline with recent informations on Root and Tuber crops cultivation (Cassava, Sweet potato, Kiriala, Dioscorea and Innala) to be published in Techno guide which is going to be revised.

ENTOMOLOGY

Table 2.2.7: Progress of activities conducted during 2011

Activity	Total No.
Laboratory diagnosis	147
Number of new pest problems identified	06
Special field diagnostic visits	11
Training classes for farmers	22
Training classes for officers	21
Number of plant clinics participated as a resource person	04
Number of letters replied to address the problems	06
Number of telephone calls answered with regard to problems	89
Seminars on IPM	05
Beekeeping	
Number of letters replied	21
Number of bee colonies established	45
Number of workshops conducted	01
Number of farmers assisted in establishing new bee colonies	52
Number of News paper articles and Leaflets published	03
Number of people visited the Insect Zoo	18,534

PATHOLOGY & MUSHROOM

1081 personnel were trained on oyster mushroom cultivation and 190 certificates were issued for registration as small scale mushroom produces.

70 personnel were trained on paddy straw mushroom cultivation while 62 personnel were trained on mushroom spawn production.

Advices given to 28 farmers by post, 984 through telephone and 649 farmers visit to HORDI (total 1661)

Disseminated mushroom cultivation technologies for 20 G.C.E. (AL) students on their “Kewala project”.

- 82 university students were trained on mushroom cultivation and spawn production. (Jaffna & Kalaniya)
- Assist to Agriculture Diploma student for his project. (Ampara)
- Two exhibitions were conducted.
- Dayata Kirula-Buthttala
- Govi sathiya–Vavuniya
- Posters and exhibits were given to three exhibitions conducted by D.D. officer Mannar & Gampaha and High Education Institute Kuliypitiya.
- Practical training workshops were conducted mushroom cultivation & spawn production with the involvement of different non-government and government organizations as follows
 - Agro Enterprise Development & Information Service Department of Agriculture 30 personnel were trained
 - ISTI, Mahallupallama - 30 personnel were trained
 - ADA office Kegalle - 41 personnel were trained
 - IFAD - 87 were trained

- AGA office Milleniya-31 personnel were trained
- Hadabema-34 personnel were trained
- Unawatuna teacher training-38 personnel were trained
- Participatory technology dissemination activities via electronic media
- Three radio programs - Oyster mushroom cultivation in paddy straw, value added products from dried mushroom (Kandurata service- “Aswanna “(live) & sandaya service) and one T.V (Ranatuwa) programmes were conducted. Paper article (Oyster mushroom cultivation) was published in Ragna news paper
- Mushroom production unit was established at school of Agriculture Vavuniya
- Distribution of 294 packet of paddy straw mushroom, 32 packet of oyster mushroom spawns to strengthening cultivation of paddy straw mushroom and oyster mushroom among farmers.

AGRICULTURAL CHEMISTRY

Soil fertility evaluation programme in

Different cropping systems in Sri Lanka

This study was conducted to assessment of the soil fertility parameters associated with different cropping systems at selected ASC division covering all the districts Sri Lanka. Sample collection was almost completed and analysis will be progressing. This study is coordinated by Division of Soil chemistry Division, HORDI and soil sampling and analysis were conducted by all the Institutions of Department of Agriculture.

Analytical Services

During the year 2011, about 2000 soil, 200 water samples, 27 plant samples and 100 compost samples were analysed and reports were submitted. It is noted that number of soil samples received for

analysis is o the rise during the year 2011 as opposed to previous years. The revenue collected during the year from these analytical services amounts to Rs. 168,830.00 (Rupees one hundred sixty eight thousand eight hundred and thirty).

Students' projects

Two undergraduate students from the University of Peradeniya and one student from University of Sabaragamuwa have completed their final year projects. In addition three students from Hardy Advanced Technological in Agriculture from Ampara and four students from National Apprentice and Industrial Training Authority have completed their in plant Training..

FLORICULTURE

- 4500 seed packets for home gardening was distributed among the officers and Farmers who trained by the division.
- Seed for 4000 home garden seed packets were stored in the division to distribute among public.
 - 42 training work shops on home gardening were conducted to Facilitators and beneficiaries of Divi naguma program.
 - Modal home garden at HORDI was maintained attractive manner through out the year.

EXTENSION, ECONOMICS AND DATA MANAGEMENT DIVISION Technology Transfer Activities

- Co – ordination of 75340 visitors
- written answers for technical inquires – 312
- School children – 28317
- Farmers – 5982
- Farmer group training programs – 2

- Coordination of group programs for other institutions – 5
- Foreigners group awareness programs - 2
- School teachers– 110
- Government officers–60
- Higher education students–205
- Individual persons–395
- Answering to letters– 47
- Dissemination of new technology by issuing 5345 advisory leaflets.
- Technical advises for 903 telephone inquires
- Preparation of HORDI research highlights book
- Design and preparation of technical bulletins & leaflets – 4

PLAN FOR 2011

Vegetables

Tomato

- Tomato varietal development via heterosis breeding
 - Production of F1 hybrids
 - Testing of F1 hybrids in variety trials
 - Parental maintenance
- Tomato varietal development via inbred development
 - Selection and evaluation
- Evaluation of tomato introductions
 - Evaluation of exotic varieties
- Breeder seed production of tomato varieties
- Promotion of newly released varieties
 - Awareness programmes on new varieties

Capsicum

- Capsicum varietal development via heterosis breeding
 - Production of F1 hybrids
 - Testing of F1 hybrids in variety trials

- Parental maintenance
- Evaluation of tomato introductions
 - Evaluation of exotic varieties
- Breeder seed production of tomato varieties
- Purification and seed production of promising “Nye Miris” types

Yard Long Bean

- Development of desirable OP Varieties
- Development of desirable hybrids

Brinjal

- Development of desirable brinjal hybrids
- Seed production of parental lines of released and promising hybrids

Leafy Vegetables

Seed and planting material production of various leafy vegetables

- Bitter gourd & cucumber Germplasm purification
- Bitter gourd & cucumber Hybridization
- Bitter gourd & cucumber screening of hybrids
- Testing of promising varieties in different environments (NCVT & VAT)
- Evaluation of exotic F1 Bitter gourd varieties
- Purification of pumpkin variety
- Seed multiplication & submission of pumpkin variety to variety release committee
- Breeder seed production of Matale green, Polon mae, Hawari mae, Sena and Panduru
- Polon mae
- Luffa Germplasm evaluation and purification
- Luffa Hybridization
- Luffa screening of hybrids

- Testing promising varieties in different environments (NCVT, Luffa)
- Maintenance of populations from bean crosses
- Testing promising varieties in different environments (NCVT, pole bean)
- NCVT (Pole bean)
- Winged bean Screening of germplasm
- Molecular characterization of bean germplasm and identifying markers linked with rust resistance
- Identifying markers linked with BW resistance in tomato Variety, KWR
- Breeder seed production (two winged bean varieties)

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
- Hybridization and selection of dragon fruit to develop quality high yielding varieties
- Effect of inter stock and rootstock variety on dwarfing of mango
- Exploration, conservation and evaluation of Embon banana accessions to identify high yielding and quality varieties
- Development of papaw hybrids using available inbred lines and evaluation of hybrids for yield and other qualities
- Establishment of one model villages.
- Development of two research farms and planting material production.

- Development of high yielding, good quality and disease resistant banana varieties through induced mutation.
- Selection of high yielding, good quality and disease tolerant banana germplasm.
- Development of high yielding, good quality rambutan varieties through induced mutation.
- Development of high yielding, good quality papaya varieties/hybrids
- Development of package of practices to improve yield and quality of rambutan
- Study 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

- Continuation of varietal development programmes in sweet potato and manioc
 - Varietal evaluation of high salt tolerant, high carotene content and high dry matter content 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
 - Germplasms maintenance of all the root and tuber crops
 - Dissemination of root & tuber crops new improved varieties and production packages by establishing nucleus units, demonstration blocks, model villages etc and by conducting training programmes
- Development of cultivation package Gerbera hybrid
 - Development of modern technologies to use in home gardening
 - Identification of better crop combinations and cropping systems to home gardening
 - Identification and Introduction of ideal crops for home gardens
 - Development of cultivation packages for 5 poly tunnel crops
 - Development of 5 poly tunnel crops
 - Maintenance of Model Home garden at HORDI

Entomology

- Development of an IPM package to control pest & diseases of pumpkin (NARP project)
 - Testing alternative insecticide treatments for the control of virus vectors of pumpkin
 - Testing alternative control techniques to improve existing IPM package for cucurbit pest and disease control
 - Testing improved IPM package for the control of virus diseases of pumpkin in research fields and in farmers' fields
 - Field demonstrations to disseminate the improved IPM technology to the farmers and extension staff
- Study the effect of Acephate 75%SP on the development of resurgence in thrips
- Screening of insecticides to control banana weevils
- The same research projects will be continued to fulfill objectives

Plant Pathology, micro biology and mushroom

- Screening of brinjal, tomato and capsicum germplasm for wilt and collar rot
- Development of control method for Fusarium wilt
- Disease diagnosis and advisory service
- Effect of irradiated chitins on pest resistance of tomato and capsicum
- Management of powdery mildew of Rambutan by irradiated Chitosans
- Development of control methods of ginger rhizome rot
- Biological control methods of 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 the pathogenic fungal growth (in vitro test)
- Studies on disease control of grapes
- Identification of diseases of pumpkin and development of 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 of banana
- Screening of fungicides against powdery and downy mildew of cucurbits
- Protocol development for milky mushroom cultivation
- Testing of cultivation methods for two new variety of Oyster mushroom
- Development of low cost method for spawn production
- Evaluation of mycorrhiza roots on vegetable and fruit crops

Soil Fertility Management

- Effect of different organic fertilizer sources on vegetable yield under organic farming
- Nutrient management of organic vegetable cultivation with special reference to N management
- Effect of different combination of nutrient sources on organic vegetable cultivation
- The long term effect of natural way of cultivation (combination of no tillage mulching) on organic vegetable yield
- Long term effect of compost application on soil vegetable yield and soil quality
- Potassium management in Banana
- Fertilizer management in Pineapple
- Soil fertility evaluation study on different ASC regions in Sri Lanka
- The effect of Nano fertilizer on vegetable yield
- Study on micronutrient status of soils in different cropping systems
- Investigation of heavy metal status in phosphate fertilizers use in Sri Lanka

- Study on heavy metal status in different types of Animal wastes
- Study on secondary and micronutrient status of green manures
- Study on heavy metal contents in edible parts of the commonly consumed aquatic plants in Sri Lanka

Central Library

- Plan to Conserve the Library Rare Book Collection in digitalized format.
- Decide to publish the Central Library Catalogue on web page.
- Planning to print the catalogue cards for newly arrived library book
- Computerized Tropical Agriculturist
- Digitalized Tropical Agriculturist and later expecting to add the internet
- Computerized all books in library

STAFF LIST

Designation	No.
Director (Actg)	01
Additional Director (Actg)	01
Research Officer	23
Administrative Officer	02
Senior Librarian	01
Librarian	02
Programme Assistant (Agri)	09
Public Management Assistant	18
Farm Clerk	05
Agriculture Instructor	35
Research Assistant	13
Research Sub Assistant	09
KKS	02
Driver	07
Store man	02
Mechanist	02
Machine Operator	01
Carpenter	01
Welder	01
Electrician	01
Lawn Mover Operator/Grass	
Cutter	01
Land Mover Operator/Tractor	03
Water Pump Operator	01
Bee Demonstrator	01
Budder	01
Circuit Bungalow Keeper	01
Nurseryman	01
Sanitary Labourer	02
Unskilled Labourer	110
Watcher	25
Total	282

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 laboratory and field

indexing, quarantine purposes, 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

Table 2.2.1.1: Annual budget -2011(Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	2,856,013	2,694,948	94
Capital	2,380,615	2,046,483	86
NARPP- Papaya Project	1,000,000	959,280	96
Tissue Culture Project	3,300,000	2,412,000	73
Mahinda Rajapaksha Sport Complex Agricultural Project	150,000	131,275	88
Model Village Project (Mullegama)	100,000	10,639	11
Total	9,786,628	8,254,625	84

PROGRESS

Conventional Plant Virology

- Detection of phytoplasma diseases in different crops by ELISA, using locally produced Weligama Coconut Leaf Wilt (WCLW) polyclonal antiserum.
This study will be continued.
- Evaluation of the efficacy of locally produced polyclonal antiserum for detection of Anthurium blight disease.

Locally produced anthurium blight antiserum can be used to detect the *Xanthomonas axonopodis pv diffenbachae* infection. This study will be continued.

- Optimization of the protocol for locally produced Weligama Coconut Leaf Wilt (WCLW) antiserum
This study will be continued
- Identification of host range for Weligama Coconut Leaf Wilt (WCLW) phytoplasma by

Enzyme Linked Immunosorbant Assay (ELISA)

- Identification of seed borne viral diseases in imported hybrid seed of cucurbits

Tested hybrid varieties were free of Cucumber Green mottle mosaic virus and Cucumber Mosaic virus. This study will be continued.

- Routine Indexing Programme by Serological methods

Total of 3550 samples were indexed.

Application: Promote disease free planting material production and correct identification of pathogen to control further spread of the disease.

Molecular Virology

- Detection of potato virus X (PVX) & Potato Leaf roll virus (PLRV) by Reverse Transcription Polymerase chain reaction (RT-PCR).

Application: Use this technology for routine virus indexing and promote virus free planting material production specially in private sector organizations and quarantine purposes.

- Detection of virus & Viroid diseases in Citrus cultivars by Reverse Transcription Polymerase Chain Reaction (RT-PCR) and develop duplex & multiplex RT-PCR

Two viroids were detected. However, the protocol should be further perfected.

- Host range study of Coconut Leaf Wilt Phytoplasma disease by Polymerase Chain Reaction (PCR) based methodology.

This study will be continued by using specific primers for Waligama coconut wilt phytoplasma. More over gene sequencing will be done for further confirmation.

Application: Restrict movement of alternative hosts other than diseased coconut to non

infected areas to control the spread of the diseases.

- Confirmation of already detected viruses (by PCR) using gene sequencing conformation of Coconut Wilt phytoplasma disease

Studies will be continued.

- Routine Virus Indexing Programme by DNA based technology

Total number of samples index by this method were 876.

Application: Use this technology for routine virus indexing and promote virus free planting material production specially in private sector organizations and quarantine purposes

- Special Project Funded by Ministry of Agriculture (NARPP)

Identification of pathogenic diseases in papaya and develop sensitive detection techniques.

Virus Epidemiology

- Eradication of pineapple wilt virus through heat therapy.

Heat treatment at 60 °C for 30 minutes in water bath is the most suitable temperature level for this experiment. Around 6000 virus free tissue cultured pineapple plants were produced using this technique.

- Field evaluation of heat treated pineapple.

According to the virus indexing results, all the plant were free from the virus up to one & half years after field planting. Plants were grown well within this experimental period.

Application: Treated pineapple suckers will be tested under farmer field condition.

- Acceptability of Pineapple Cultivar Marian Gold 3 (MG3) for Commercial Cultivation

MG3 Kew cultivar is suitable for local conditions with regard to growth characters

and fruit quality and it can be successfully use for commercial cultivation.

Application: Popularize new variety of pineapple and test it's adaptability.

- Control of Papaya ring spot virus (PRSV) in papaya by mixed cropping with ginger and with application of neem oil (2ml neem oil, 2ml tepol/ 1 liter of water)

Papaya plant with ginger as mix crop showed less number of diseased plants compared to other treatments. Appearance of disease symptoms were delayed in mix cropped with ginger and application of neem oil treatment when compared to the control.

Application: This technology will be given to farmers to protect their papaya cultivation from PRSV.

- Study the different transmission methods of Papaya Ring Spot Virus (PRSV) and phytoplasma diseases in selected Papaya cultivars.

The study revealed that through mechanical & aphid transmission Papaya ring spot virus could be transmitted to MS 100, Sinta, Rathna, Red lady & local cultivar. Further phytoplasma could be inoculated to Papaya through trunk wounding successfully.

Other Pathogenic Organisms

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

The plate test should be repeated to confirm the results. Field experiment will be done subsequently.

Application: Promote framers for non chemical leafy vegetable production

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

20 % concentration of Ginger could be used as most effective inhibition of *Colletotrichum spp*. The plate test should be repeated to confirm the results. Field evaluation will be done subsequently.

Application: Promote framers to reduce chemical application

- Testing of tree injectors for control of pest and disease on perennial tree crops

Application: Popularizing environmentally friendly method to control pest and diseases.

- Routine disease diagnose programme

More than 143 disease samples have been diagnosed and delivered effective IPM based solution to farmers for year 2011. Total number of samples tested was 145.

Application: Disease identification and provide control measures

Tissue Culture Division

- Protocol development for improved Anthurium cultivars through micro-propagation (Lady Jane)

This experiment will be continued.

- Development of suitable protocol for Papaya through micro propagation

This experiment will be continued.

- Semi micro grafting of mandarin variety "Indu" and indexing for virus and virus like diseases.

The grafted plants found to be free of viruses tested.

- Field evaluation of tissue cultured MG3 pineapple obtained from different tissues (leaves, slips) for growth and yield performances

Both type's show good growth and 9 months after planting flowers were initiated without

any treatments. Moreover, there's no fruit abnormalities were seen. This experiment will be continued.

- Identification of suitable protocol for micro-propagation of banana variety "kolikuttu" This study will be continued.

- Field evaluation of tissue culture propagated banana and pineapple

This study was conducted to evaluate growth and yield parameters of micro - propagated banana and pineapple. Growth & yield parameters of banana, Variety Cavendish dwarf, Ambun, Anamalu, Binkesel, Seeni kesel, Pulathisi, Alukesel, Kolikuttu & Ambul were showed good growth and yield performance & no BSV induction.

- Growth & yield parameters of pineapple, var. Mauritius propagated through TC

Plants showed good growth within this experimental period. Flowers initiated 10 months after field planting. Average fruit weight - 1.78 kg. No any morphological variations could be seen. Experiment will be continued.

- Production of banana and pineapple planting materials through micro-propagation

400 to 500 plants were obtained from a single mother plant of variety Amban, Ambul, seeni kesel. Further 500 to 600 plants were obtained from a single mother plant of variety Angaviyaru & nethrampalam. However multiplication rate of kolimuttu was low when compared to other varieties.

For pineapple var. Mauritius - Avg. No. of plants produced were 1000

Technology Transfer

To disseminate new technologies 17 training classes were conducted for farmers, farmer organizations teachers, students of youth center, school children & undergraduate students.

Three radio programme one TV programme 08 newspaper articles 03 school home gardens 01 model village at Mullegama 50 field visits 03 crop clinics were done during this year. In addition advises were given to 130 farmers / growers who have visited the center with different problems related to their cultivations.

One Urban agriculture model and 01 home garden model were maintained in the center. Three exhibition namely Dillies fashion emporium to mark world environment day, exhibition conducted by Ministry of agrarian services at Maharagama, exhibition at BMICH for CARP awards ceremony and exhibition at Naiwala organized by NITA.

PLAN FOR 2012

Conventional Plant Virology

- Production of polyconal antiserum for Banana Bunchy Top Virus(BBTV)
- Identification of virus and virus like diseases in papaya using seriological detection techniques.
- Detection of phytoplasma diseases in Agricultural crops except coconut using locally produced WCLW antiserum
- Detection of seed borne virus diseases in imported hybrid seeds of cucurbits by ELISA techniques
- Testing of semi micro-grafted mandarin plants using serological detection technique for

Citrus Tristeza virus and Citrus Greening bacteria

- Evaluation of the efficacy of locally produced polyclonal antiserum for Anthurium blight
- Application of Rhizobacteria for induced systemic resistance
- Routine pathogen indexing programme and issue of test reports.

Molecular Virology

- Testing of semi micro-grafted mandarin plants using serological detection technique for Citrus Tristeza virus and Citrus Greening bacteria
- Application of developed RT-PCR technique by a survey in potato growing areas for potato virus PVY
- Detection of Potato Leaf Roll Virus (PLRV) & PVX in potato cultivations by RT-PCR with Specific primers.
- Detection of virus and viroid diseases in citrus cultivars by Reverse transcription Polymerase chain reaction (RT-PCR) and develop multiplex RT-PCR
- Identification of pathogenic diseases in papaya and develop sensitive detection techniques.
- Testing of already detected viruses by PCR & conformation by gene sequencing.
- Study the host range of coconut leaf wilt disease by PCR based method.
- Routine virus indexing by PCR methodology and issue test reports.

Virus Epidemiology

- Evaluation of heat treated tissue culture pineapple in farmer's fields(Arangala,

Welisara,Wadduwa) and monitor pineapple wilt virus disease

- Management of virus diseases in pumpkin using non chemical methods
- Field evaluation of newly released papaya variety (MS 100) for virus tolerance
- Identification of potential vectors for common virus diseases (Papaya ring spot virus, Banana bunchy top virus, Okra vein net mosaic virus, Cassava mosaic virus, etc.)
- Laboratory methodologies to identify nematodes as virus vectors
- Dissemination of virus control strategies among growers (Papaya Ring Spot Virus, Banana Bunchy Top Virus, Virus Diseases in Cucumber, Cassava Mosaic Virus & Pineapple Wilt Virus)

Other Pathogenic Organisms

- Testing of Tree Injectors to control pests & diseases in perennials by using suitable chemicals.
- Control of Anthracnose in capsicum by using herbal extract.
- Identification of other pathogenic organisms and issue of test reports.

Tissue Culture

- Identification of suitable protocol for micro-propagation of banana variety kolikuttu by manipulation of the different growth hormones.
- Multiplication of selected Anthurium cultivars through micro-propagation (Lady Jane and Kirimatiya selection) etc.
- Development of suitable protocol for papaya through micro-propagation

- Production of 20000 tissue cultured banana plantlets (Amban, Kolikuttu, Seeni, Nethrampalam, Angaviyaru, Ambul) and 50000 plants of Pineapple (MG 3 and Mauritius)
- Semi micro grafting of mandarin variety “Indu” and indexing for virus and virus like diseases.
- Field evaluation of tissue cultured MG3 pineapple obtained from different tissues (leaves, slips) for growth and yield performances
- Field evaluation (in farmer’s field) of tissue cultured banana and pineapple and practice of control measures for viruses.

Technology Transfer

- Conducting awareness and training programmes (For officers ,Training for farmer organization , Training or updating knowledge of undergraduates/ school students/other students, farmer clinic , Field inspection , Radio programme , Television programme , Field trial)
- Field visits to cultivations and home gardens
- Publication of news paper articles
- Urban Agriculture & home garden models
- Special programmes (Model village demonstration) Community based seed and planting material production
- Promotion of vegetable cultivation at PVIC land (1.5 Acs)
- Radio and Television programmes
- Maintenance of exhibition unit
- Agriculture programm at Diyagama Mahinda Rajapaksha sports complex

STAFF LIST

Designation	No.
Research Officer In Charge	01
Research Officer	05
Agricultural Monitoring Officer	01
Programme Assistant	05
Research Assistant	04
Agricultural Instructor	09
Management Assistants’ Service	03
Store man	01
Driver	02
Laborer	03
Laborer (Contract)	11
Watcher	02
Total	47

2.2.2 FRUIT CROPS RESEARCH & DEVELOPMENT CENTRE (FCRDC) - HORANA

The mandate of the Fruit Crop Research and Development Centre (FCRDC) is to develop appropriate technology for enhancing the productivity and production of fruit crops in the country. The FCRDC gives a special emphasis on the crops adapted to the low country wet zone (LCWZ). The present research programs are focused 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 adapted to the conditions of Low country wet zone in fulfilling the needs of the farmers in the region.

BUDGET

Table 2.2.2.1: Annual Budget -2011(Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	930,000	1,428,179	154
Recurrent	7,092,945	5,806,516	82
Production & Usage of Organic Fertilizer	977,470	877,037	90
Establishment of Bio Diversity Garden of Tropical fruits at Horana	6,621,000	6,232,380	94
Development of high yielding good quality papaya varieties	400,000	153,053	38
Promotion of quality planting material of important crop through tissue culture	4,200,000	3,551,004	85
Hybrid seed development (okra)	325,000	250,588	77
Yield and quality improvement of mango	1,000,000	827,820	83
Evaluation of citrus (orange & mandarin) varieties and different management	400,000	244,927	61
Development of promising zones duration varieties for commercial cultivation	300,000	195,813	65
Evaluation of banana accessions for high yield disease tolerance and salt tolerance	100,000	89,483	89
Total	21,586,415	19,100,872	88

PROGRESS

CROP IMPROVEMENT

Germplasm evaluation of sour-sop (Katu anoda)

Sour-sop is one of the better known fruits of high nutritive value. Among those cultivar collected at FCRDC promising characteristics could be identified. Therefore with the objective of selecting a superior cultivar, studies were initiated in 2007.

Evaluation of 10 accessions of sour sop during a period of 2007-2011, 04 promising cultivars were identified. Among those, 01 cultivar of high quality with tasty & juicy flesh having a high brix value was selected. The selected cultivar was capable of producing an average yield of 26 fruits/tree (24.9kg) at the age of 7 years.

Programme funded by “Development of high yielding good quality papaya varieties” project

Development of papaya varieties

Development of high yielding and good quality papaya varieties is the major objective in papaya breeding programme at FCRDC, Horana. Eight varieties which showed more than two considered characteristics were collected from different locations. Base population of 150 plants was established using their seeds to select individuals for the second generation advancement.

Programmes funded by “Bio-Diversity Fruit garden” project

Evaluation of papaya hybrids

Two new inbreds (CP-1 and CP-13) of papaya were developed using local papaya varieties and four new hybrids were developed using those new inbreds and variety Rathna. These four new hybrids were evaluated with three parents and a

control (Red lady) in a replicated trial. Two hybrids which are reciprocals of same parents were selected as promising. The yield and quality characteristics were comparatively higher than the parents and control. The yield was almost 50 kg/tree/year with an average weight of a fruit of 1.5 kg in the wet zone conditions. Fruits have moderately hard bright red flesh and high brix value (>12) with adequate thick outer peel for transportation. Seed multiplication of parental lines and hybrids is being conducted to evaluate the performance of hybrids during 2012 in different Agro Ecological regions in Sri Lanka.

Development of passion fruit varieties

Development of a synthetic/ composite passion fruit variety is one of the ways to distribute a passion fruit variety by seeds. It assists to incorporate more desirable characteristics in a commercial variety and help to break the virus cycle which spreads through cuttings. Therefore, the Passion fruit development programme at FCRDC gave more effort to produce a synthetic variety in passion fruit. Seed production in Synthetic 1 generation was completed during 2011 and the second generation was established for further improvement and multiplication.

Evaluation of mango hybrids

Development of mango hybrids was initiated during 2007 with the objective of incorporate desirable quality characters into presently cultivated varieties. Karthakolomban, vellikolomban, Willard and Namdocmai were used as parents. Floral biology of these parents was studied during two seasons. Crosses were made using these parents and seven seedling hybrids could able to survive and presently they are being evaluated in the field. The hybridity of the seedlings have to be confirmed because if not they should be maintained in the field for several years. Therefore, the DNA analysis for conforming

hybridity of these seedlings will be done in collaboration with PGRC.

Programmes funded by “Development promising durian varieties for commercial cultivation” project

Collection, evaluation & selection of local accessions of Durian

Among the 68 varieties, 4 promising durian varieties were selected for releasing to the farmer cultivation. Grafted plants are producing for field testing. Three germplasm collected and established in gene bank at FCRDC and 2 germplasms are to be established. Characterization of 6 promising durian varieties are continuing.

Development of durian F₁ hybrids for commercial cultivation

700 durian F₁ were established in the field. 150 F₁s are to be planted.

Programmes funded by “Evaluation of citrus varieties and different management” project

Collection, evaluation & selection of local accessions

Three promising mandarin varieties were selected they are under evaluation in different agro ecological zones. Four mandarin varieties two pumello varieties one grape fruit variety four lime varieties were collected from different areas and they were established in field gene banks.

Development high yielding good quality sweet orange & mandarin F₁ hybrids

150 crosses were done & successful 50 F₁s were in the field evaluation.

Development of good quality high yielding seedling citrus mutants

Mutated M₁ generation is under field evaluation.

Evaluation of exotic orange & mandarin varieties introduced from Japan

Varieties were established eight different agro ecological zones in the country and they are being evaluated for adaptability. Promising 3 mandarin varieties are testing in different agro ecological zones.

Germplasm collection, Conservation, Characterization and Evaluation of underutilized fruit crops

This program was initiated in late 2002 and by the end of 2008, 303 accessions were established in the field gene banks in an area of 3.73 ha. These gene banks comprised with 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)

Experiment was started using materials collected from the FCRDC farm consisting of 17 accessions in 2007. Growth performance, yield, fruit quality, fruit size and shape were evaluated in all accessions and mother plants. Out of all 17 accessions HOS 2, HOS 12 and HOS 13 have comparatively higher yield and a vigorous growth. HOS 2 has bigger fruit size with 21⁰ TSS (Total Soluble Solids) content, HOS 12 and HOS 13 have 20⁰ and 17⁰ TSS contents respectively with medium fruit size.

All fruit were sweet in taste and low in acidity. HOS 2, HOS 12 and HOS 13 have being nominated for release.

Weralu (*Elaeocarpus serratus*)

In the field gene bank there are 13 accessions collected from farmer fields and propagated by wedge grafting techniques. From 2003 to 2010 their growth performance, yield, fruit quality and fruit size were evaluated. Fruit bared from the third year of establishment and HOW 3, 4, 5,7,12, and 13 were capable of high yielding while HOW 9 had a moderate and HOW 1 less. HOW 13, 7, 9, and 5 had acceptable good qualities. HOW 13 contain comparatively a higher level of total soluble solids, lower acidity and comparatively good balance between sweetness and acidity and fruit is in medium size. HOW 7 is comparatively a medium size fruit with even coloured surface and has fairly less sweet taste and medium acidity. HOW 9 has a medium size fruits with less acidity and fairly sweet taste and has a starchy pulp compared to other accessions. Surface colour is more even and the fruit is darker to other varieties. HOW 5 Is comparatively a large fruit with even coloured surface and better appearance showing higher market value. It is medium sour , starchy and has low content of TSS.HOW 5, 7, 9 and 13 have being nominated for release.

Germplasm collection, Conservation,

Characterization and Evaluation of Goraka

32 accessions of goraka have established in the field gene bank. Three promising accessions (HoG-3, HoG- 8, HoG- 11)were identified and handed over to the varietal releasing committee for official release.

Programmes funded by “Hybrid seed development (Okra)” project

Development of hybrid varieties of Okra with desirable characters suitable to the L.C.W.Z

Four hybrid varieties were selected from the studies conducted using fourteen inbred lines and their 91 cross combinations. These cross combination were evaluated in the National co-ordinated varietal trials. Three hybrid varieties: HB 100, HB95, and HB93 were tested for their adaptability in the wet zone & intermediate zones. Based on yield, quality and tolerance to Leaf vein Mosaic virus HB100 and HB95 were selected for further evaluation.

Development and purity maintenance of Green chilli variety

Ten varaniya green chilli farmer selection were tested and four varaniya types were selected according to pungency and external characters. These four type were purified and evaluated for yield. Varaniya green type was selected & initiated seed production and included in the National Co-ordinated varietal trial – 2011/2012 Maha season.

Development of high yielding good quality banana varieties through collection, evaluation and selection of banana germplasm

Banana accessions of Ambun (11), Embul (5), Rath Kesel (5), Seeni Kesel (7) & Kolikuttu (5) were established at FCRDC for further evaluation. Three NCVT trials of Seeni Kesel(Group 1), Puwalu, Suwandel, Kolikuttu (Group 2) & Embon, Bin Kesel(Group 3) were established & being evaluated.

Programme funded by “Yield and quality improvement of Mango” project

Yield and quality improvement of mango

Collection and selection of promising mango accessions were started in 2011 at FCRDC Horana. Out of 25 mother plants collected from farmers' fields 4 promising accessions were identified. 4 promising cultivars from Govt. Farm were also selected. Existing trees were pruned, fertilized and mapped. Evaluation is in progress.

CROP PROTECTION

Control of anthracnose post-harvest fungal disease of papaya

Causal agent of anthracnose disease of papaya was identified as *Colletotrichum gloeosporioides* fungus. Several fungicides and herbal extracts were tested to screen the inhibition of mycelial growth of the fungus. Chlorothalonil (Daconil) was selected as most effective fungicides to control anthracnose disease of papaya. Other fungicides as Carbendazim (Bavistin) and Mancozeb are less effective in control the disease. Copper fungicides are effective to inhibit the fungal growth but it had shown phytotoxicity effect such as scorching of the peel of papaya fruit.

Several plant extracts were evaluated to select the best inhibition of the fungal growth in in-vitro. Cinnamon oil and cinnamon leaf extract were selected as effective herbal extracts to control the anthracnose disease of papaya.

Control of Fusarium wilt of passion fruit through fungicides

Die-back of passion fruit vines is common problem in passion fruit orchards and causal agent is the fungus *Fusarium spp* which cause the collar rot and root rot.

Several fungicides were evaluated to identify the effective fungicides which can effectively reduce the growth of fungal mycelium. Out of eleven fungicides, Bavistin, Folicur, Daconil, Topsin, and Homai had shown the effective control. Bullet, Eraser, Copper fungicides, Ridomil, Mancozeb, Sulphur are less effective fungicides to inhibit fungal growth.

Management package to control citrus die-back disease

Die-back causal agent is identified as *Botryodiplodia theobromae* fungus. Eleven fungicides were evaluated to control the disease. Out of eleven fungicides, eight fungicides can use to reduce the disease condition. They are Bavistin, Daconil, Mancozeb, Bullet, Folicur, Topsin, Ridomil and Homai. Copper fungicides, Sulphur fungicides and Eraser are less effective to control the disease.

Identification of disease causal agents of under-utilized fruit crops

Following disease and their causal organisms were identified. Guava fruit rot (*Cylindrocladium scoparium*), Passion fruit rot-3 causal agents (*Colletotrichum gloeosporioides*, *Botryodiplodia theobromae* and *Fusarium solani*) and Veralu anthracnose disease (*Colletotrichum gloeosporioides*)

Evaluate the performance of different guava varieties against root knot nematodes

Root knot nematode infestation is one of the most serious problems in guava cultivation in last years. Therefore, study was carried out to evaluate the tolerance levels of different guava varieties against root knot nematodes. Nine guava varieties, Horana Rosy (HRo), Lanka Giant (LG), Horana Sweet (HS), Red Giant (RG), Horana White (HW), Horana Red (HR), Pubudu (Pu), Kanthi (Ka) and

Saffida (Sa) were inoculated with *Meloidogyne* sp. root knot nematodes (r.k.n.) and the time duration for showing leaf symptoms and percentage root galling were assessed.

All the varieties were susceptible for r.k.n., but Kanthi variety took longest time period (15 wks) to show deficiency symptoms, while variety Pubudu showed short period (8-10 wks). Varieties LG, HW and Ka showed low galling density (60%) and varieties Sa, RG and HS showed higher galling density.

Evaluation of extractions against mealy bugs in pineapple

Pineapple is very delicious fruit; hence it has big demand too. However, mealy bug infestations affect its marketable yield badly. Therefore, non toxic botanical extractions were tested against mealy bugs. Water extracts and Ethyl alcohol (EtOH) extracts of Anona mature leaves, anona immature leaves, citronella leaves and citronella roots were applied on mealy bugs in laboratory conditions and mortality was assed.

Citronella leaf water extract showed highest mortality rate (47.3%) followed by citronella leaf EtOH extract. The EtOH extracts of citronella leaves and anona immature leaves gave relatively lower mortality rate than their water extracts, but citronella roots and anona mature leaves acted in different way, giving relatively higher mortality rate by EtOH extracts than its water extracts.

SOIL NUTRIENT MANAGEMENT

Stem bulging of passion fruit

Stem bulging is characterized by seedling and cracking of pests of the vines of passion fruit. Due to this disorder, weakened and dead stems beyond the affected area could be observed. The soils of the effected fields were found to be low in calcium and pH value.

Depending on soil characters at some locations application of higher levels of calcium or foliar sprays of borax delayed the incidence of bulging proper methods of applying these nutrient to minimized the disorder are being tested further.

Farmers demonstrations on compost with chemical fertilizer on guava and passion fruit

Guava and passion fruit plots were maintained separately at two locations with several combinations of compost and chemical fertilizer selected from earlier experiments. It was well demonstrated that the recommended chemical fertilizer could be reduced by 25% without adversely affecting the yield when they were applied with 10kg of compost/vine/year for passion fruit and with 20kg of compost/plant/Year for guava in first year of fruiting.

Integrated effect of chemical fertilizer with compost on yield and quality of pineapple, passion fruit, mangosteen and guava

Chemical fertilizer application can be reduced by 25-50% when compost applied at 10t/ha/year.

Testing effect of different organic material taken for vermi composting and vermiculture

Vermicompost by heap method using grass, gliricidia and banana stems each at 1:1 with cattle manure showed that, nitrogen percentage in final vermi compost was maximum at 1.4% with gliricidia followed by grass and banana stem. Nitrogen of vermi compost by tank method was comparable to that with heap method. During vermi composting height of waste reduced by 30%-50%.

Development of organic fertilizer package for passion fruit

Vermi compost at 20t/ha or decompose poultry manure at 20t/ha. each applied thrice a year found to be suitable for growing organic passion fruit production when compared with the recommended chemical fertilizer.

Development of a soil management information system for rambutan/pineapple cropping systems in the Gampaha district

Socio economic survey was conducted with 64 rambutan farmers. The results revealed that their knowledge on correct agronomy practices were very poor. Soil fertility survey carried out in 15 rambutan orchard revealed that there is a tendency to phosphorus accumulation. Soil thematic maps were prepared for pH electrical conductivity, available phosphorus, exchangeable K and Ca.

Programme funded by “Production & Usage of organic Fertilizer” project

Production of high quality compost

High quality compost production programme was initiated at FCRDC Horana in 2009 & produced micro organism rich compost packets were 3486 distributed among farmers.

CROP MANAGEMENT

Evaluation of compatible root-stock against root-knot nematode infestation in guava

During the recent past, guava has become one of the leading commercial fruit crops in Sri Lanka. A severe infestation of root-knot nematode identified as *Meloidogyne spp* was reported to be a major threat to the cultivation

There was a variation in incidence of nematode attack among guava plants propagated by different techniques, such as air layering, seedlings, patch bud grafted and inarched plants. The high rate of survival in bud grafted and inarched plants over those of layered has been observed. This is due to well developed deep tap root system of budded or inarched plants. Further more, it is important to identify a guava cultivar with nematode resistance or tolerance characteristics as a root stock. Seeds from 74 different accessions were collected & seedlings raised. Seedlings will be artificially inoculated by nematodes.

Mangosteen - Evaluation of double root-stocked grafts for growth & yield performances

Poor distribution of mangosteen crop is mainly due to its slow vegetative growth rate associated with long unproductive period of 8-10 years. As such, with the objective of over coming slow growth rate and there by enhance productivity of mangosteen, studies were initiated in 2004. At the 7th year after establishment, double root-stocked grafts have yielded, 43 fruits per graft in post graft performance evaluation. It was observed that grafts had an inclined vegetative growth habit, which was a common characteristics in grafts. In general branches show an inherent horizontal branching pattern. Scion shoots are to be taken from those branches and this results in grafted plants also grow horizontally, showing inclined growth habit. Horizontal growth habit of double root stocked plants could easily be prevented by using 2 stakes poling and a form of a cross at initial growth stays until 3-4 years. Later on grafts tend to grow naturally.

Programme funded by “Evaluation of banana accessions for high yield , disease and salt tolerance” project

NCVT trial was established and data are being recorded.

Effect of plant density and pruning height on growth and yield of rambutan

36 plants from Malwana special at three different plant densities {10mx10m (recommendation) 10m x 7.5m, 10mx5.0m} and two different branching heights {90cm (recommendation) and 30cm}. So far there is no significant difference in plant height, canopy spread and yield. Evaluation is being continued.

Effect of size of cutting & number of cuttings per training post on growth of vines, yield and quality of Dragon fruit

Higher growth of vine (height of vine) observed in 12-15” cuttings. Length. 12-15” and 4 cuttings per post showed the highest number of primary and secondary branches while lowest number of branches recorded in treatment no 1 (3-4” length of cuttings and 1 cuttings/post). Few of the treatments gave fruits. Experiment will be continued up to its full bearing stage before come in to conclusion.

Crop Management studies on Elabatu

As poor seed germination was observed in the nursery, a green house experiment was carried out using fresh seed, 2 wks old seed & one month old seed. Seed dormancy was not observed and nursery pots placed in high temperature condition (UV treated 1000 gauge polythene) gave 100% germination.

FRUIT DEVELOPMENT ACTIVITIES

Production of planting materials

During 2011 the centre sold 28,034 budded plants, 1,568 grafted plants and 2,177 seedlings plants of rambutan, mango, durian, jak, avocado, star fruit, sapodilla, garcena, lime, mangosteen, jambu, lovi, annona, guava, orange, beli, weralu, mandarin, passion fruit, strawberry guava etc. and earned Rs. 4,504,210.00 as gross profit.

Programmes funded by “Promotion of quality planting material of important crop through tissue culture” project

Micro propagation of Banana

At present, protocols were optimized for micro-propagation of banana cultivars such as Ambul, Sini, Netrapplam at RCRDC. During the year 2011 around 1500 banana plants were produced and most of them were distributed among farmers. Eight evaluation plots were established in farmer fields and research fields to evaluate tissue cultured banana plants.

Embryo rescue of Mango

Hybrid embryo rescue technique is successfully used in rescue of dropped or harvested immature fruits. Therefore a research program was initiated to develop protocol for Embryo rescue of local mango varieties. Basic studies were started in year 2011, however, the program was abandoned due to lack of fruits in last season. Program will be continued in next season.

Establishment of bio diversity garden of tropical fruits

About 15 ha of land had been cleared and established new plants of Banana (661) Mangosteen (40) and Mango (59) and uprooted the old rubber plantation for new cultivation. Pruning

was started in old mango plantation and weed was controlled in mango, guava, banana and mangoostin plantations. Fertilizer was added to mango, durian, and tissue cultured banana and rose apple plantations.

Budded plants of Rambutan (7862), Durian (1038), Veralu (165), Mango (428) and Jack (1855) were produced.

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

A home garden was established at FCRDC, Horana in 2005 to demonstrate the usefulness of home gardening and to educate school children etc. In 2011 – 3251 school children, 138 teachers and 69 other persons were visited the home garden and improved their knowledge in home gardening.

Training programmes

The following training programs were conducted in 2011

- 2951 school children & 179 teachers were visited the centre from 30 schools.
- One training programme was conducted for 190 university students & lectures.
- Sixteen training programmes on fruit cultivation, home gardening tissue culture & nursery management were conducted for 726 trainees.
- Five training programs were conducted on high quality compost production & distributed micro organism rich compost packets & 1325 plants of mango, rambutan, durian, jack and 'haritha katurumurunga' in Dambara, Handupelpola, Kumbuka, Halapitiya & Godigamuwa (175 beneficiaries) under model village programme.

- Under 'Divineguma' 58 training programmes were conducted on compost production & distributed micro organism rich compost packets. (4200 beneficiaries from Horana secretariat division)
- 2755 farmers from 50 villages from Horana area were given training on new techniques on fruit culture, pest & disease control and crop management.
- 1615 advisory leaflets were distributed among farmers.

Farmer Advisory programmes

- 78 disease samples received from farmers and extension officers were examined and cultured pathogen in the laboratory to identify the diseases and recommendations were given for their control.
- 98 field problems submitted by farmers pertaining to pests and diseases, dragon fruit, durian, Rambutan, pineapple and Vegetable cultivation were attended during the year and control measures were given.

Mass Media

Officers from FCRDC participated in 09 TV Programs (Mangosteen, Guava, Durian, Mandarin, Rambutan, home gardening and Compost production) and 04 Radio programs on fruit crop cultivation, pest & diseases.

PLAN FOR 2012

Crop Improvement

- Development of high yielding, good quality banana varieties through collection, evaluation and selection of banana germplasm
- Development of high yielding, good quality avocado varieties through collection,

evaluation and selection of avocado germplasm

- Collection, conservation, & evaluation of lavulu germplasm
- Collection, conservation, & evaluation of lovi germplasm
- A study on yield performances of promising accessions of sour sop
- Germplasm conservation & evaluation of weralu
- Germplasm conservation & evaluation of Sapota
- Germplasm conservation & evaluation of jack fruit
- Collection & Maintenance of mango germplasm in WZ & selection of good quality Giraamba & petti amba local cultivars for cultivation in LCWZ
- Collection & Evaluation of Rambutan
- Characterization, of existing rambutan population at FCRDC
- Collection & Evaluation of Goraka
- Characterization of 17 Uguressa germplasm
- Germplasm collection, characterization and evaluation of gaduguda
- Maintenance of mother plant orchard of guava hybrids
- Selection of promising durian varieties for commercial cultivation
- Development of high yielding good quality durian F1 hybrids through hybridization
- Development of high yielding, good quality mandarin varieties through selection
- Development of high yielding, good quality orange & mandarin varieties through hybridization
- Evaluation of mutated orange & nas naran varieties

- Evaluation of exotic orange & mandarin varieties introduced from Japan
- Collection establishment of 8 beli germplasm
- Characterization of 5 beli germplasm
- Seed production and purity maintenance of varaniya green chilli variety
- Germplasm collection & multiplication of Ela batu (small type)
- Hybrid development of Papaya, Passion fruit and Mango
- Development of high yielding good quality papaya varieties
- Hybrid Seed Development Year 2012 - Okra
- Development of promising durian varieties for commercial cultivation
- Development of high yielding good quality citrus (orange and mandarin) varieties
- Develop Good Quality High Yielding Cultivars of Mango from Existing Germplasm

Crop Management

- Study the effect of number of cuttings and cutting size on yield and quality of dragon fruit
- Evaluation for performances of Dragon fruit under low country wet zone
- Studies on partial filling of rambutan (observational)
- Growth enhancement in mangosteen grafts and seedlings through provision of additional root system
- Screening of root-stocks against root knot nematodes
- Productivity improvement in seedling sour-sop through development of a suitable training and pruning system
- Maintenance of guava mother plant orchard
- Maintenance of 25 waxapple accessions
- Development of profitable crop management practices for Rambutan

- Control of stem bulging of passion fruit through vine management
- Training and pruning of grafted durian accessions
- Development of virus free citrus (Orange & mandarin) mother plants
- Testing of different 3 establishment and 2 tree management methods for citrus
- NCVT trial for citrus
- National coordinated varietal testing trial on Sweet potato
- National coordinated varietal testing trial on Chilli
- Field evaluation of TC banana

Plant Nutrition and Organic Fruit Production

- Measuring occurrence of stem bulges of passion fruit with different calcium levels and application methods
- Evaluation of selected applied nutrients on gamboge disorder of mangosteen
- Effect of organic fertilizer application on yield of Dragon Fruit.
- Integrated effect of chemical & organic fertilizer application on yield of Mangosteen
- Testing effect of different organic matter on vermi composting
- Preliminary studies on different dilutions of vermi wash on yield of pineapple
- Identify methods of application of calcium minimize fruit cracking of banana
- Identification of suitable fertilizer practice for tissue cultured banana
- Promotion of organic fertilizer production and Use

Plant Pathology

- Screening of herbal extracts, GRAS compounds and fungicides to control sigatoka disease of banana
- Screening of mango germplasm for selecting resistant or tolerant varieties for anthracnose and die-back disease
- Control of fruit rot diseases of mango through GRAS compounds, herbal extracts and fungicides
- Control of fruit rot disease of papaya through GRAS compounds
- Control of fruit rot disease of Guava through GRAS compounds

Entomology

- Studies on suitable guava root stock tolerant to plant parasitic nematodes
- Evaluation of different soil amendments against plant parasitic nematodes

Tissue Culture

- Micropropagation of recommended banana cultivars
- Embryo rescue of mango

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 established model home garden
- Establishment of Bio Diversity Garden of Tropical Fruits at Horana

STAFF LIST

Designation	No.
Additional Director	01
Research Officer	12
Economist Assistant	01
Programme Assistant	06
Development Assistant	01
Assistant Director	01
Research Assistant	06
Agricultural Instructor	14
Public Management Assistants' Services	07
Driver	03
Store man	01
Watcher	01
Budder	01
Labourer	30
Labourers (Contract)	80
Total	165

2.2.3 FOOD RESEARCH UNIT (FRU) – GANNORA

The Food Research Unit functions under the administration of Horticultural Crop Research and Development Institute (HORDI). The major tasks undertaken by 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.

BUDGET

Table 2.2.3.1. Annual Budget – 2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	164,500	143,404	87
Recurrent	1,552,505	1,353,198	87
Projects			
Value addition (Fruits, Vegetables & Cereals) - NARP	1,000,000	253,140	25
Marketing of agricultural products and establishment of value chains - AWRN	4,000,000	2,878,254	72
Establishment of model villages - AWRN	1,000,000	69,671	7
Entrepreneurship development -	2,000,000	292,886	15
Increasing local food consumption - AWRN	1,000,000	825,342	83
Repairing of factory building of FRU - AWRN	1,000,000	105,450	11
Establishment of a food processing factory to increase the income of farmers – Korean funded project	3,600,000	667,966	19
Total	15,317,005	6,589,311	43

PROGRESS

Research

- A recipe was developed to prepare chilli pickle. Jalapeno chilli can be successfully pickled in vinegar with salt and sugar.
- Successfully developed the rice flour based premix for bread making.
- The research activity of development of ready to serve Mangosteen peel is progressing.

- Pumpkin based snack is introduced using pumpkin flesh.
- Research was conducted to control of diseases of mango through improving Potassium level. Double dosage of Potassium recommendation caused profuse flowering and fruit setting. Fruit retention was also improved. Peel colour development, flesh colour development were also improved.
- Double dosage of Potassium recommendation significantly reduced anthracnose and Fusarium rot development of Red lady papaya. This observation was confirmed with inoculated fruits.
- Double dosage of K significantly reduced the internal browning of Pineapple. The study further showed that the higher level of urea application increased the internal browning.
- Pre harvest management practices are developed to improve the post harvest quality of tissue cultured Banana. Higher dosage of Potassium increased the girth of plant base and early flowering. Plants with high dosage of Potassium also showed more vigour than plants applied with recommendation.
- Mature ripe 'Weralu' had high level of antioxidants and 'Heen Weralu' had more antioxidant activity than 'Maha weralu'.
- Jak fruit had high antioxidant and especially the layer in between seed and flesh had the higher antioxidant activity.
- Technology was developed to prepare tea bags using curry leaves.

Development Activities

- Project on "improving farmer income through establishment of a processing factory" funded by Korean Government was initiated. A small scale processing plant is to be established at

Kundasale. This processing plant is to be used as training of processors.

- Under the marketing of Agriculture products and establishment of value chains programme, 20 beneficiaries were identified. Plastic crates (about 2000), weighing machines and name boards were supplied with 50% subsidies.
- Factory Building of food research unit was successfully repaired.

Training Programmes

- Training programs were conducted for the whole sellers, transporters, collectors, retailers to reduce the post harvest loss of fruits and vegetables.
- 300 Agric. Diploma students, 148 university students, 150 Technical College students were trained on post harvest technology and food processing.
- 30 No.s Vidatha programs were also conducted on food processing.
- AGEDIS sponsored training – 02 training programs were conducted with private sector participation on fruits and vegetable processing and rice based products.
- 4 (125 individuals) training programs on rice based products, 55 (790 individuals) on processing of fruits and vegetables

Technology Transfer

- Technology for Tea Bag production using curry leaves was given to 'Sam Products' No. 05, Rathnagiriya, Janapadaya, Lindula.
- FRU continues to provide laboratory analytical facilities. During the year several samples of ready-to-serve beverages, chutney, cordial, jam, dehydrated vegetables, pastes, bites, french-fries, received from private sector were analysed to ensure the quality of products.

- One hundred fifty food quality evaluation reports of vegetables sixty reports of fruits and 100 reports of yams were issued for breeders.

PLAN FOR 2012

Research

- Development of Mangosteen drink using Mangosteen peel.
- Development of Papaya fruit leather
- Utilization of Kesi-pissan (*Cyclea burmanni*) for Jelly making
- Development of a Snack using Pumpkin
- Development of cake mix using rice flour.
- Development of a method to identify Calcium carbide (CaC₂) treated fruits (Mango, Banana) in markets by consumers.
- Development of rice based Amaranthus seed biscuits using different Amaranthus varieties and study their nutritional quality differences.
- Development of fruit based rice “vandu” using rice flour and study keeping quality of vandu.
- Development of palatable food products from dragon fruit.
- Study on quality attributes of sago using various cassava varieties
- Storage study on selected sweet potato varieties by applying curing procedures.
- Improve palatability of selected underutilized yam by applying different processing techniques.
- Development of a minimal processing technique for Onion leaves.
- Evaluation and make Improvement of the minimal processed technique of vegetables in the super market and local market.

- Selection of varieties to enhance the quality of chili powder.
- Product development using Pumpkin (RTS, Toffee).
- Post harvest loss reduction of Papaya (Control of anthracnose disease).

STAFF LIST

Designation	No.
Head	01
Research Officers	03
Agriculture Instructors	03
Research Assistants	02
Agriculture Monitoring Officers	01
Programme Assistants	01
Management Assistants	02
Laboratory Sub Assistants	02
Drivers	01
Machine Operator	01
Electrician	01
Labourer	06
Labourer (Contract)	07
Watcher	02
Total	33

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

RARDC, Bandarawela located 1200 meters above msl. in the Up Country Intermediate Zone, is the main Research Centre responsible for development of appropriate technologies to enhance the agriculture production in the Uva region and Balangoda segment of Sabaragamuwa province. It has two satellite stations located at Rahangala and Maduruketiya and experimental farms at Bibile and Muthukandiya. The mandated area of RARDC, Bandarawela covers agro ecological regions of IU₂, IM₂, IM₃, WM₃, IL₂, and WM₃. Although the main

task of a research centre is carrying out Research programmes, the Centre conducted many agricultural development programmes with the financial support from the Ministry of Agriculture. Developing model villages, production and distribution of compost and high quality planting materials of Pear, Citrus, Avocado, Mango and Potato are some of such activities. The main target of such activities is to enhance agriculture production of farming community using advanced technologies.

BUDGET

Annual budget -2011(Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	8,235,028	7,383,696	90
Capital	6,395,223	3,296,790	52
Projects			
– RARDC, Bandarawela			
NARP- Bean	400,000	379,347	95
NARP - Potato	600,000	499,258	83
NARP-Citrus	200,000	192,846	96
NARP-Pest & Diseases	200,000	139,321	70
Organic Fertilizer	900,000	749,386	83
Model Village	300,000	132,713	44
Hybrid tomato seed production	400,000	315,659	79
Tissue culture	3,000,000	1,602,436	53
Breeder seed production	250,000	239,333	96
Planting Material Production-Fruits	227,500	212,600	93
Vegetable Production	150,000	99,520	66

Vote	Allocation	Expenditure	Expenditure %
- ARS, Moneragala			
NARP- Citrus	250,000	210,255	84
NARP – Banana	100,000	96,130	96
Organic fertilizer	600,000	450,308	75
Model village	200,000	98,145	49
Fruit planting material production	1,130,000	477,559	42
- ARS, Rahangala			
Organic fertilizer	500,000	391,844	78
Hybrid seed production	300,000	259,849	87
NARP – Bean improvement	300,000	216,983	72
NARP- Banana	50,000	34,187	68
NARP- Citrus	200,000	136,374	68
Model village	100,000	95,661	96
Total	22,287,751	11,974,403	54

PROGRESS

Research and development activities carried out during the year under review 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).

CROP IMPROVEMENT

- Bean varietal improvement programme was continued with local and exotic accessions. Varieties BN16 (21.21 t/ha) and Bil-1(21.18 t/ha) gave higher yields compared to check variety KWG (9.71 t/ha).
- National coordinated varietal trials for brinjal, and tomato, were continued during the year 2011.
- Bean germplasm collection and evaluation programme conducted at ARS, Rahangala collected 63 pole bean accessions form local

farmers. Out of this, 8 lines showed promising performances.

- Local and Japanese orange and mandarin varieties were evaluated at RARDC, Bandarawela, ARS Moneragala and ARS Rahangala. Japanese varieties Nichini Nichigo and Nankan Nichigo produced good quality fruits. Performances of these varieties are best at RARDC, Bandarawela when compared to other locations
- Mother plant orchards of temperate fruit crops viz; Apple, Peach, Pear, Chinese guava, Nectarine, Avocado, Carombola etc; are maintained at RARDC research field.
- Under bean germplasm collection and evaluation programme, 140 accessions have been collected form bean growing areas of Badulla, Kandy, Rathnapura and Matale districts.
- Seeds of parental lines of tomato variety Bhatiya were produced and the amounts

produced were 722.0 g of Female (P3) and 591.0 g of Male (P4) lines.

AGRONOMY

- The highest seed tuber yield from potato RSC in Yala season can be obtained intercropping potato with maize. Both crops have to be planted at the same time to get the benefit.

PLANT PROTECTION

- With the satisfactory results obtained from pilot scale trials, Hexaconazole 5%EC, a new fungicide to control foliar diseases in Bean (Rust, Angular leaf spot and Anthracnose) have been recommended. The new molecule showed better performances than recommended chemicals Tebuconazole and Chlorothalonil.
- Less toxic, environmentally safe and organically acceptable chemical Kaligreen® (Potassium bicarbonate), has been evaluated to control foliar diseases of tomato grown in poly-tunnels. The product showed good performances over sulphur which produced phytotoxicity symptoms on leaves.
- Cabbage varieties obtained from local market were evaluated for resistance/tolerance to bacterial diseases (*Erwinia carotovora* and *Xanthomonas campestris*), using artificial inoculation and under natural diseases pressure at RARDC, Bandarawela. Among nine varieties tested, Ninja and Samurai showed high tolerance to both diseases.
- A commercial neem formulation Nimbacidine 1% (1 ml/l) and neem seed water extract were compared with recommended synthetic chemical Chlofluzuron (1 ml/l) in managing caterpillar complex of cabbage. Neem formulations and synthetic chemical performed

equally recording less pest damage (severity 1.93 in 1-10 scale) with acceptable head size (1.92 kg/head).

- Experimental results revealed that cabbage row-intercropped with leek produce higher yield (1.86 kg/head) than the sole crop. However no reduction of pest damage was observed with any intercropping systems practiced.
- New insecticide formulations Virtako 40WG® and Flubendiamide 20WG were evaluated against bean pod borer (*Maruca vitrata*) @ 0.5 and 0.75 g/l. Both chemicals recorded lower pest incidence compared to treated (Novaluron 100 g/l EC @ 1 ml/l) and untreated controls. However the higher dosage tested (0.75 ml/l) reduced pod yield significantly.

HORTICULTURE

- A laboratory experiment was conducted to delay the ripening process of avocado using CaCl₂. Pressure infiltration (250 mmHg for 120 min) of the chemical at the concentration of 4% to 6% gave the best results.

TISSUE CULTURE

- MS medium supplemented with 0.1 mg/l TDZ, and 1 mg/l BAP was the best medium for shoot regeneration and multiplication of strawberry variety Chandler, respectively.

FLORICULTURE

- Maximum flower production of Super daisy can be obtained with plant spacing of 20 x10 cm and 30 x10 cm.
- Considering water uptake, flower fresh weight, and flower opening rate, AgNO₃, STS, and Sucrose are suitable as preservative solutions for Super Daisy.

- The stage between the visibility of 1st and 2nd pollen ring on flower disc is the best maturity stage for harvesting of Gerbera flowers

SPECIAL PROJECTS

Other than the research activities carried out at the centre during the period under review, some special projects have been conducted by the officers at the center in order to disseminate the new technologies. These programmes are funded by the Ministry of Agriculture and the ultimate aim of the projects is uplifting of living standard of the farming community in Uva province.

Potato Seed Tuber Production Through Rooted Stem Cuttings

- More than 34,000 mini-tubers were produced and 28,000 were distributed among the farming community in Uva province. The programme is much successful and some farmers intended to buy mini-tubers from the Research Centre. More than 60,000 RSC are available at RARDC to produce mini-tubers and the production will be distributed among farmers and used in experimental purposes.

Model Village Programme

- Three villages have been identified as model villages to provide technical know-how and material distribution. However, due to the limitation of manpower, one village is finally selected for catering. Some agricultural inputs and technology will be provided to them in order to increase the production as well as the quality of the product.

Planting Material Production

- Two-hundred and fifty budded plants of pear variety Rahangala selection was distributed

among farmers. 1300 pear rootstocks are available at RARDC to produce budded plants.

- Planting material production of Orange has been continued and 1000 budded plants of variety Arogya were produced and 500 were sold to farmers. Pineapple orange 1200 budded plants were produced and 200 plants have been given to horticulture farm Ulpathagama.

Production and use of organic fertilizer

- Development of IPNS package was initiated for citrus, tomato and bean. A ½ acre of IPNS demonstration site was established for vegetables. Compost production was continued and 30.5 mt was produced.

SERVICES

Breeder seed production

- DOA-SCS certified breeder seeds of Pole bean varieties Keppetipola Nil (154 kg.), Lanka Butter (60 kg.) and KWG (10 kg.) and Bush Bean Varieties Sanjaya (61 kg) and Wade (3 kg) were produced.

Soil test based fertilizer recommendation programme

- More than two hundred samples were tested and fertilizer recommendations were given accordingly.

TECHNOLOGY TRANSFER ACTIVITIES

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

- Conducted several training programmes for farmers on cultivation of flower crops, potato, pear and avocado. Some of those trainings were held at farmer fields.
- Provided advices for pests and diseases management to farmers who cultivate vegetables, fruits, flower crops and potato.
- Conducted training programmes for more than 1000 school students and 150 farmers.

PLAN FOR 2012

Vegetables

- NCVT and VAT of bush and pole bean.
- NCVT and Vat of Mustard.
- Studies on organically acceptable growth media for bell pepper in poly tunnels.
- Production of parent seed materials of DOA recommended hybrid tomato and brinjal.
- Germplasm collection and evaluation of pole bean.
- Identification of proper planting density for seed and root production of “Lanka Carrot”.

Seed Production

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

Potato

- Production of quality seeds through Rooted Stem Cuttings.
- NCVT & VAT trials collaboratively conducting with ARS Sita Eliya.

- Establishment and technology development for hydroponic seed potato production.
- Technology development for yield maximization of potato mini-tubers and RSC.

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.
- Evaluation of rootstock varieties and materials for orange.
- Enhancement of post harvest storage life of pear and peach.
- Citrus flower induction studies.

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 gray mold (*Botrytis cinerea*).
- Laboratory and field evaluation of cabbage varieties against soft rot (*Erwinia carotovora*) disease.
- Development of IPM package for Citrus.
- Identification of an IDM package for root rots of bean.
- Control of gray mould and stem break of gerbera through fertilizers.
- Screening of new insecticides against vegetable pests.

- Management of sucking pests (thrips) on capsicum in organic farming.
- Effect of row intercropping system on pest incidence in Cabbage.
- Use of herbal extracts and mulches to reduce pest incidence of capsicum and tomato

Floriculture

- Evaluation of propagating materials of gerbera.
- Increase of flower quality of chrysanthemum.
- Development of post harvest quality management package for super daisy.
- Identification of optimum plant density for high quality cut flower production of Roses.

Tissue Culture

- Increased sucker production in gerbera through growth hormones
- Use of chemical mutagens and UV rays to improve flower quality of Ox-eye daisy.
- Planting material production of Potato, Anthurium, Madonna lily, and Gerbera.

Soil Science

- Establishment of N, P, and K fertilizer levels for seed potato production.
- Development of fertilizer package for short age cauliflower varieties.
- Formulation of low cost fertilizer mixture for soil based cultivation of crops in poly tunnels.
- IPNS for bean, tomato and citrus.
- Control of nutrient deficiency symptoms in citrus.
- .Development of completely soluble fertilizer mixture for hydroponics.

STAFF LIST

Designation	No.
Research Officer In Charge	01
Research Officer	18
Agricultural Monitoring Officer	01
Economist Assistant	01
Programme Assistant	05
Research Assistant	12
Agricultural Instructor	12
Laboratory Sub Assistant	02
Public Management Assistant	09
KKS	03
Driver	07
Tractor Operator	03
Budder	02
Mason	01
Carpenter	01
Watcher	13
Circuit Bungalow Keeper	01
Permanent Labourer	83
Labourer (Contract)	74
Total	249

2.2.5 REGIONAL AGRICULTURAL RESEARCH & DEVELOPMENT CENTRE (RARDC) - MAKANDURA

The regional Agricultural Research and development Centre (RARDC) at Makandura caters to the agricultural research and development (R&D) needs of the Gampaha, Kurunegala and Puttalam districts. The two agricultural research station (ARS) at Kalpitiya and Vanathawilluwa, the

three adaptive research units (ARU) at Tabbowa, Iginimitiya and Wariyapola. The research and development activities of the center are focused mainly on developing and integrating technologies for coconut based cropping system to sustain crop productivity in the area

BUDGET

Table 2.2.5.1: Annual budget – 2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	3,045,226	1,077,156	35
Recurrent	4,622,929	4,638,051	100
Production of compost and promotion of integrated plant nutrient system	7,770,000	6,881,135	89
NARP	500,000	447,613	90
Tissue culture Project	2,000,000	1,517,465	76
Fruit planting material production			
Pineapple	330,000	327,651	99
Rambutan	100,000	84,601	85
Root & tuber crops	70,000	36,000	51
Total	18,438,155	15,009,672	81

PROGRESS

RESEARCH

Soil Science

- 130 Compost samples sent by compost producer analyzed for evaluating their quality and 117compost sampled analyzed for research progress.
- 39 Soil samples received under the soil test fertilizer recommendation based on soil analyzed.

- 27 plant samples and 96 water samples were analyzed.

Root & Tuber crops

- Hormone testing in cassava over 20% yield increments of cassava.
- Fertilizer study in sweet potato and NPK 60:140:120- gave highly significant yield increment.

Vegetables

- Selected & local pumpkin varieties, purified those varieties & produced inbred lines. Two

inbred lines will be used to conduct NCVT trials in different zones.

in total nitrogen supply in flower production in anthurium than N nutrient having unmixed ammonium sulphate or calcium nitrate fertilizer.

Floriculture

- N fertilizer having N-NH₄⁺ and N-NO₃⁻ at a ratio of 2:1 and 1:2 were more effective

PLANTING MATERIAL PRODUCTION

Table 2.2.5.2: Planting material production during 2011

Institute	Name of Plant	No. of plants sold
1 RARDC-MK	Dragon Fruit	878
	Anthurium	1,020
	Pineapple	12,400
	Banana	959
2. ARS-Kalpitiya	Pomegranate	18,321
	Grapes	1,705
	Guava	2,100

TECHNOLOGY DISSEMINATION

Training programmes

Table 2.2.5.3: No. of training programmes conducted during 2011

Topic of the programme	No. of Programmes	No. of Participants
Compost	189	11,102
Mushroom	5	142
Pineapples	5	220
Floriculture	10	206
Home garden	110	5,500
Root & Tuber		University students-4 Diploma holders-2
Dragon Fruit	10	100
Vegetable		University student- 10 Diploma holders- 15 School children -100

Advisory Services

Table 2.2.5.4: No. of advisory services provided during 2011

Field	No. of Advisory
Compost	40
Mushroom	125
Pineapples	60
Floriculture	10
Home garden	30
Root & Tuber	5
Dragon Fruit	160
Pathology	75
Entomology	20
Rice	120
Vegetable	25
Banana	760

PLAN FOR 2012

Fruit Breeding & Tissue culture

- Pineapple hybridization program
- Hybridization programme of pomegranate
- Mutation Breeding of Anona (Katu anoda)
- Planting material production of Pineapple & Banana by tissue culture techniques

Fruit Agronomy

- Banana germplasm collection, evaluation and characterization
- Finding a optimum plant density for dragon fruit cultivation
- Variety Evaluation of Banana (Seeni kesel)
- National Coordinated Variety Trial – Banana

Entomology

- Comparison of organic and conventional management systems for banana pests

Soil science

- Soil, water, compost and plant sample analysis.
- Survey on usage of fertilizer and irrigation techniques on vegetables & fruits in Kalpitiya Peninsula.
- Assessment of the inorganic nutrient requirement and the response of Pineapple to the addition of N & K.
- Survey on macro & micro nutrients on Pineapple in Gampaha & Kurunegala districts, mapping spatial variability of inherent capacity of soil and develop a best nutrient management practice for higher and quality production .
- Evaluation of Gliricidia hedge row cultivation under coconut
- Evaluation of vermin compost in improving yield of Gotukola
- Evaluation of different levels of Eppawela rock phosphate (ERP) on compost quality

Vegetables

- Evaluation of local pumpkin germplasm to select better parents for production of pumpkin F1 hybrid.
- Development of Green chili variety
- Purification of Green chili variety
- Breeder seeds production of Bitter gourd variety
- Breeder seeds production of Snake gourd variety
- NCVT brinjal
- NCVT cucumber
- NCVT Chili

Floriculture

- Evaluation of fertigation for anthurium cultivation in rain shelter
- Establishment of germplasm collection and breeding programme in anthurium cut flowers
- Effect of vermicompost on plant growth and suppress the disease on *Dracaena sanderiana*.

Pathology

- Testing of the suitability of banana leaves as a cultivation medium for straw mushroom (*Volvariella volvacea*)
- Testing of suitability of straw as a growing media for oyster mushroom (*Pleurotus ostreatus*)
- Application of lime to control bacterial wilt (*Ralstonia solanacearum*) of ginger

STAFF LIST

Designation	No.
Deputy Director (Research)	01
Research Officer	11
Agriculture Monitoring Officer	02
Programme Assistant	04
Agricultural Instructor	23
Research Assistant	06
Farm Clerk	01
Research Sub Assistant	01
Driver	03
KKS	01
Mason	01
Watcher	04
Mechanic	01
Nurseryman	01
Special Labourer	02
Electrician	01
Circuit Bungalow Keeper	01
Tractor Operator	03
Sanitary Labourer	01
Water pump Operator	01
Grass Cutter	01
Laborer	64
Total	134

2.2.6 AGRICULTURAL RESEARCH STATION (ARS) -

SITA ELIYA

Research and development activities of Agriculture Research Station, Sita Eliya, focus on productivity improvement of potato, up country vegetables, selected temperate fruit, floricultural crops and need based research for protected agriculture. This station is also responsible for producing initial

planting material of Potato, Strawberry, Baby's breath and Gerbera for national requirement. In addition, it provides training and technical advice to government farms, farmers and extension staff and students of different categories.

BUDGET

Table 2.2.6.1: Annual Budget -2011(Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	1,187,220	1,182,510	100
Recurrent	4,477,001	3,185,029	71
Expansion of seed potato production	5,500,000	5,494,367	100
Improvement of seed potato production technology	1,100,000	674,234	61
Development of new potato varieties for local conditions	306,000	304,978	100
Evaluation of citrus varieties	100,000	85,904	86
Biological Control of Black Cut Worm	200,000	161,093	81
Promotion of quality planting materials of important crops through tissue culture	3,100,000	1,600,077	52
Production and usage of Organic fertilizer	1,250,000	1,002,311	80
Model Village	100,000	70,398	70
Total	17,320,221	13,760,901	79

PROGRESS

RESEARCH

Agronomy

- Twenty commercial potato varieties imported during 2010/11 were evaluated in Nuwara Eliya and Badulla districts and two new varieties namely, YP 03-107 and Toluka were found to be promising under UCWZ.
- Seed production of potato variety Golden Star under hydroponic system was perfected by manipulating strength of nutrition solution.
- Performance of cut seed tubers were studied and there were no significant difference between whole tuber and cut tuber under UCWZ during Yala 2011.

- Two commercial potato varieties viz. Calwhite & Red la soda were found to be promising in Jaffna district under research management.

Plant Breeding

- Ten locally developed potato lines were evaluated under NCVT.
- Out of 2814 locally developed potato lines, 189 lines screened for late blight, powdery scab & bacterial wilt & found no resistance.
- 11 locally developed potato lines were evaluated under AMYT.
- 7 locally developed potato lines were evaluated under MYT.

Tissue culture

- A protocol was developed for micro-propagation of *Limonium latifolium*.
- Developed a low cost protocol for mass production of *Gypsophila paniculata*

Plant Pathology

- Amistar and Fluazinam were found to be giving effective control against late blight of potato
- The new fungicide, namely Ridomil Gold was effective in controlling late blight of potato under farmers' field conditions
- New potato varieties YP/07/03, Toluka, Rosarna, Ambition and YP/93/104 were highly tolerant to late blight and gave higher yield under sprayed conditions
- 21 different isolates of *Xanthomonas campestris* pv. *campestris* showed varying degree of virulence on different cruciferous crops
- Futrifol was found to be effective in controlling powdery mildew of Zucchini

- New potato lines screened against different diseases of potato
 - 150 lines against late blight
 - 21 lines and varieties against Powdery scab
 - 18 lines against bacterial wilt

Entomology

- New formulation of Abamactin 36g/l EC was recommended for the control of larval stages of the *Liriomyza huidobrensis* under the farmer field.
- Thiamethoxam 75 WG 50g/ha was recommended for the control of whiteflies and thrips on potato.
- Biology of larval instars of Vegetable leaf miner (*Liriomyza huidobrensis*) was studied and duration taken for the development of 1st 2nd & 3rd larval stages were identified .
- Chlorantraniliprole 200g/l SC and Virtako 20 WG (Chlorantraniliprole + Thiamethoxam) had given better control over damage of *Agriotis ipsilon*.

Soil Science

- Two new formulations for hydroponic system were developed and compared with Albert's solution. One of the solutions is comparable to Albert's solution but need modifications.

Vegetables

- Three cabbage varieties namely, Green Lake, Sky Line and Bronco were performed well under UCWZ and recommended for importation.
- New beet variety, Bricores performed well in terms of yield and tolerance to pest & disease under UCWZ and recommended for importation.

- New lettuce varieties, Rubex (Red Lolo rosa type), Opel ((Red Lolo rosa type), marble and Jade performed well under UCWZ and recommended for importation.

DEVELOPMENT ACTIVITIES

Agronomy

- 402,330 numbers of G₀ mini tubers were produced and 252,330 of these seeds were issued to farmers for polytunnel and open field seed production. The balance is under storage for distribution during 2012.
- Establishment of seven hydroponic units in farmer field under IFAD project.
- Constructed an aeroponic unit (300 m²) for SPMDC in Sita Eliya.
- Construction of a new hydroponic unit (44 m²) at research station under IFAD project.

Tissue culture

Disease free *in-vitro* plant production

Potato: 1906 numbers of *in-vitro* plants of variety Granola were issued for formal seed potato production programme and another 2953 numbers of *in-vitro* plants were issued for experimental purposes.

Strawberry: Supplied 432 numbers of *in-vitro* plants and 10,037 numbers of *in-vitro* derived planting material to farmers directly and through Provincial DOA, Nuwara Eliya. 1121 numbers of plants used for runner production at the research station.

Floricultural crops: 3430 numbers of Baby's breath, 3007 numbers of Madona lily and 100 numbers of Gerbera plants were produced and issued for private growers.

Entomology

1384 soil samples were analyzed from Govt. seed potato farms and no PCN was detected.

Pathology

- 1384 soil samples were analyzed for bacterial wilt.
- 15 plant samples were received for diagnosing diseases and given recommendations
- 12kg oyster spawn and 3 kg button mushroom were distributed among farmers.

Soil Science

- Soil testing for fertilizer recommendations,
 - pH- 242 , Phosphorus (P)- 99 ,
 - Potash (K) - 99
- 60MT of compost was produced.

Technology Dissemination

Farmers	: 200
Agriculture related officers	: 250
University students	: 155
Agriculture diploma Students	: 221
Vocational Training Students	: 04
School teachers (Agriculture)	: 67
School Children	: 392

Other Activities

- Model Village programme
 - 64 numbers of farmers were selected from three villages namely, Meepilimana, Jayalanka, Katumana for cultivation of strawberry, potato and floricultural crops, mushroom. Nine training programmes were conducted and six demonstrations were carried out.

PLAN FOR 2012

RESEARCH

Agronomy

- Evaluation of four commercial potato varieties
- Development of new techniques for pre-basic & basic seed production
- Storage studies for minitubers & different generations of seed tubers
- Performance of cut tuber potato under up country wet Zone

Plant Breeding

- Evaluation of heat tolerant commercial varieties
- Evaluation of new potato breeding lines for suitable traits
- Development of new potato varieties
- NCVT /VAT

Tissue culture

- Study on planting material production for pears & citrus
- Mutation breeding of potato for development of bacterial wilt resistant varieties
- Anther culture of potato
- Increase of number of micro tuber per plant & identify the suitable storage conditions

Plant Pathology

- Screening of potato varieties for Powdery Scab, Late Blight & Bacterial Wilt.
- Screening of breeding lines for potato for Powdery Scab, Late Blight & Bacterial Wilt.
- Screening of fungicides for Late Blight.

- Management of *Xanthomonas* of cruciferae crops.
- Testing of soil sample for Bacterial Wilt.
- Assessment of Powdery Scab in Government Farms & Farmer fields.
- Screening of Chemical on Zucchini.
- Virus Indexing of potato in-vitro plants.
- Screening of fungicides for *Mycosphaerella* on Cabbage.
- Effect of Poultry manure on populations of *Ralstonia solanacearum* in potato fields

Entomology

- Bio control of Black cut worm
- Mass rearing & augmentation of *Diglyphus isaea*
- Monitoring of PCN in Govt. seed farms
- Bio Control of White grubs using Bt
- Bio control of DBM
- Screening of new insecticides against black cut worm
- Screening of new insecticides against sucking pest complex of potato
- Root knot management on guava

Soil Science

- Testing of different nutrient formulations for hydroponic & aeroponic systems
- Increase productivity through nutrient management & microbial activity
- Testing of new fertilizer formula for seed potato production

- Testing of new fertilizer formula for ware potato production
- Effect of time of application of N on growth&yield of potato
- Land improvement & soil conservation

Vegetables

- Development of seed production technology for carrot & beet root
- Exotic vegetable varietal evaluation Carrot, Cabbage, Leek varieties
- Breeder seed production of lanka ball radish

DEVELOPMENT ACTIVITIES

Agronomy

- Production of 2 million pre basic seeds and distribute among farmers.
- Establishment of new aeroponic unit in research station.
- Establishment of hydroponic unit in farm division.

Tissue culture

- Diseases free potato in-vitro mother plant production
- Quality planting material production of strawberry Variety Chandler
- Collection & maintainace of floricultural crops Baby's breath, Madonna lily, Gerbera & Limonium
- Disease free potato micro tuber production

STAFF LIST

Designation	No.
Research Officer In Charge	01
Research Officer	09
Programme Assistant	03
Research Assistant	04
Agricultural Instructor	05
Research Sub Assistant	02
Public Management Assistants' Service	04
Watcher	01
Labourer	18
Labourer (Contract)	39
Total	86

2.2.7 AGRICULTURE RESEARCH STATION (ARS)

- TELIJJAWILA

Agriculture Research Station, Telijjawila is a satellite station of HORDI, Gannoruwa located in Matara district. It is responsible for implementing research activities to address the field problems in the southern province. The major areas of research are agronomy and plant protection for fruits,

vegetables including mushroom and root & tuber crops. In addition, under development programmes model villages, production and popularization of organic manure, planting materials production and farm development were implemented.

BUDGET

Table 2.2.7.1: Annual budget-2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	3247,222	3205,315	99
Capital	1192,540	1048021	88
Projects	200,000	199,110	100
Production and use of organic fertilizer			
Fruit plant production programme	600,000	594,286	99
Model village programme	500,000	495,979	99
Farm development & planting material production	2379,000	2333,562	98
Total	8,118,762	7,876,273	97

PROGRESS

Identification of suitable cover crops for controlling weeds in pineapple cultivations

An effective and environmentally friendly weed controlling technique has been developed. Mukunuvanna provided an effective ground cover while generating an additional income. In addition, practical

problems encountered with this developed technique were identified.

Testing of the impact of mealy bug eliminating heat treatment on pineapple wilting virus of planting materials

Heat treated mother stumps (60 °C for 03 - 04 mts) produced mealy bug free and pineapple wilting virus free (Confirmed with laboratory testing) suckers as planting materials.

Development of a nondestructive method to estimate leaf area of pineapple and banana

A best fitted statistical function was developed to estimate leaf area of pineapple and banana without disturbing leaves.

Feasibility of using pleurotus spent Mushroom substrate for subsequent cultivation

It was identified that the inclusion of spent mushroom substrate at 50% (W/W) to the conventional media increased the mushroom yield by two fold.

Potential applicability of 4 different waste materials for pleurotus cultivation

Addition of paddy husk to conventional mushroom growth substrate increase the biological efficiency of the substrate.

***In-vitro* mutagenesis of banana for Fusarium wilt resistance/tolerance**

Cultures of cultivar Agra were established.

Micro propagation of spine gourd

Cultures of three varieties were established in two media.

NCVT programmes of Mae and Brinjal

Field evaluations are in progress

Progress of special projects

Fruit plant production programme

- About 8200 banana suckers were produced by conventional mean and distributed for Divi naguma programmes
- About 47000 suckers of pineapple were produced and issued for growers under Model village programmes and for extension division on requests.

Model village programme

- Six villages were established
- Two commercial scale nurseries and two commercial scale compost making units were established
- About 65 farmers were provided with planting materials and other inputs
- Six training classes were conducted.

Production and use of Organic Manure

- About 25 tons of composts have been produced
- Three tons of inoculums were produced and 400 bags in 05 kg were distributed

Farm development and planting material production

- Production of planting materials :

Pineapple	- 25000
Passion fruit	- 1000
Kiriala	- 16000
Cassava	- 500 m
Banana	- 10000
Leafy vegetables	-250 g
- Materials were purchased for fencing around 01 km
- Established 2000 arecanut trees
- Established 50 budded jak plants and 450 seedlings
- Uprooted 305 diseased coconut trees
- About 1000 marginal coconut trees were manured.
- About 05 ha of farm lands were developed
- A potting shed and a field store were partially built
- A store room for mushroom production unit was partially built
- Water well was dug and an irrigation system was established.

Infra Structure Development

- Completion of the constructions of toilet system.
- Repairing of two vehicles
- Construction of a rest room for labourers
- Completion of the acquiring of the land from LRC to the DOA
- Preparation of a formal plan of the farm land after the acquisition

PLAN FOR 2012

Continuation of ongoing research programmes on Banana, Pineapple, Mango, Kiriala, Citrus, Guava, under utilized fruit crops, mushroom , and vegetables

- Formulation of an effective nutrient combination for pineapple
- Nutrient (K) management for the productivity and quality enhancement of banana
- In - vitro mutagenesis of banana for fusarium wilt tolerance
- Micro propagation of Spine gourd
- NCVT programmes for vegetables
- Breeding programmes for vegetables
- Testing of four used substrates for oyster mushroom cultivation
- Substrate formulation for oyster mushroom cultivation using delayed released nutrients
- optimization of the growth substrate for oyster mushroom cultivation

STAFF LIST

Designation	No.
Research Officer In Charge	01
Research Officer	02
Agricultural Instructor	06
Research Assistant	02
Research Sub Assistant	01
Programme Assistant	03
Public Management Assistant	03
Driver	02
Watcher	04
Sanitary Labourer	01
Labourer	04
Labourer (Contract)	35
Total	64

2.2.8 AGRICULTURAL RESEARCH STATION (ARS)

- GIRANDURUKOTTE

The Agriculture Research Station, Girandurukotte, established in 1980 by the Mahaweli Authority of Sri Lanka, is responsible for research and development activities in agriculture, and in particular for addressing the field problems pertaining to

crop production of the farming community in Mahaweli system “C”. In addition to the research and production programmes, the ARS conduct regular training programmes for officers, farmers and students.

BUDGET

Table 2.2.8.1: Annual budget - 2011(Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	2,566,243	2,238,813	87
Recurrent	2,945,929	2,874,652	98
Projects			
• Hybrid seed Production programme of Maize (var. Sampath)	300,000	275,880	92
• Organic Fertilizer Production and Promotion Project	500,000	450,392	90
• NCVT of Banana	50,000	49,667	99
• NARP Citrus Project	100,000	99,685	100
• Seed Paddy Production Bg 250	400,000	359,294	90
• Seed Paddy Production Bg 366	630,000	303,590	48
• Papaya Seed Production Programme (Rathna)	400,000	225,209	56
• Model Village Programme	100,000	63,544	64
Total	7,992,172	6,940,726	87

PROGRESS

Research

Fruits

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

Rice (NCRVT)

Varieties of 2 ½ month, 3 months, 3 ½ months, 4 month and 4 ½ month age groups were tested in 2011.

Vegetables

- National coordinated varietal trials for following vegetables were conducted.
 - Brinjal - 05 varieties
 - Mae- 07 varieties
- Varietal Adoptability Trials for okra – 4 varieties, were conducted.

Seed Production Programme

Hybrid Maize Seed Production

Hybrid maize seed production block was established in 01 ha and produced over to Regional Assistant Director, Pelwehera and 22 kgs sold.

Seed Paddy Production

During 2011, 28.6 MT of seed paddy from Bg 250 were produced.

Planting Material Production

Table 2.2.8.2: Planting materials produced during 2011

Crop	Varieties	Production
Banana	Seenikesel, Embulkesel, Kolikuttu, Ash plantain, Kandula and Other varieties	683 suckers
Papaya	Rathna	499 potted plants
Pineapple	Mauritius	1452 potted plants
Kiriala	Isuru	300 plants
Cassava	Kirikawadi and Jaffna selection	518 meters of stems
Sweet potato	Gannoruwasudu, Ranabima, Ama and Dhawala	55 kg of cuttings
Embaralla	Short	10 potted plants
Dragon fruit		07 potted plants
Passion fruit		200 potted plants

Compost Production and Promotion Programme

41 mt of compost were produced and 1990 kgs were distributed out of 4000 Kg of inoculum produced. 398 participants were trained.

Technology Dissemination

Several training programmes were conducted at ARS Girandurukotte during year 2011

- “Modal village” Programme (02 programmes for 20 participants)
- Field demonstration for Banana and Pineapple mix cropping.

150 school children, farmers and government officers visited the station for information.

PLAN FOR 2012

- National coordinated variety trails of selected vegetables.
- National coordinated rice variety trail.
- National coordinated variety trials of selected tuber crops and OFC
- Organic fertilizer production and promotion programme.
- Basic and standard seed production of Papaya variety “Rathna”
- Seed paddy production of varieties of Bg 250 and BG 366
- 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

Designation	No.
Research Officer In Charge	01
Research Officer	04
Agricultural Instructor	06
Research Assistant	02
Research Sub Assistant	02
Public Management Assistant (Grade III)	01
Tractor Operator	01
Storeman	01
Carpenter	01
Watcher	04
Unskilled labourer (Grade III)	26
Labourer (Contract)	27
Total	77

2.2.9 HORTICULTURAL RESEARCH UNIT 2 - GANNORUWA

Horticultural Research Unit 2 at Gannoruwa is the specialized Research and development Station for Fruit Crops under the administration of the Horticultural Crops Research and Development Institute (HORDI) situated closer to HORDI, about two kilometers from Peradeniya junction along Gannoruwa-Katugastota road.

This Research Unit enjoys a prestigious history as Kandian king's recreational and horticultural park was located over these premises. After surrendering the whole island to British Crown, Sir Edward Banters the governor of Ceylon (1824-1831) opened up this area and established his private garden and paddocks for horse rearing. His cultivation of tea, rubber, spice crops, fruits and grass continued until 1916. Mr. R.L. Lyne, the First Director of Agriculture took over this farm and converted into crop research farm of the newly

formed Department of Agriculture in 1912. After few restructuring programs took place in following 100 years, this farm totally converted into a Fruit Crops Research Station of the HORDI, naming it as Horticulture Research Unit

Horticultural Research Unit 2(HRU- 2) spreads 25.2 ha at present. This unit conducts research, development and technology on Rambutan, Durian, avocado, mango, sweet orange, jackfruit, mandarin, sapodilla, banana and many under-utilized fruit crops including beli, masan, jambu, veralu etc. Varietals development (selection and evaluation of local and exotic variation), propagation techniques, nursery management, orchard establishment and management flowering induction and off-season for fruit production and productivity enhancement are the major areas worked on.

BUDGET

Table 2.2.9.1: Annual Budget - 2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	3,220,715	3,043,683	95
Projects			
Yield & quality improvement of Mango	425,000	343,546	81
Model Village Project	200,000	150,369	75
Tissue Culture Project (Banana & Pineapple)	250,000	235,370	94
Planting Material Production	470,000	301,382	64
SPMDC Project	183,000	185,804	102
SLUSA Project	250,000	183,324	73
Deyata Kirula	1,000,000	800,000	80
Centenary Celebrations	300,000	300,000	100
Compost Project	100,000	95,000	95
Total	6,398,715	5,638,478	88

PROGRESS

RESEARCH

Maintenance of durian germplasm

collection

A block of 1.5 acre has been developed with durian germplasm collection. Newly

released varieties (Ambatenne and Kasun) and other potential accessions have been planted in this block (Table 2.2.9.2). This block is being experiencing maintenance difficulties due to lack of field labour, irrigation facilities and lack of other inputs. However, the progress is slow due to casualties of the field planted grafts.

Table 2.2.9.2: Durian varieties and accessions in the germplasm block

Accession No.	Selection name	No of plants	Status
D - 6	Kasun	12	04 trees growing vigorously, 02 died but replaced
D - 11	Ambatenna	12	09 plants are growing vigorously
D - 3	Gannoruwa - 3	3	All growing vigorously
D - 1	Gannoruwa – 1	3	All growing slowly
D – 2	Selection	2	All growing slowly
D - 5	Selection	1	Early growing stage, growing slowly
D - 4	Selection	4	Growing stage, growing slowly
D -31	Selection	1	Died
D - 32	Selection	1	Growing vigorously. 02 new plants planted
Ratnapura W	Selection	6	

Status: Maintenance of these trees is continued aiming to select promising varieties in future

Maintenance of avocado germplasm collection

This is the first exotic avocado germplasm block established by the Horticultural Project of the FAO/DOA in 1987/88. This block is being maintained for future studies. Most of them have been attacked by pests thus need rehabilitation or rejuvenation. Table 2.2.9.3 shows the status of this block.

Table 2.2.9.3: Avocado varieties in the germplasm block

Variety	No of trees	Remarks
Fuerte	6	Rehabilitation is a
Tower 2	3	continuous process.
Booth 7	6	Following trees died
Simmonds	4	due top fungal
Booth 8	4	diseases e.g.
Choacat	4	<i>Phytophthora</i> collar
Monroe	2	rot.
Hass	4	
Waldin	7	Hass 10
Reed	4	grafts
Brook's Late	5	Fuerte 01
Pollock	2	grafts
Nebal	4	Simmonds 01
Shepherd	4	grafts
Pinkerton	4	Tower 2 01
Edranol	2	grafts
		About 15 grafts of Hass variety were established at another place of this Unit. They are growing vigorously. Fuerte, Tower 2, Hass, Booth 7 and Walding are fruiting.

Maintenance of other varieties is continued aiming to select promising varieties in future.

Improving conventional vegetative propagation techniques of avocado

Improvement of the efficiency of wedge grafting is a need as the limitation of uniform scion wood in large scale affects commercial planting material production

Observational studies revealed that length; maturity and presence of apex of the scion wood affect the efficiency of bud take on wedge grafted on 1 month old rootstock seedlings raised in polythene bags. Mature scion wood of about 5-10 cm length seem to be more suitable when the apex of them removed before wedge grafting. Replicated studies have been planned for next year. Observational trials resulted about 85% success 20 days after grafting. This paved use of mature twigs as scion wood for very young rootstocks.

Multiplication of 'Surath' pummelo variety for multilocational testing

About three hundred pummelo grafts were ready for distribution. Twenty five grafts have been distributed among private nurseries as mother plants. Another hundred grafts have been established at this research Unit for future uses. Others have been reserved for researchers for multi locational evaluations.

Field performance of tissue cultured Nethrapalam banana

Tissue cultured Nethrapalam suckers showed slow and less vigorous growth during first four months while the conventional suckers showed vigorous growth. However, the plant height, girth and number of leaves emerged were similar in both treatments a seven months after planting. Bunch yield was similar in both treatments (5.975 kg). Tissue culture technique is applicable for multiplication of Nethrapalam banana. However, new trial will be established to compare these with conventional cultivation.

Selection of elite cultivars of Longan (*Euphoria longana*)

This selection has fruits in large size (4.8- 7 g), good quality with 18-20 brix value. Further studies continued.

Perfecting propagation techniques for longan, wax apple and lansone

Vegetative propagation of longan is continued. Potting media of compost : sand 1 :1 ratio was the best medium for rooting of wax apple stem cuttings. Lansone can be successfully propagated through wedge grafting.

Studies on pest and diseases of ber (*Ziziphus mauritiana* and *Z. jujube*)

Bactrocera pyrifoliae and *Carponya versuviana* fruit fly species were identified in ber.

DEVELOPMENT WORK

Horticultural Research Unit has established two model villages in Kandy District for fruit crops (Table 2.2.9.4).

Table 2.2.9.4: Model Villages established

Divisional Secretariat	AI range	Grama Niladhari Division	No. of beneficiaries	Fruit crop	Other benefits granted
Teldeniya	Udispattuwa	Ranwala	40 farm families	Mandarin, rambutan, sweet orange, durian, waraka, mango	Agro-techniques and minor tools (secateurs). Seventy old fruit trees were rehabilitated.
Udunuwara	Talawathura	Wegiriya	40 farm families	Mandarin, rambutan, avocado, beli, durian, mango, guava	One hundred sixty two grafts were established. Twenty equipment were distributed

Planting material production

Large number of grafted fruit plants, seedlings, suckers and rooted cuttings were produced at the Research Division and Farm Division separately.

Table 2.2.9.5: Planting material production

Crop	Research Division	Farm Division	Total	Remarks
Avocado	-	1596		Grafts, seedlings, rooted cuttings and layers are included
Rambutan	-	8796		
Durian	-	407		
Mango	-	2247		
Sweet orange	-	203		
Mandarin	-	284		
Other	2,600	13250		
Total	3,200	26783	29983	Masan and beli mainly in research division. Carambola, guava and jackfruit included in farm division. Grafts and rootstock seedlings included

Technology Transfer

A Fruit Crop Park at Nugawela Central College was completed. About 55 -50 fruits species and 200 plants established

Compost production programme

Compost production programme achieved 10 tons which was used for research plots. This programme is continued to expand.

TRAINING AND EXTENSION WORK

Following training programmes on fruit cultivation and nursery techniques were conducted during 2011.

Under graduates students

- 2 students; duration was 6 months

Diploma students

- 2 students; duration was 4 months

School pupils

- 2000; duration was one day

Provincial council DOA on special training

- 60 AII, SMO, AOO and DD

Department of Agriculture official/ seasons and special training - 350 AII, AOO, DD

Seasonal training program: Three programmes were conducted for DOA extension official

- Commercial fruit cultivation. Issues, technologies and potential
- Improving productivity of fruit crops
- Off-season fruit production

Special training programmes: Eight special training programmes conducted as follows

- Potential of foliar nutrition of fruit crops for Central Province extension staff (60 participants)
- “Present status, issues and potential of fruit industry of Sri Lanka: Role of the Department of Agriculture: Five

programmes were conducted for newly recruited SLAS officers. (4)

- Fruit crop propagation and nursery management to increase productivity of commercial horticultural nurseries: Two programmes conducted for the nurserymen and nursery in-charge officers of the DOA farms and SCS of the DOA.

One day training programmes: Six one day programmes were conducted for the school children when they visited this Research Unit.

Four month long special vocational training programme was conducted for one university student. She conducted advance research on avocado propagation under my supervision as the external supervisor.

Television programmes: Three television programmes were presented on following aspects.

- Fruit crop nursery management techniques
- Training and pruning of rambutan for high yield
- Avocado production: uses, potential and important aspects

Six radio programmes were conducted on following aspects

National level/ All Sinhala channel simultaneously: News Show

- Off-season fruit production: Potential and suitable techniques
- Improving productivity of fruit trees in home garden

Kandurata FM: Aswenna Programme on

Friday

- Improving productivity of fruit trees in home garden
- Design, placement and rehabilitation techniques of fruit trees in home gardens
- Flowering and fruiting problems in home gardens fruit trees

- d. Maintenance of Fruit Villages: issues and remedies

Newspapers – One article was published

- a. Commercial papaya cultivation

Agricultural Periodicals/ Magazine: Six articles were published

- a. Commercial banana cultivation: Govigedera April-June 2011
 b. Fruit and nuts, need research: AgTec, DOA March-April 2011

Edited 4 extension booklets/ field advisory notes of DOA

- a. Pineapple, mango, papaya and citrus

PLAN FOR 2012

Research

- Improving avocado wedge grafting technique
- Chemical flowering induction in avocado, mango and rambutan.
- Evaluation of tissue cultured Nethrapalam banana.
- Genetic improvement of Avocado cultivation using novel technology.
- Effect of different grafting of technique for jack
- Improvement of some underutilized fruit species aiming to commercial production.
- Development of propagation techniques for selected underutilized fruit crops.
- Development of early grafting in coir pots for fruit crop propagations.
- Studies on creating seedlessness in avocado, mango and Rambutan
- Effected foliar nutrition of pineapple aiming to replace ground application of fertilizers.
- Potential of foliar nutrition to suppress Papaya Ring Spot Virus symptoms

STAFF LIST

Designation	No.
Research Officer In-charge	01
Research Officer	01
Programme Assistant	01
Agricultural Instructor	05
Management Assistant	01
Farm Clerk	02
Driver	01
Watcher	06
Budder	02
Welder	01
Tractor Operator	01
Labourer	15
Labourer (Contract)	44
Total	81

2.3 RICE RESEARCH AND DEVELOPMENT INSTITUTE (RRDI) - BATALAGODA

Rice Research and Development Institute (RRDI) continues to play a major role in the country's rice sector by releasing new high yielding rice varieties and introducing improved rice production and protection technologies to help farmers to convince the yield potentials of the varieties that they grow. The research and development programme at RRDI focuses on increasing farm productivity

while reducing cost of production and improving grain quality of rice and supplying rice to consumers at affordable price.

During the year 2011, the country entered in a new arena searching for rice export potential for foreign markets. In recent history, Sri Lanka's capacity to export rice had not been investigated even though during the past couple of years it has been started. From the year 2009, rice exports have been increased from 4,000 mt (2009) to 10,000 mt (2010).

BUDGET

Table 2.3.1: Annual budget-2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	32,548,601	9,627,818	30
Recurrent	29,555,800	27,613,024	93
Special Project	152,000,000	7,319,451	5
Foreign funded projects			
Weed science (IRRI)	300,000	228,900	76
Green Super Rice (GSR)	2,619,843	599,846	23
Projects (Local)			
Hybrid seed production	2,700,000	1,954,642	72
Organic Manure	4,510,000	2,965,000	66
Model village	300,000	263,533	88
NARP (submergence)	2,000,000	1,600,215	80
NARP (fertilizer use)	4,200,000	3,421,489	81
NARP (weedy rice)	1,400,000	1,369,863	98
NARP (drought)	3,000,000	2,143,699	71
Total	235,134,244	59,107,479	25

PROGRESS

RICE VARIETAL IMPROVEMENT PROGRAMME

RRDI and its satellite stations continued its rice variety improvement activities through conventional as well as heterosis breeding. Substantial gains have achieved by developing rice varieties and new elite lines with wide genetic base for resistance to many biotic factors during the year 2011. Lines with tolerance to deep water and salinity stress were identified and further testings are in progress.

Newly Recommended Rice Varieties

Two new rice varieties (Bw 367 and Ld 368) were released in 2011 for commercial cultivation.

Bw 367 - white samba variety, belongs to 3.5 months age group. This has short round grain type which matures within 107 days in the Wet Zone and suitable for General cultivation island wide. The variety has a yield potential of 7.9 t/ha and having moderate resistance to Iron toxicity, a physiological disorder. This variety is more tolerant for lodging than the existing samba varieties. Tolerance to neck blast disease is another important character of the variety.

Ld 368 - belongs to 3.5 months age group, matures in 105 days under Wet Zone condition was released for island wide cultivation, It is a red, short round grain variety. This new variety has a realizable yield potential of over 7 t/ha and is resistant to Leaf Blast, Neck Blast and moderately resistant to Bacterial Leaf Blight, Rice Gall Midge and Brown Plant Hopper. The variety has none lodging plant type. Grain discoloration does not occur.

Breeding Programme - 4 – 4.5 month age class

In 2011, 55 different combinations of crosses were made and 41 F₁ populations were selected in the field for evaluation. Among them, 24 F₁ populations were selected for further advancement. In addition, seventeen F₂, thirteen F₃ and ten F₄ bulk populations were established in the field for evaluation and selection from previous crosses. From the F₅ generation onwards 1132 progenies of 43 advanced populations were established in the field for further evaluation and selection during Maha 2010/11 and Yala 2011 seasons. Eighteen elite lines were evaluated for grain yield and grain quality characteristics in Preliminary Yield Trials (PYT) and Major Yield Trials (MYT) using Bg 379-2 as the standard.

Breeding Programme - 3 ½ months age class

Yielding ability of few 3½ month rice varieties is similar or higher to 4 month rice varieties. Rice varietal improvement programme at RRDI has prioritized its breeding objectives to develop 3½ months age class rice varieties with high yielding, acceptable grain quality and resistance to major biotic and abiotic stresses. In 2011, 32 new F₁ crosses were made and out of them, 28 F₁ generations were established. Fourteen F₂ populations, nine F₃ populations and two F₄ populations from previous crosses were identified by early segregating populations. About 153 progenies were selected for advanced generations from 19 crosses.

From Preliminary Yield Trials (PYT) and Major Yield Trials (MYT), sixteen elite lines were selected and evaluated for yield potential, pest and disease reaction and grain quality against Bg 357 and Bg 358 as standard varieties. Four elite lines were nominated for National Coordinated Rice

Varietal Testing (NCRVT) programme as promising lines.

The promising line, Bg 3R is being tested in the Large Scale VAT programme island wide.

Breeding Programme - 3 months age class

Importance of this age class is increasing with the erratic rainfall pattern coupled with the shorter growing season. Therefore the priority of the breeding program at RRDI is given to this age class as well to identify high yielding and better quality rice lines with prolong resistance for Brown Plant Hopper (BPH), Rice Gall Midge (RGM), Bacterial Leaf Blight (BLB) and Blast.

Breeding programme - 2.5 months age class

The breeding programme to develop ultra short age varieties at RRDI continued in 2011 with the objectives of increasing grain yield potential with multiple resistances to BPH, RGM, BLB, Blast and Thrips. 45 crosses were made to develop new varieties. Eleven bulk populations and 370 progenies were advanced further. Preliminary Yield Trials (PYT) were established using 5 previous short round grains lines (10-2891, 2902, 2881, 2884, 2913) Of the above five varieties, 4 white were white pericarped and one was red pericarped) and Bg 250 was the standard. Elite line multiplication (Bg 10-2907) was continued to supply the purified seeds to conduct the NCRVT, VAT and LSVAT programme.

Advancement of breeding populations

Sixty crosses were made in 2011 with the aim of increasing yield potential, resistance to major pest (BPH, RGM) and diseases (Blast and BLB), improved grain quality and ability to withstand diverse environmental conditions. Out of 60 crosses, 48 F1 populations were established in the field and selected 13 populations for generation

advancement. In additions bulk populations of 28 crosses were established and 22 crosses were selected from F5 generation onwards from previous crosses. Approximately 812 progenies were evaluated for pest and diseases resistance and grain yield.

In preliminary Yield Trials (PYT) and Major Yield Trials (MYT), nine elite lines were tested with a standard variety, Bg 300 for their yield potential and grain quality. Five lines were selected as promising lines.

Three lines were nominated for NCRVT programme during 2011.

Improvement of traditional varieties through mutation

Objective of the research activity of traditional varieties was to develop varieties with lodging resistance and acceptable grain quality from traditional cultivars. *Suduru* samba and *suwanda* samba were muted in the past using Gamma irradiation. Modified bulk method was followed for further selection. Seed multiplication and purification of three advanced lines, SW 25, SSR 8, SSR 26 were performed and observational yield trials were conducted for two seasons in 2011.

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

Hybridization was performed earlier using *O. nivara* (WR ac 04) as a female parent and Bg 380 as male parent to develop BPH resistant rice variety. Two selected lines (WH 20 and WH 48) were established in 3 ½ month yield trial and these lines were multiplied for further yield evaluation.

Germplasm multiplication, characterization and conservation

As done in the past, 1500 rice accessions (including traditional cultivars, introductions and improved lines) were multiplied and conserved at RRDI at short term conservation unit in 2011. Seed samples were also distributed among farmers, school children, universities, NGOs and other interested groups upon their request.

Biotechnology

Molecular marker assisted back cross breeding programme was initiated under NARP (National Agricultural Research Plan) funds in 2011 to incorporate “sub 1” gene and salinity tolerant character into popular local rice varieties. Some markers for submergence and drought tolerance were identified and several crosses were made using them. Out of the many crosses, six were successful. Back crossing programme was also initiated to improve BLB resistance in popular varieties. BC1F1 of Bg250/IRBB 60//Bg250 was raised in the field.

Attempts were made to develop drought and salinity tolerant mutants using callus generated from seed embryos of Bg 250 and Bg 352 in 2011. Plants were raised in single row progenies (G1) to be selected for age and for better agronomic characters (plant type, tillering, grain type and seed color). Anther culture technology was carried out to induce gametoclonal variations to induce dwarfness in traditional varieties such as *Sudururu Samba*, *Rathel*, *Suduheenati* and *Suwandel* and calli were obtained.

Wide hybridization with embryo rescue is a useful technique to transfer important traits found in wild species into elite rice varieties. Therefore, in 2011, a single plant from *O. sativa* / *O. rhyzomatis* cross was advanced up to F2 generation. Recombinant

inbred lines are being developed as mapping populations for genetic studies in rice thrips (*Dahanala /Sudururu samba*), Submergence (Bg 300/*Goda heenati*) and Salinity (At354/Bg352).

HYBRID RICE

In addition to conventional breeding programme, hybridization of rice is a key technology aimed at bridging yield gaps and raising the yield potential. RRDI maintains several research programmes on hybrid heterosis to improve hybrid seed production.

Seed production of Bg HR–8, a variety with high yield and promising characters, developed under 3 – 3.5 month age category, was carried in 2011. Further to Bg HR–8, fifteen early maturing new hybrid rice combinations were developed at RRDI. These varieties proven to be higher yielders than the check varieties (Bg 357, Bg 300). Further studies will be conducted to study the line characters with respect to grain qualities and resistance to pest and diseases.

Development of parental lines (Restorer and CMS) is one of important activities in the Hybrid rice programme. New test crosses (325) were done in order to develop the new CMS and Restorer lines. Of them, 150 lines were selected to back cross nursery for further improvement of CMS. Purification of the lines was done and the required amount of seeds was produced in 2011.

Seed production of Bg 407 H was done and 90 Kg of F1 seeds were harvested in 2011. This seeds distributed among three farmers each in Trincomalee, Polonnaruwa and Anuradhapura districts in the Dry Zone with the objective of popularizing hybrid rice cultivation and to receiving their feedback.

Four Indian hybrid lines (CRH 501, CRH 502, PAC 832 and Swarna 02) were tested with local hybrids including two high yielding inbred check

varieties (Bg 300, Bg 357) in 2011. Variety Swarna 02 and PAC 832 were given higher yield than the other two Indian lines.

Nuclear seed production of promising hybrid lines were continued in 2011. Under natural out crossing, 300 crosses were made and 26 Kg of CMS seeds were obtained. Three hundred crosses were done in 4A/4B and 4Kg seeds of above CMS were obtained through natural out crossing. In addition 4A/SN 50 combinations were used for nuclear seed production and 250 crosses were made.

DISEASE MANAGEMENT

Effect of different fertilizers on grain discoloration of rice

Grain discoloration of rice, which is caused by a complex of fungal species, was becoming a devastating field problem in Sri Lanka in 2011. Therefore, investigations on the effect of different fertilizer applications on grain discoloration of rice was tested using organic manure, inorganic fertilizer, inorganic fertilizer + 25% organic manure and 75% inorganic + 25% organic manure with no fertilizer as the control. In comparison to inorganic fertilizer alone, the percentage discoloration was reduced in the combination of 75% inorganic recommended fertilizer + 25% organic manure.

Effect of *Oligochitosan* to control grain discoloration and rice blast disease

Oligochitosan, is a low molecular weight compound prepared by irradiating a Chitosan solution out of shrimp shells. This product is effective as a biotic elicitor and plant growth and yield promoter but results indicated no significant effect of *Oligochitosan* in controlling grain discoloration. *Oligochitosan* was used as a seed

treatment to test the effect of the material in controlling rice leaf blast disease. There wasn't a significant effect of *Oligochitosan* to control rice leaf blast when used as a seed treatment.

Screening for resistance to rice blast

Rice blast is a fungal disease in rice that causes severe damage to the crop. Therefore, entries comprising advanced progenies, all yield trials, CRVT and VAT entries were screened against blast disease. Number of entries were 1624 in 2010/2011 *Maha*, and 1502 in 2011 *Yala*. Among the lines screened 1269 entries in 2010/2011 *Maha* and 1277 entries in 2011 *Yala* were identified as resistant or moderately resistant to rice leaf blast.

Screening for bacterial blight resistance

Bacterial Leaf Blight (BLB) is an economically important bacterial disease in rice cultivation. BLB Control by chemical means is still not possible. Therefore, breeding elite rice lines for BLB resistance is the most effective and environmentally friendly option. Lines comprising all yield trials and CRVT were screened against BLB disease. Number of lines tested in 2010/2011 *Maha* was 138 lines and in 2011 *Yala* was 137. Among the lines screened, 52 lines in 2010/2011 *Maha* and 48 lines in 2011 *Yala* were categorized as resistant or moderately resistant.

PEST MANAGEMENT

Screening for pest resistance

Brown Plant Hopper (BPH) and Rice Gall Midge are the most important pests in paddy cultivation. In 2010/2011 *Maha* season 1513 entries were checked for resistance to Rice Gall Midge and BPH. 1023 and 940 entries were identified as resistance or moderately resistance to the RGM and BPH damage respectively. Out of 1323 entries, 706 of RGM resistance entries and 555 of BPH

resistance varieties were identified in 2011 yala season

New insecticide for control of paddy pests

Brown Plant Hopper and Rice leaf folder attack causes considerable yield loss to rice crop. There was a need to identify insecticides with different modes of actions and with low mammalian toxicity for the above two pests. Thiamethoxam and Clorantraniliprole were identified as most effective insecticide against Brown Plant Hopper and Rice leaf folder in 2011.

Biological products screening against rice pests – *Oligochitosan*

Oligochitosan was tested as a bio elicitor in 2011. It was found that *Oligochitosan* is effective in controlling BPH and thrips at the concentration of 50 ppm.

WEED MANAGEMENT

Evaluation of sprayers and standard nozzles for herbicide application

Selecting an appropriate sprayer and a nozzle is necessary to increase the efficiency of herbicides to control weeds in rice field. Three types of knapsack sprayers (Osatu sprayer, Swan sprayer and Hayesprayer) one power sprayer and three types of nozzles were evaluated. Similar weed control efficacy (70%-80%) was observed in three knapsack sprayers but less herbicide amount was required in Osatu sprayer. Weed control efficacy of both pre and post emergence herbicide were very poor in power sprayer. In addition, higher weed controlling efficacy was observed in deflective nozzle type than flat fan and hollow cone nozzles.

Variation in the morphology of offspring derived from single panicle of weedy rice

Morphologically, weedy rice closely resembles the cultivated rice. Panicles of seven morphologically different bio types of weedy rice from “Hathamuna Yaya” in Matara District were sampled and identified each bio types using characterization catalogue developed by RRDI in 2011. General linear models and cluster analysis were performed. Comparison of dendrograms showed there is a significant morphological variation resulting from wide segregation in the offspring derived from the selected seeds of the same panicle. The results further demonstrate that weedy rice fell into 112 groups based on panicle and grain characteristics. The opening of florets in weedy rice duration is longer than the cultivated rice. So, it is provided a greater possibility for cross pollination. The higher possibility of cross-pollination in weedy rice explains the high level of ODV found in weedy rice infested rice fields.

Weed dynamics and nutrient uptake under different moisture regimes

Water and weeds are often closely interlinked and a study was carried to evaluate the effect of different moisture regimes (Submerged, Saturated, Alternative Wetting and Drying (AWD) and 50% saturated conditions) on changes of weed flora, growth and effect on growth and yield of rice plant. The results indicated that in weeded condition at AWD gave the highest yield with higher NPK absorption by rice plant. Grass weeds were dominant in AWD and 50% saturated condition while broadleaf and sedges weeds were abundant at submerged condition. *Leptochloa chinensis*, *Ludwigia octovalvis* and *Monochoria vaginalis* were the most prominent weeds at submerged and saturated conditions whereas perennial grass weeds; *Paspalum* spp, *Cyanodon dactylon* and

Isachne globosa were the dominant at AWD moisture regimes.

Competitive interaction between weedy rice and cultivated rice

The competitive outcomes between rice (*Oryza sativa* L.) variety Bg 379-2 and a black-hulled weedy rice biotype collected from Matara District were tested to evaluate the competitive interactions between weedy rice and cultivated rice. Pot experiment was conducted. Bg 379-2 seeds were established with 15 cm spacing. These were grown with 0, 1, 2, 3, 4 and 5 weedy rice plants per pot depending on the treatment. Weedy rice density had significantly effect the plant height, leaf count, number of tillers, biomass production, yield and yield component of Bg 379-2. At high weedy rice densities (55 plants/m²), there was 78% grain yield loss of Bg 379-2 compared to control. Under 44, 33, 22 and 11 plants/ m² weedy rice densities, yield loss was 71%, 66%, 53% and 42% respectively. Results of the study clearly illustrate that black-hulled weedy rice biotype had a severe adverse effect on the growth and grain yield of cultivated Bg 379-2 rice variety. These results could be provided baseline information for farmer-awareness programs and to strengthen farmer capabilities of weed management in rice fields. In particular, these results may provide guidance and justification for the costs of weedy rice prevention and control measures.

Management of Weedy Rice in Wet Seeded Rice in Sri Lanka (NARP project)

The study developed an integrated approach for weedy rice management aiming at sustainable and profitable rice farming in the country. To educate farmers on weedy rice management, 25 awareness programs were conducted in ten locations including; Kurunegala, Puttlum, Polonnaruwa, Ampara, Rathnapura, Kalutara, Galle, Matara,

Hambanthota and Anuradhapura districts. Altogether 13 demonstration trials were conducted in highly infested weedy rice fields in Kurunegala, Polonnaruwa, Ampara, Rathnapura, Galle, Matara and Hambanthota.

Identified effective integrated control package including proper land preparation, used of weeds free seed paddy, application of pre emergence herbicides (pretilachlor) (1.6 l/ha) and different establishment methods (Transplanting, Seedling broadcasting, Row seeding with drum seeder and Random broadcasting) were demonstrated in farmer fields at 13 demonstration sites in Kurunegala, Polonnaruwa, Ampara, Rathnapura, Galle, Matara and Hambanthota. Those effective management practices were compared with farmer practice in each experimental site. Results indicated that transplanting and seedling broadcasting, row seeded establishment with above management practices highly reduced the emergence and growth of weedy rice and reduced the yield losses due to weedy rice compared with farmer practice.

National Coordinated Herbicide Screening Trial (NCHST) for wet seeded trial

The resilience of weed population under intensive herbicide use with continuous application builds up weed species tolerant to control methods used. Therefore, evaluation of newly introduced herbicides with superior characteristics such as broad spectrum of herbicidal activity, wide application window, and low toxicity herbicides are timely requirement. Seven candidate herbicides were tested in 2011 under lowland conditions and four herbicides (Butachlor, Propyrisulfuron, Bispyribac sodium+Metamifop, Bensulfuron methyl + Bispyribac sodium) were selected for pilot scale testing in farmer's fields.

Herbicide screening trial for dry seeding establishment

Eight already recommended herbicides were tested for dry seeding establishment. Among them 3-4 DPA followed by MCPA, Clincher followed by MCPA and Solito were selected for dry seeding establishment.

SOIL SCIENCE

Salt tolerant rice

Experiments to develop salt tolerant rice varieties were commenced in 2003 and now 17 rice lines were identified. Salt tolerant rice lines, Bg 11-139 and Bg 5-110 which gave higher yield (7 t/ha) under salinity conditions in farmers' fields in Puttlum and Polonnaruwa districts were introduced to National Coordinated Rice Varietal Testing (NCRVT) program for Island wide testing under diverse environmental conditions in 2011.

Response to chemical fertilizer

Development of rice varieties which thrive under low fertility levels is one of the options to reduce chemical fertilizer use in rice cultivation. With previous experiments, rice varieties, Bg 352, Bg 358, Bg 305, At 353, At 354, At 362, Bg 379-2 Murungakayan, Suduheenati, H4, H7 and H10 were identified as suitable for low fertility conditions. Experiments were commenced in 2011 to verify the performance of above varieties under low phosphorus conditions and are in progress.

Response of rice to potassium fertilizer application is rare under local conditions. Second and third season results obtained in 2011 from the long term experiment conducted at RRDI revealed that, with straw back to fields, application of half the DOA recommendation of potassium at Panicle Initiation (PI) alone gave similar grain yield compared to full DOA recommendation of potassium applied in

basal and in PI stages. The first season results of the same experimental condition at 37 locations in four districts; Kalutara, Polonnaruwa, Kurunegala and Hambanthota in 2011 under NARP project have proven above findings. Studies are in progress in all locations to ascertain long term effects.

Experiments conducted at 37 locations in four districts; Kalutara, Polonnaruwa, Kurunegala and Hambanthota in 2011 under NARP project revealed that application of nitrogen fertilizer based on Leaf Colour Charts (LCC) helps to reduce nitrogen fertilizer application by 25% - 33% without any yield reduction irrespective of the location. Further, it was observed in Polonnaruwa district that additional 5 % yield increment based on LCC nitrogen application can be obtained in comparison to DOA present recommendation.

Soil fertility tests were conducted in 2011 in a long term fertilizer experiment conducted at RRDI. It is revealed that, in terms of rice yield and soil fertility enhancement, combined application of chemical fertilizer and organic manure is superior to detached application of the same. Even though chemical fertilizer or organic manure is applied repeatedly every season to rice fields, building up of soil fertility above the critical levels does not occur in long run. Nevertheless, seasonal application of both organic manure and chemical fertilizer has proven optimum soil fertility levels.

A long term field experiment is set up at the RRDI to observe long term effect of application of phosphorous fertilizer in different methods. 4th season samples collected in 2011 revealed that; significant yield difference could be seen between no P treated plots and P treated plots. Even after 4th season, a significant yield difference was not observed between plots treated with alternative season P and seasonal P. Similar experiments were set up at 37 locations in four districts,

Polonnaruwa, Kurunegala, Kalutara and Hambanthota, in 2011 under NARP project to study the effect of alternative seasons P fertilizer application on grain yield. The first season results revealed no significant yield reduction due to absence of P fertilizer. Results indicated that application of P fertilizer at alternative seasons does not reduce grain yield but saves P fertilizer use. Experiments are in progress to ascertain further information.

Introduction of slow release fertilizer is one of the alternatives to reduce fertilizer wastage in rice cultivation. Different nano-formulations of N, P and K fertilizer were tested at green house conditions at RRDI in 2011. Of the different formulations, one formulation of each N and K was promising. Promising formulations were tested under field conditions in *maha* 2011/12 revealed that Potassium formulations are better than Nitrogen formulations in reducing fertilizer usage and increasing grain yield. Both formulations are being tested for second season to test for Nitrogen and Potassium supplying capacity.

WATER MANAGEMENT AND GIS

Effect of rice straw on potassium availability under water shortage condition at the critical stage of rice

Water shortage at critical growth stages is one of the main reasons for low productivity of the most rice growing environments. Experiments conducted in 2011 revealed that the effect of water shortage is most critical at flowering stage, which is one week before and after the flowering. It is further observed that rice plant limits the Potassium absorption under water shortage conditions. Potassium is an essential element that acts in most important physiological and biochemical functions that determines quality and quantity of the produce. So that low levels of Potassium reduces number of

spikelets per plant, number of panicles per plant, filled grain percentage and 1000 grain weight. Therefore, this results suggest that maintenance of proper moisture level at the critical growth stage of rice plant is important. Rice straw is readily available material that can be used to conserve available moisture in the soil. Hence this study was sought to determine the effect of rice straw on Potassium availability under water shortage conditions at the critical growth stages.

An experiment was conducted with two main treatments and two sub treatments; no water shortage throughout growing season and water shortage at the most critical stage were two were the main treatments. . The different fertilizer levels, NP only, NPK, NPK with straw and NP with straw were the four sub treatments. Results revealed that, in the absence of water shortage, there wasn't significant yield difference at four fertilizer treatments. When there is a water shortage, significant yield difference was observed among four fertilizer levels. The highest yield of 5.1 t/ha was recorded by NPK + straw and the lowest yield of 3.4 t/ha was given by the treatment by NP. Hence a significant yield response to Potassium and straw was observed at the water shortage at critical growth stage.

Demarcation of irrigated and rainfed paddy fields in Kurunegala district

Studies were conducted under NARP project to demarcate rainfed and irrigated paddy fields with the objective of introducing suitable rice varieties and management package to reduce yield variation in the district. Field boundaries for irrigated and rainfed paddy fields were demarcated on digital maps for 12 ASCs out of 55 Agrarian Service Centers in 2011. Maps were then produced as rainfed paddy, minor irrigated paddy and major irrigated paddy in Mahananiya, Ibbagamuwa and Alawwa ASCs. As the next step of the project,

rainfall data and soil physical properties will be analyzed in selected three ASCs to determine the water availability in rainfed paddy fields.

AGRONOMY

Variety evaluation for moisture limited environments

Selection of suitable rice varieties for moisture limited conditions is a prerequisite. Seventeen rice varieties selected after screening for dry conditions in the previous year were evaluated under both aerobic and dry conditions under IRRI/DOA collaborative research programme in 2011. DSN 11, DSN 22, DSN 37 and DSN 56 were found promising for moisture limited conditions.

The two varieties, CNI 9024 and CNI 9028 identified earlier as drought tolerant were tested in farmers' fields in the Intermediate Zone in 2011 for their adaptability and farmer acceptability, and found to be adaptable and acceptable.

National Coordinated Rice Variety Testing Programme (NCRVT)

During 2011, NCRVT program continued with 3 and 3½ maturity classes. Nine new rice lines of 3 month and 8 new lines of 3½ months duration were tested with standard check varieties in 8 locations under complete researcher managed conditions.

Following lines were selected for further testing in farmers' fields under the VAT program.

Bg 5-110 - 3½ month line tolerance to salinity

Bg 11-139 - 3½ month line tolerance to salinity

Bg 8-2398 - 3½ month line with an intermediate bold grain type

Variety Adaptability Testing Programme (VAT)

Trials for testing adaptability of 5 new elite lines namely At 7-800, At 6-631, Bw 5-1621, Bg 7-997 and Bg 6-1350 were conducted over 75 locations in the Dry, Intermediate and Wet zones in 2011. Among the lines tested, At 7-800 (3 month white), was superior to the standard check varieties.

Large Scale Variety Adaptability Testing Program (LSVAT)

In 2011, three new elite lines, At 4-486 (3 month white intermediate bold), At 6-650 (3½ month red samba), Ld 3-6-12 (3½ month white samba) were tested in large plots of farmers' fields to understand the farmers' acceptability. All three lines showed promising. They will be further popularized among farmers in future by distributing small seed packs and farmers' response will be gathered before considering for national release.

IPNS AND ORGANIC MANURE PRODUCTION AND PROMOTION PROGRAMME

Use of organic manure increases the inorganic fertilizer use efficiency and it supplies additional amount of essential nutrients to the soil. This phenomenon can be used to reduce the inorganic fertilizer use in rice production system without affecting to the yield. Experiment conducted with different combinations of inorganic and organic fertilizer for 2 seasons during 2011 revealed that, use of 4 t/ha straw and 2 t/ha compost with chemical fertilizer increases the fertilizer use efficiency and it indicated that 25% of chemical fertilizer can be reduced without affecting to the yield of rice grown in LCIZ.

This was also tested under large scale plot trials and shown that, 85% reduction of chemical fertilizer has not been affected to yield.

Effect of different levels of compost on grain yield of rice

Rate and time of compost application will help farmers to increase their crop yield. Nutrient supply capacity of organic manure and response to application of compost are not known for rice crop especially under organic farming. Therefore, experiment was conducted in 2011 to determine the required of amount compost and suitable time schedule to obtain high yield of rice grown in LCIZ. Application rates of 2,4,6,8 and 10 tons of compost per hectare (as a whole amount, basal alone and as two equal splits at basal in tillering phase) were tested for the crop organically grown. Results revealed that, grain yield was increased with increased compost application and split application was more beneficial than whole amount applied at once.

Compost production and promotion

During 2011, 191 tons of compost was produced using rice straw, grasses, vegetable waste, Gliricedia, Sesbania, Banana, Rock Phosphate and other plant debris available in the farm. In addition,

11 tons of quality inoculants for compost production were produced and distributed among farmers to use them in compost production. 3.75 ac of Gliricedia plantation was established during the year and 2.5 ac old plantation was maintained. 250 kg Sesbania seeds and 240 kg Sunhemp seeds were produced and 50kg of Sesbania seeds were distributed among farmers to produce seed under green manure promotion program. Thirty different composts were made using different ratios of organic materials and analyzed for nutrient contents. Eight types were found within the standards. This organic materials and mixing ratio can be recommended to farmers who are involving in compost production. Approximately, 3000 personals including farmers, students and officers were trained for organic manure production and its use in 2011. Inoculants and sesbania seeds were distributed among these trainees.

BREEDER SEED PRODUCTION

Breeder seed production of recommended varieties for all age classes was continued to assure genetical purity and quality seeds to national seed paddy production programme.

Table 2.3.2: Breeder seed produced (kg) during 2010/2011 Maha and 2011 Yala

Age class /Variety	Breeder seed Quantity (kg)		Total
	Maha 2010/11	Yala 2011	
<u>5 - 6 month</u>			
Bg 3-5	40	-	
Bg 745	40	-	40
<u>4 month</u>			
Bg 379-2	160	120	280
Bg 450	120	80	200
Bg 403	100	-	100
Bg 454	-	40	40
Bg 406	60	160	220
<u>3.5 month</u>			
Bg 94-1	80	160	240
Bg 352	80	260	340
Bg 357	80	60	140
Bg 358	140	280	420
Bg 359	160	200	360
Bg 360	60	140	300
Bg 366	200	160	360
<u>3 month</u>			
Bg 300	140	240	380
<u>80 Days</u>			
Bg 250	40	40	80

Productivity Enhancement in the Low Country Wet Zone Paddies

A special programme was launched in the Low Country Wet Zone districts (Kalutara, Galle, Matara, Gampaha, Colombo, Ratnapura and Kegalle) in 2011 under the special guidance of Ministry of agriculture with the objective of uplifting the paddy productivity and the farmer income. The Project will be conducted in collaboration with Provincial Department of Agriculture and the line institutes of the Department of Agriculture.

The preparatory focus group discussions were held with relevant stakeholders to trace the burning issues faced by the farmers in the locality. A benchmark survey will be conducted in connection

with Socio Economics and Planning Centre and a land characterization study will be done by the Natural Resources Management Centre of DOA.

TECHNOLOGY DISSEMINATION

Technology dissemination process commenced at RRDI premises with the formal inception of the "Rice Production Technology Training Center". Awareness programmes and full day trainings on proven technologies were delivered to relevant stake holders in 2011. Altogether, 4192 training programmes were conducted in 2011 for field extension staff, farmers, agriculture teachers, university students, school children and private sector participants. 809 school children attended trainings while 288 and 57 university students respectively from Agriculture Schools and Universities trained and assisted in completion of

thesis a research projects. Several research–Extension dialogues and seasonal meetings with the participation of extension staff of DOA and officials of other departments and ministries were conducted during 2011. Most importantly, 105 private sector official trainings were conducted. A field day was organized to demonstrate research and development activities of RRDI in line with the ceremonial opening of hostel complex attached to the training centre with the participation of the Hon Minister of Agriculture, other officials and farmers.

Model Village programme

Model Village programme initiated in 2010 was diffused to three more villages (Atalla, Bakmeewewa amd Manapaha) in 2011 with a special allocation received from the Ministry of Agriculture. The objective of the programme was to expedite the technology diffusion process to farmers, while increasing their farm income. RRDI disseminated selected rice technologies (Parachute method, Integrated Plant Nutrient System, Zero tillage, LSVAT and VAT) by establishing field demonstrations at the three villages in 2010/11 *Maha* season and 2011 *Yala* seasons. A seed multiplication programme was also undertaken and the effort was to maintain a sustainable system for own seed paddy production by the farmers.

RICE RESEARCH STATION, AMBALANTOTA

The main objectives of the existence Rice Research Station, Ambalantota are the development of improved red pericarped rice varieties, salinity tolerant varieties and high yielding short age rice varieties with the improvement of grain quality and incorporation of resistance to insect pests and diseases.

VARIETAL IMPROVEMENT

Hybridization and selection programme

About 100 crosses were made with above objectives during the year. About 106 bulk

populations were evaluated and 87 were selected for further evaluation. From F5 generation onwards, about 1474 progenies were established and 221 were selected for further evaluation as progenies and in yield trials.

Yield evaluation

About 26 lines were selected for preliminary yield trials (PYT) and 16 lines were selected from preliminary yield trials to evaluate in major yield trials (MYT) during the year

National Coordinated Rice Varietal Testing Programme (NCRVT)

Six newly developed lines; At 08-593, At 08-617, At 08-648, At 09-854, At 09-861 and At 09-1078 were further evaluated.

1. At 08-593- 3 months, red, basmati type line
2. At 08-617 - 3 months, white, long medium grain type line
3. At 08- 648 - 3 months, red, long slender grain type line
4. At 09- 854 - 3 months, white, small round grain type line
5. At 09- 861 - 3 months, white, small round grain type line
6. At 08-1078 - 3 1/2 months, red, Intermediate bald grain type line

Varietal Adaptability Testing programme (VAT)

Varietal Adaptability Trials were conducted at 11 locations in Matara and Hambantota districts in two seasons. Following three newly developed lines were further evaluated in Varietal Adaptability Trial programme.

- At 07-800 - 3 months, white, Intermediate bald grain type line
- At 07- 695 - 3 1/2 months, white, small round grain type line
- At 06- 631 - 3 1/2 months, white, small round grain type, scented, highly palatable line

Large Scale Varietal Adaptability Testing programme (LSVAT)

A new promising line; At 05- 1382 was selected from VAT for further evaluation in LSVAT. Two newly developed lines; At 06-650 and At 06- 486 were further evaluated.

Breeder Seed Production

Following quantities of breeder seeds, At 306, At 307, At 308, At 353 and At 362 were produced for the national seed paddy programme.

Table 3: Breeder seed produced (kg) during 2010/2011 Maha and 2011 Yala

Variety	Amount (kg)		Total (kg)
	2011/2012	2011	
	Maha	Yala	
At 362	180	160	340
At 308	40	100	140
At 307	-	140	140
At 353	20	20	40
At 306	-	40	40
At 405	120	-	120

Research related to rice grain quality

A sensory acceptability study was done to introduce sprouted brown rice for daily consumption as a healthy food with the aim of incorporating the available nutrients. The possibility of incorporating sprouted brown rice (SR) to milled rice at different proportions was experimented with two red (At 361/At 362) and white (At 307/At 308) varieties. The time spent for sprouting of red and white pericarped rice were 24 and 28 hrs respectively. Overall acceptance was highest for milled rice and score for the SR was higher than the brown rice. The best mixing ratio of SR to MR for red and white rice were 1:6 and 1:7 respectively. These results suggested that introduction of SR to daily dish is a feasible option

to increase the daily nutritional status and health of rice consuming people.

An experiment was done to evaluate cooking behaviour of some rice varieties in relation to their gelatinization temperature (GT) and amount of added water to cook rice. Six rice varieties comprising three groups of GT, low (*Bg* 403, and *At* 405), intermediate (*Bg* 379-2 and *At* 306) and high (*At* 307 and *At* 593) were chosen and in each group the former and latter variety had an intermediate bold (IB) and long slender (LS) grain shape and size (GSS) respectively. Cooked rice weight, absorbed water weight, percentage weight increase and time spent for cooking increased with increased water amounts. Water absorption and percentage weight increase during cooking could be influenced by GT and related rice to water ratio of a variety not by the thousand grain weight, raw rice weight or grain size and shape of a variety.

RICE RESEARCH STATION, SAMANTHUREI

Rice Research Station, Samanthurei was established to cater the needs of rice farming in the Eastern region of Sri Lanka. The research station is responsible for the selection of suitable promising elite rice cultivars and development of suitable agronomic packages to maximize rice yield. In 2011, rice adaptability testing trials such as NCTVT, VAT and LSVAT at the research fields and the farmer fields.

Technology Dissemination

Three training programmes were conducted for farmers, students and private sector participants with the objective of disseminating rice technologies. Under the organic production programme, 11 training programmes were conducted with the participation of 820 farmers and the participants were issued compost culture. Field experiment was carried in line with IPNS programme and awareness workshops were held

for the farmers to lessen the weedy rice problem in the region. Three field days were organized at Addalaichenai, Buddangala and Malwathe during 2011 Yala season in collaboration with Provincial department of agriculture.

Organic manure production and promotion program

Under this project 15,000 kg of compost were prepared. 1600 sticks of upland green manure plants (*Gliricidia* and 'Kaduru') were maintained.

PLAN FOR 2012

RRDI continued its unending efforts to develop high yielding varieties which led achieving the self sufficiency in rice by the country. The productivity improvement breeding programmes will be on par with giving special emphasis on rice quality enhancement research. Quality attributes like aroma, softness (intermediate amylose and low Gelatinization Temperature) and long slender types preferred by the average consumers will be favoured which is capable of fetching a premium price at the market. The quality rice programme will be conducted using some selected varieties at RRDI (Jasmine rice, Basmathie 370, Basmathie 217, Basmathie 9-95, Basmathie lamo, Seeraga samba, Suwadel, Ratheal, Suduru samba, KDML 105, At 405, At 306, At 362, Bg 300, Bg 352, Bg 357, Bg 359, Bg 360, Bg 94-1, IR 07A127).

Purification and multiplication of selected traditional rice cultivars is planned to carry in 2012 since there is an increasing demand for traditional rice cultivars due to its attributes such as taste and nutritional value. Nevertheless, finding quality seed materials for cultivation in sufficient quantities are a current problem. Therefore the purification for selected traditional cultivars (Sudu heenati, Dostara heenati, Suwandal, Kurulu thuda, Rathdel, Herath banda, Sulai, Pachcha perumal, Kalu heenati, Weda heenati) will be done at RRDI.

The ongoing research programmes will be continued with appropriate modifications. The programme on the production of commercial seed paddy that is in short supply to farmers will continue with renewed commitment. With request of Hon Minister of Agriculture, new plans have been drawn to increase the productivity in the LCWZ. There is also a plan to increase organic paddy cultivation in the LCWZ. Dissemination of technology and infrastructure development will be further strengthened.

Research partnership with International Rice Research Institute (IRRI) will be further strengthened via Multi Environment Testing (MET) programme, a project funded by IRRI under GRiSP. The main objective of the research study is to develop harmonized procedure for nominating, advancing and discarding breeding lines and to facilitate exchange of germplasm.

STAFF LIST

Designation	No.
Director	01
Deputy Director	01
Assistant Director	01
Research Officer	28
Agriculture Officer	01
Agricultural Economist	01
Agricultural Monitoring Officer	01
Programme Assistant	04
Agricultural Instructor	21
Research Assistant	11
Research Sub Assistant	03
Laboratory Assistant	06
Drivers	09
Watchers	13
Labourer	70
Labourer (Contract)	143
Total	314

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

The Regional Agricultural Research and Development Center (RARDC) Bombuwela and its two sub stations, at Bentota and Labuduwa develop and disseminate technologies aimed at increasing 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 is concentrating in developing high yielding rice varieties particularly tolerant to iron toxicity whereas the ARS, Labuduwa is engaged in activities to develop mainly red pericarped samba type rice varieties. The ARS, Bentota is straining to develop rice varieties for the flood and saline prone areas.

BUDGET

Table 2.3.1.1: Annual budget -2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	5,042,492	4,942,952	98
Recurrent	11,182,000	10,493,146	94
Projects			
Production and promotion of usage of organic matter	850,000	735,442	87
Model Village Programme	300,000	157,576	53
Total	17,374,492	16,329,116	94

PROGRESS

Varietal Improvement

A new rice line (Bw 04-992) 3½ month age, white pericarped, samba has been nominated to

the Varietal Release Committee to be held in January, 2012. Another 3½ month variety having red pericarped (Bw 05-16210) was tested in the NVAT programme. The following 6 promising lines have been selected to be nominated to the NCRVT:

Table 2.3.1.2: Promising rice lines selected for NCRVT

Line	Characteristics	Age
Bw 03-1198	Red, long medium	3½ months
Bw 09-906	Red, long	3½ months
Bw 09-840	Red Intermediate bold	3½ months
Bw 07-676	White Intermediate	3½ months
Bw 09-1125	Red Intermediate bold	3 months
Bw 09-1127	White Intermediate bold	2½ months

All above lines are tolerant to iron toxicity and major pests and diseases.

Breeder seed production

Following quantities of breeder seed of Bw varieties were produced.

Bw 272- 6b	-	30 kg
Bw 363	-	20 kg
Bw 361	-	60 kg
Bw 363	-	20 kg
Bw 364	-	40 kg.

AGRONOMY

Direct sowing of hybrid rice

Direct sowing of hybrid rice seed at the rate of 30kg/ha under LCWZ conditions is now at the farmer testing level prior to recommending as a new technology. Research on the use of zero tillage as a method of establishment of rice in the boggy soils of the LCWZ has repeatedly shown encouraging results and this technology is also at the stage of farmer level testing. Results obtained from the repeated IPNS trial, coordinated by RRDI, have shown that chemical fertilizer can be reduced by 25% under sandy clay conditions.

NCRVT and NVATT Programmes

This program was carried out in 2½, 3 and 3 ½ month (samba and long – medium grain) age groups. A total of 24 nominations (island wide) were evaluated. In the VAT program a total of 6 promising lines (island wide) were tested in the Colombo, Gampaha, Kalutara and Ratnapura districts. Out of these, At 07-695 (3½m, 'samba') and Bw 05-16213(3½m, red 'nadu') were promising and acclaimed by farmers.

WEED SCIENCE

Chemical weed management

Several weedicides were screened in wet-seeded fields during the year. Encouraging results were obtained with 3 weedicides.

Integrated Weed Management

In an ongoing study to establish an integrated weed management package, several crop establishment methods were tested. It was seen that using straw as mulch either soon before or after sowing controls weeds effectively particularly, during early stage of the crop. Wood shavings used soon after sowing also gave similar results. In a crop established by 'Parachute' method both these material can be used as mulch soon before planting. Supplementary weeding of plants emerging through the mulch will improve the efficacy of this methodology.

ENTOMOLOGY

Insect Screening Programme

Virtako 40WG (Thiamethoxam 20 + Chlorantraniliprole 20), a new chemical for the control of BPH (brown plant hopper) and Leaf folder has been found to be very effective for these pests..

In the routine screening programme, 20 breeding lines resistant to rice gall midge and 07 lines resistant to BPH have been identified under both greenhouse and field conditions. In another screening trial on 26 CRVT nominees were screened for RGM (rice gall midge) and BPH. Out of these 11 varieties were found to be MR (moderately resistant) for RGM whereas 02 were seen to be MR-R(resistant).

Different bio-pesticides were evaluated under field conditions against rice sheath mite

(*Stenotarsonemus spinkii* Smiley). ‘Milbemectin’ (fungal derivative) showed promising results and was selected for further testing.

PATHOLOGY

Varietal screening for rice blast

There was activity under a special project (‘Radiation Processing of Polymeric Materials for Agriculture and Environmental Radiation’) to evaluate irradiated Chitosan formulations on growth of rice and management of important rice diseases. In addition to this, the usual research programme was carried out where 72 Bw lines were screened for rice blast disease. Out of this 56 lines were identified as being resistant to rice blast disease.

SOIL SCIENCE

The Division analyzed 283 soil samples and 33 compost samples during 2011. Besides this, the usual research programme was conducted.

Adaptability Testing of Efficient Fertilizer use Technologies in Farmers’ fields (NARP)

Under the NARP project conducted during one season (Yala) valuable knowledge has been collected in relation to the fertilizer requirements of the LCWZ. There is indication to say that considerable amount of N, P and K fertilizer could be cut down in the LCWZ. Repeated trials are in progress.

Promotion of production and usage of organic matter

Over 30 tons of compost was produced under this project. Thirteen training classes and 03 field days were conducted for 601 stakeholders. There were also 02 large scale demonstration plots on replacement of 10% of the Department of Agriculture fertilizer recommendation by organic matter.

Model Village Programme 2011

The Model Village Programme was initiated to disseminate new technology (suitable varieties for LCWZ) where 18 bushels of Bw varieties (Bw 361, Bw363, Bw364, Bw272-6b, and Bw 04 -992, Bw 05-1621) were distributed among 56 farmers. 200 bushels of seed paddy were produced which were laterally spread. Two field days were held educating farmers about the importance of using Bw varieties.

RICE RESEARCH STATION, LABUDUWA

The Rice Research Station, Labuduwa is responsible for developing technology such as high yielding rice varieties and red samba varieties for high potential rice lands in the southern region of the LCWZ. This Station also carries out research activities on plant protection.

Rice Breeding

Development of New Varieties

Variety Ld 3-12-50 (3½ month, red samba) has been nominated to the Varietal Release Committee. There is one variety in the LSVAT (Ld 3-6-12, a 3½ month white samba) and two NCRVT entries (Ld 7-6-2, a 3½ month whit long; Ld 8-6-7 a 3½ month red short/round) and one in the DUS Testing (Ld 1-5-15, a 3½ month white samba)

Breeder Seed Production

Following amounts of breeder seed were produced;

Ld 365 - 140kg

Ld 408 - 21.5kg

Plant Protection

Out of 100 International Bacterial Leaf Blight (BLB)) resistant varieties received from IRRI, Philippines, 05 lines were found to be promising under SI Lankan conditions. From the herb oil testing programme two promising oils have been identified for further testing on rice thrips and paddy bug.

Weed Science

04 promising weedicides and 04 establishment methods have been identified from the National Coordinated Herbicide Screening trial and NARP Project activities respectively.

Extension

Two farmer field days were conducted in farmers' field on weedy rice besides the routine extension activities.

AGRICULTURAL RESEARCH STATION, BENTOTA

Varietal screening program for flood tolerance was continued. Five IRRI selected lines (IR 119, sub 1 Samba Mashuri, sub 1 IR 64, Swarna sub 1, IR 7F 290) were tested with Bg 96-741, Bw 364, Bg357 and Bg 5R under the particular farming situations in the Kalutara and Gampaha districts. Results show that Bg 96-741 and Bg 364 performed better than the exotic rice varieties. The NCRVT and NVAT programs were also continued under representative field conditions in farmers' fields.

Organic manure production and promotion programme

Under this project 15,000 kg of compost were prepared. 1600 sticks of upland green manure plants (*Gliricidia* and 'Kaduru') were maintained.

TECHNOLOGY TRANSFER

Seminar Programme 2011, RARDC, Bombuwela

A total of 44 seminar programmes were conducted during the year at the Centre.

A total of 601 trainees (DOA officers, teachers and students) were trained on compost production and usage under the project 'Promotion of Production and Usage of Organic Matter' at the RARDC, Bombuwela. Besides these, 124 trainees were trained in various aspects of paddy cultivation during the year.

There were also two TV programmes and four radio programmes on new technologies developed by the research staff at the RARDC, Bombuwela. There were 03 field days at the Centre (under the Organic Matter Project) and 02 field days in farmers' fields (Model Village). The Centre took part in 05 exhibitions and representations were made at the Kalutara District Agriculture Committee in 12 sittings in advisory capacity.

PLAN FOR 2012

The ongoing research programmes will be continued with appropriate modifications. The programme on the production of commercial seed paddy that is in short supply to farmers will continue with renewed commitment. By the intervention of the Hon Minister of Agriculture new plans have been drawn to increase the productivity in the LCWZ. There are also plans to develop the boggy land area of the research paddy tract. There is also a plan to increase organic paddy cultivation in the region. Dissemination of technology and infra structure development will be further strengthened in consultation with RRDI, Batalagoda.

STAFF LIST

Designation	No.
Deputy Director	01
Research Officer	13
Agriculture Officer	01
Agricultural Monitoring Officer	04
Programme Assistant	08
Agricultural Instructor	14
Research Assistant	12
Farm Manager	01
Watcher	05
Sanitary Labourer	01
Labourer (Grade II)	26
Labourer (Grade III)	08
Labourer (Contract)	53
Total	147

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

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 Plant Genetic Resources Center (PGRC). SCPPC is responsible for providing vital services to farmers such as high quality seeds and planting materials, plant protection and control of agricultural pesticides and is also responsible for conservation of Plant Genetic Resources of food crops and plant quarantine activities. SCPPC has regulatory functions pertaining to the following acts.

1. Plant Protection Act. No 35 of 1999
2. Control of Pesticide Act No.33 of 1980
3. Seed Act. No. 22 of 2003.

It also serves as the National Plant Protection Organization (NPPO) and the national inquiry point for phytosanitary related activities in Sri Lanka.

BUDGET

Table 3.1.1: Annual budget -2011 (Rs)

Vote	Allocation	Expenditure	Expenditure %
Capital	33,051,000	24,670,288	75
Recurrent	45,598,000	41,375,607	91
Total	78,649,000	66,045,895	84

PROGRESS

Import Permits

Import permits informing entry conditions were issued during the year 2011 for the following items.

Table 3.1.2: Import permits issued during 2011

Permit type	Number
Vegetable seeds	979
Fresh fruits	686
Plant and Planting materials	618
Plant Products	263
Seed Potato	33
Animal feed	135
Cut flowers for religious purposes	20
Products for human consumption	54
Biological agents	02
Total	2790

Seed Potato Imports

Table 3.1.3: Seed potato imports during 2011

Country	Imported quantity (mt)	Released quantity (mt)	Laboratory Tests / lots
Netherlands.	700	700	50
USA	75	75	05
France	23	23	10
Germany	50	50	01
Total	848	848	66

Twenty entry point inspections were carried out for imported seed potato consignments and there were no rejections. A sample from each lot was planted at post control field at Sita Eliya for post entry quarantine evaluation.

Vegetable and Fruit Seed Imports

Table 3.1.4 indicates the quantities of vegetable and fruit seeds imported under 979 vegetable seed import permits issued during 2011. A national database is being developed on vegetable seed

imports for easier retrieval of vital information.

This would facilitate to provide information relevant to permits issued and the details of actual seed imports through Plant Quarantine Units of Seaport and Airport since 2004.

Table 3.1.4: Vegetable and fruit seed imports during 2011]

Crop	Port of Entry – Quantity (kg)		Total Quantity (kg)
	Airport	Seaport	
Asparagus	0.98		0.98
Beans		247,750.5	247,750.5
Beet	500	20,583.1	21,083.08
Bell pepper	6.0		6.0
Bitter gourd	282.02	3,666.5	3,948.52
Bottle gourd	0.01		0.01
Cabbage	493.08	1,563.9	2,056.98
Carrot	55.5	40531.7	40,587.20
Cauliflower	47.5	208.8	256.30
Celery		3.0	3.0
Chili	510.16		510.16
Chinese cabbage		45.0	45.0
Chinese kale		266.0	266.0
Chinese radish		1,160.0	1,160.0
Cucumber	1,494.8	4,583.7	6,078.48
Egg plant	63.02	697.5	760.53
Kang kong		655.0	655.0
Kohlrabi	1,200	2,110.0	3,310.0
Leek	165	11,080.0	11,245.0
Lettuce	0.5	315.0	315.5
Long Bean		15,662.0	15,662.0
Luffa	410	5,385.65	5,795.65
Maize	154	790,450.0	790,604.0
Melon		50.07	50.07
Okra	535.07	603.00	1,138.07
Onion	5,668		5,668.0
Pakchoi		30.00	30.0
Papaya		15.03	15.03
Parsley	1.5		1.5
Pepper	857.17	7,662.01	8,519.18
Pumpkin	1,428	9,801.24	11,229.24
Radish	202	17,212.35	17,414.35
Snake gourd		3.00	3.0
Squash		5,975.00	5,975.0
Sweet corn	24	4.00	28.0
Tomato	377.08	1,164.57	1,541.65
Turnip	3		3.0
Water Melon	673.36	11,478.28	12,151.64
Zucchini	2.5		2.5
Total Quantity (kg)	15,154.24	1,200,715.87	1,215,870.11

New Regulations to the Plant Protection Act No. 35 of 1999

New Regulations to the Plant Protection Act No. 35 of 1999 were submitted to the Legal Draftsman which is currently at the final stage.

Post Quarantine Inspections

Two post quarantine inspections were carried out to monitor the fulfillment of permit conditions.

Table 3.1.5: Post quarantine inspections conducted

Location	Type
Ja-ela	Bulk wheat processing facilities for animal feed.
Welimada – Nuwara Eliya	Potato fields where imported seed potatoes were grown.

Export Certification

Factory premises facilities and the process of plants and plant products of exporting companies at Minuwangoda, Dambulla, Welimada, Meerigama and Pannala areas were inspected to facilitate export certification.

Media Programmes

A media week was conducted from 18th – 25st of December through television, radio, newspapers and other communication methods on implementation of the Seed Act through following programmes.

Television Programmes

Govi Bimata Arunalu
Mihikatha Dinuvo

Short advertisements

Radio Programmes on Sri Lanka Broadcasting Corporation

Maha Gedarin Govi Gedarata

Govithanata Peyak

Kalavita

Asvenna

Wayamba Gewatte

Ruhunu Gewatte

Posters

6000 copies of two types of posters

Newspapers

News supplements and short advertisements on Seed Act in Lankadeepa and Rivira.

Media programmes were also conducted on plant quarantine through following Kamatha, (Swarnavahini) and Ran Atuwa (ITN) programmes.

Field Inspections

Field inspections were carried out to detect quarantine pests in potato fields at Nuwara Eliya area. Based on these data pest surveillance programme will be initiated in future. Nursery inspections were carried out at Puttalam area for imported teak ex-vitro plants.

Export Interceptions

During 2011, ten interceptions were reported from destined countries for not fulfilling the mandatory phytosanitary measures. This is a 23 % reduction of export interceptions in comparison to that in 2010. The exporters were duly informed to act in conformity with the quarantine regulations in future.

Investigation on Export Interception

A comprehensive investigation was carried out to verify the claim made by Vietnam Quarantine Authorities that wheat bran pellets sent from Prima

Ceylon Ltd. Trincomalee was contaminated with weevils (*Trogoderma granarium*). Samples were taken at various points in the production process and test report was obtained from NPQS, Katunayake. It was revealed that it was highly unlikely that any contamination could occur at the factory premises up to the point of dispatch of wheat bran pellets for shipment to Vietnam.

Implementation of Australian Fumigation Accreditation Scheme (AFAS)

The AFAS training when implemented in Sri Lanka will undoubtedly help to upgrade the fumigation activities in general. The main objective of this training is to fulfill a very important component of the training of quarantine officers which will be very helpful in streamlining the documentation process involved in Methyl bromide fumigation.

This training will greatly facilitate trade, particularly Sri Lanka and Australia while upgrading fumigation treatments in general. It will also help to minimize interceptions to Australia which occurred in the recent past.

In the first phase 25 officials attached to different divisions of DOA namely, Seed Certification and Plant protection Centre, National Plant Quarantine Service, Plant Quarantine Units at the entry points at Seaport and Airport, Office of the Registrar of Pesticides, In Service Training Institute at Gannoruwa and Angunakolapalassa were provided a comprehensive training on Methyl bromide for quarantine purposes complying with Australian Quarantine Inspection Service fumigation standards. In addition 25 persons from the private fumigation treatment providers were also trained on the above.

Following a successful fumigation training visit in March 2011, DAFF Bio security returned to Colombo in May 2011 to deliver the AFAS audit training package. The course ran over three days and was delivered to 20 government officers from the DOA. After the completion of the training course, DAFF Bio security accompanied the Sri Lankan DOA on a number of advisory audits to fumigation companies in Colombo.

Encouraging local grain production

Steps were taken to encourage local grain production by limiting the importation of maize seeds during the local peak production period. The concurrence of the Ministry of Agriculture was obtained when issuing import permits.

Seminars / Awareness Programs / Trainings on Plant Quarantine

Awareness programmes on plant quarantine were conducted for 60 Custom Officers and Quarantine Officers. It was carried out to enhance the understanding between the Quarantine Officers and Custom Officers. 32 Agricultural Instructors who were newly recruited to the DOA were trained on plant quarantine. Also 40 students from the School of Agriculture, Kundasale and university students were trained on plant quarantine at the In Service Training Institute, Angunakolapelessa.

26 officers from SCPPC, NPQS and two entry points at the seaport and airport participated in potato pest surveys at several farmer fields in Nuwara Eliya and contract growers at Ambewela. During this training, the officers trained in visual inspections of potato fields were exposed to the production system of potatoes from the establishment to the harvesting stage.

PLAN FOR 2012

- 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 enterprise in the country
 - Development of good quality planting material production in the country
 - Strengthening national phytosanitary capabilities
 - Upgrading technical capabilities
 - Harmonization of regulatory measures
 - Promotion of most effective and safe pest control strategies

STAFF LIST

Designation	No.
Director	01
Research Officer	01
Agriculture Officer	02
Program Assistant (Agric.)	03
Agricultural Instructor	02
Administrative Officer	01
Public Management Assistant	12
Store Keeper	01
KKS	02
Driver	03
Laborer (Casual)	02
Laborer (Contract)	04
Total	34

3.1.1 SEED CERTIFICATION SERVICE (SCS) - GANNORUWA

The seed certification service (SCS) performs regulatory functions pertaining to assuring the quality of seeds and planting materials available to farmers.

BUDGET

Table 3.1.1.1: Annual budget -2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	18,530,000	16,910,000	91
Capital	13,440,000	12,300,000	92
Projects –Seed production village	3,190,000	840,000	26
Seed Act	20,000,000	15,500,000	78
Total	55.16	45.55	83

PROGRESS

- Inspected 6364 ha of rice, 581 ha of OFC, 126 ha of vegetables and fruits and 76 ha of potato fields cultivated for seed production.
- Tested 13234 seed samples representing 7999 mt of seed paddy, 216 mt of OFC seeds 27 mt of vegetable seeds and 312 mt of seed potato.
- Registration and inspection of 240 horticultural nurseries producing certified planting materials and quality certified by labeling of 260,048 grafted fruit plants.
- Evaluated 13 rice, 19 OFC and 10 vegetable varieties under DUS testing programme.
- Testing of 526 post control samples of rice, OFC, vegetable and potato in PC 1- PC 4 situated at Gannoruwa, Sita Eliya and Mahailuppallama.
- Registered 918 and 410 renewals of seed handlers under the Seed Act.
- Trained 604 Government officers and seed farmers under the Seed Act
- A successful media week which included 15 TV/ Radio programmes and 5 advertisements was held under the Seed Act.
- A successful workshop was held to obtain requirements and supplement of fruit plants under ‘Divi neguma’ programme. Nearly 250 private nurserymen representing all districts, farms of Seed and Planting Material Division of DOA and other Departments (Hadabima etc.), Planning Directors of 9 provinces, 4 district secretariats, 9 Provincial Directors were participated. Under this programme a booklet and CD was published named “National programme for the supplement of seed and planting material for 10 million home gardens” district wise.
- Under Seed Production Village programme, 337 ha of rice, 100 ha OFC, and 14 ha of vegetables were registered representing 119 mt of rice, 1.6 mt of OFC and 1.9 mt of vegetables.
- SCS head quarters and all regional SCS offices and 4 seed testing laboratories were linked through providing internet facilities
- Software was introduced to the seed testing laboratories for easy and efficient accessing of data for field officers, proper database

management and methodical printing of seed lab reports.

Seed Paddy Certification

During 2011, total extent registered to produce seed paddy was 6364 ha of which the share of private sector was 69%. Extents registered for certified seed paddy production under different

Table 3.1.1.2: Extents under seed paddy production in 2010 and 2011

sources and seed classes are given in Table 3.1.1.2. An increase of 38% was observed in the year 2011 in the extent registered for seed production of rice when compared to the year 2010, due to the increase of participation of all sources in seed production during the year.

Source	Seed class	2010		2011		Accepted %
		Extent registered (ha)	Extent inspected (ha)	Extent registered (ha)	Extent inspected (ha)	
Research stations	Breeder's	5.2	5.2			
Govt. farms	Foundation	53	42	65	47	98
	Registered	459	431	618	369	100
	Certified I	132	106	299	212	100
	Certified II	3.5	3.5	53	43	100
Contract growers	Registered	12	12	31	25	100
	Certified I	598	551	759	543	99
	Certified II	74	67	120	75	100
Private growers	Registered	29	27	420	138	97
	Certified I	3416	2974	3459	2131	99
	Certified II	422	371	540	307	98
Total		5203.7	4589.7	6364	3890	

During 2011, a total of 7999 mt of seed paddy was produced of which the quality standards of 3869 mt of seed paddy were accepted by laboratory tests (Table 3.1.1.3). DOA farms

with contract grower programme produced 3140 mt (39%), and Private growers produced 4857 mt (61%).

Table 3.1.1.3: Quantities of seed paddy tested and % accepted in 2010 and 2011

Source	2010		2011	
	Quantity tested (mt)	Accepted %	Quantity tested (mt)	Accepted %
Research stations	3.7	79		
Govt. farms	2672	92	2480	90
Contract growers	1476	95	661	85
Private growers	6969	71	4858	23
Total	11127.7		7999	

Certification of Other Field Crop (OFC) seeds

The total registered extent under OFC seed production was 581 ha of which contract growers accounted for 66%. Maize, Mungbean, ground nut, sesame, cowpea,

finger millet, black gram soybean and pigeon pea were included in the OFC seed production programme. Extent registered for seed production under different sources and classes are given in Table 3.1.1.4. There was a 16% increase in registered extent for OFC seed production compared to 2010.

Table 3.1.1.4: Extents under OFC seed production 2010 and 2011

Source	Seed class	2010		2011		Accepted %
		Extent registered (ha)	Extent inspected (ha)	Extent registered (ha)	Extent inspected (ha)	
Research stations	Breeders	2.8	2.7			
Govt. farms	Foundation	33.2	30	12	9.3	100
	Registered	17	14.6	32.5	16.3	100
	Certified I	7.9	7.9	35.7	13.2	100
	Hybrid			0.75	0.75	100
Contract growers	Foundation	0.9	0.9	1.0	1.0	100
	Registered	58	53.8	75.0	56.5	100
	Certified I	328	306	355.9	178.8	100
	Certified II	49.8	46	36.6	18.0	93
Private growers	Foundation	2.0	2.0	10.5	7.8	100
	Registered			12.7	3.8	100
	Certified I	21	20.4	8.7	4.9	100
	Certified II	0.8	0.8	0.4	0.4	100
Total		521.4	485.1	581.8	310.8	

During the year 2011, total OFC seed production was 216 mt of which 89% were certified.

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 2010 and 2011

Source	2010		2011	
	Quantity tested	Accepted (%)	Quantity tested	Accepted (%)
	(mt)		(mt)	
Research stations	1.9	98		
Govt. farms	22.1	78	27.4	88
Contract growers	236.9	96	168.1	90
Private growers	6.6	85	20.8	93
Total	267.5		216.3	

Certification of vegetable seed production

Registered extent for vegetable seed production was 126 ha of which private growers accounted for 54%. Registered land extents under different sources and seed

classes are given in Table 3.1.1.6. Tomato, Okra, Chilli, Snake gourd, Bean, Brinjal, Bitter gourd, Radish, Luffa, Capsicum, Yard long bean, Cucumber, Pumpkin, Amaranthus, Vegetable cowpea, Winged bean, Water melon, and Papaya were included in the seed production programme.

Table 3.1.1.6: Summary of Vegetable seed production extents (ha) in 2010 & 2011

Source	Seed class	2010		2011		Accepted (%)
		Extent registered	Extent inspected	Extent registered	Extent inspected	
		(ha)	(ha)	(ha)	(ha)	
Research stations	Breeders	1.4	1.3	0.2	0.2	100
Govt. farms	Basic	23.5	21.3	6.7	5.1	100
	Standard	27.1	26	26.0	23.0	100
	Hybrid			0.24	0.24	100
Contract growers	Basic	2.8	1.7	0.2	0.2	100
	Standard	53.9	49.4	21.5	14.0	100
Private growers	Standard	88.5	74.2	71.4	51.5	100
Total		197.2	170.2	126.3	94.3	

During the year, total vegetable production was 28.5 mt of which 27 mt were certified. Quantities tested and percentages accepted from different sources are given in Table 3.1.1.7.

Table 3.1.1.7: Vegetable seed production in 2010 and 2011

Source	2010		2011	
	Quantity tested (mt)	Accepted (%)	Quantity tested (mt)	Accepted (%)
Research stations	0.4	82	0.027	100
Govt. farms	9.4	99	5.6	95
Contract growers	24.2	84	7.05	91
Private growers	36.2	68	15.86	96
Total	70.2		28.54	

Seed Potato Certification

Cultivated extents for different seed potato classes are given in Table 3.1.1.8. The total extent under seed potato was 72 ha and a total of 312 mt of seed potato of one popular potato variety (Granola) was certified. In addition, 76535 mini tubers produced under the special seed potato programme in poly tunnels were certified.

Table 3.1.1.8: Extents under seed potato production in 2010 and 2011

Source	Class	2010		2011	
		Extent registered (ha)	Extent accepted (ha)	Extent registered (ha)	Extent accepted (ha)
Govt. farms	Pre-basic	0.10	0.10	0.12	0.08
	Basic	13.28	12.28	43.01	41.81
	Certified	25.87	24.01	10.23	10.23
Private growers	Certified	13.00	12.90	19.35	18.83
Total		52.25	49.29	72.71	70.95

Seed Testing

A total of 13,234 seed samples were tested for quality certification at the DOA seed testing laboratories at Peradeniya, Mahailuppallama, Aluttarama and Bata atha.

Certification of Planting Material

A total of 60,048 fruit plants produced in government nurseries and private nurseries were certified and labeled (Table 3.1.1.9) which is a 22% increase compared to year 2011.

Species	No. of plants certified	
	2010	2011
Mango-grafted	99,565	146,979
Rambutan-grafted	63,960	27,116
Orange-grafted	30,572	82,162
Manderin	6,854	-
Avacado	580	918
Durian	304	282
Jak	441	2,591
Total	202,276	260,048

Registration of nurseries

240 nurseries were registered during 2011.

Mother plant certification

A total number of 1307 Mango, Rambutan, Citrus, Pears, Durian and Jak mother plants were selected and registered.

Post Control Testing

Post control tests were conducted to evaluate 526 seed samples. These 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 3.1.1.10.

Table 3.1.1.10: Number of mother plants registered in 2010 and 2011

Species	No. of Plants Registered
Manga-grafted	450
Rambutan-grafted	357
Citrus	415
Pears	77
Durian	1
Jak	12
Total	1307

Table 3.1.1.11: Number of post control samples tested

Crop group	No. of lots tested
Rice	165
OFC	189
Vegetables	165
Fruit	7
Total	526

Distinctness, Uniformity, and Stability (DUS) Testing

Thirteen rice varieties, (Bw 04-992, At 676, Ld3-6-12, Bg3R, At 06-631, Bg 465, Pokuru samba, Ld 1-5-15, CIC 3-1, Bg 5-15-31, BG 4-2236, Bg 11-139,

Bg 5-110) were tested for DUS at post control field at Gannoruwa and 14 vegetable varieties, 19 OFC varieties were also tested. DUS testing of 8 rice, 8 vegetables and 5 OFC 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	13	8
OFC	19	5
Vegetables	14	8
Total	46	21

Implementation of Seed Act

Seed Act No. 22 of 2003 has been implemented since 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. A number of 918 seed handlers have been registered and 410 renewals under the Seed Act during the year. 12 complaints were inquired and necessary action was taken against seed handlers for violating of Seed Act. Fifteen inspections were made and necessary actions were taken to protect seed industry of Sri Lanka.

One week mass media campaign was launched including 5 paper advertisements (Lankadeepa-3, Rivira-1, Thinakaran—1) 4 Television programmes (Rupavahini-3, Sawrnawahini-1), 2 television advertisements (Rupavahini 30 seconds*21 times, Sawrnawahini 30 seconds*14 times) , radio advertisements (City FM 30 seconds*28, Commercial service 30 seconds*28 times, Ran FM 30 seconds*40 times, Neth FM 30 seconds*65 times, Lakhanda 30 seconds*15 times, Sri FM 30 seconds*15 times, Shakthi FM 30 seconds*14 times, Sirasa FM 10 times) for making seed handlers aware on the provisions of the Seed Act.

Research and Development

Research studies were conducted in following areas;

- To find out expiry date for vegetable seed packaging.
- To find out scientific solutions for day to day field problems in fruit plant certification programme.
- To study the risk associated with imported seed lots.
- To study in moisture vapour transmission of different packaging materials.

Training Programmes

SCS conducted 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 Programme	No. of Trainers
Seed farmers/ Nurserymen Govt. officers	60 544
Total	604

SCS Information System

Development of the database on Seed Certification was continued by linking 22 SCS regional stations, 4 seed testing laboratories and 4 post control stations, throughout the country for easy and efficient data retrieval and management of information. Furthermore, designing a new database system on personal data of all the staff members of all categories serving in the headquarters, regional units, laboratories and post control stations was completed.

PLAN FOR 2012

- Empowering seed certification service to achieve the 31% of the national seed paddy requirement by certified seeds.
- Establishment of new seed health testing unit to enhance seed hygiene by identifying seed borne pathogens.
- Establishment of seed research unit to conduct seed research pertaining to post harvest problems encountered by seed handlers especially on seed packaging, storing and determining 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.
- Designing SCS website for public awareness, to improve information dissemination on seed certification programme and for efficient and easy access of our service.
- 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 to distribute among all seed handlers.
- Preparation and distribution of seed producers' directory and planting material producers' directory in each growing season.

STAFF LIST

- Publishing crop guidelines for seed handlers.
- Finalizing and publishing the newly amended Seed Act and regulations.
- Construction of new seed testing laboratory and office complex in Paranthan, SCS regional office buildings in Kundasale, Matara, Jaffna and Karadiyanaru and post control fields in Karadiyanaru and Bata atha.
- Strengthening all SCS units with staff and equipment

Designation	No.
Deputy Director	01
Research Officer	02
Agricultural Officer	09
Agricultural Monitoring Officer	04
Programme Assistant	03
Agricultural Instructor	102
Research Assistant	01
Research Sub Assistant	04
Govt. Management Assistant	09
Driver	14
Electrician	01
Watcher	16
Labourer	65
Seed Technician	10
Seedman	01
Sanitary Labourer	01
Total	243

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 in agricultural crops under farmer conditions.

These broad objectives are expected to reach 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.

Consulting on control of specific pests out breaks and pests in households are also undertaken by PPS. These activities are encompassed a major sector of the mandate of the “Plant Protection Act No: 35 of 1999”. PPS also plays a supplementary role in implementing the Pesticide Act of 1981 through evaluation of new herbicides at pilot scale in farmer fields.

BUDGET

Table 3.1.2.1: Annual Budget -2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	1,822 000	1,696 522	93
Capital	2,045,000	1,832,842	90
Model villages	100,000	73,872	74
Paddy cultivation development (IPM)	140,000	97,863	70
Total	4,107,000	3,701,099	90

PROGRESS

Promotion of Integrated Pest Management (IPM)

Under this component PPS has implemented IPM programme in three major areas such as rice, vegetable and leafy vegetables.

Integrated Pest Management in Rice

Regular training programmes on IPM were done throughout the season for seventy officers of the Agriculture Department in Kandy, Monaragala and Kalutara districts.

Integrated Pest Management in Vegetables

PPS implemented a programme to promote correct strategies of controlling the pest in major vegetable crops grown in Sri Lanka while minimizing the use of agrochemicals. The programme has been based on the promotion of biological control agents a

component of IPM and use of botanicals as an alternative to synthetic chemicals etc. Under this component following activities were completed in 2011.

Vegetable IPM training for DOA Officers

- 3 day training program on vegetable IPM was held at the District Training Center in Trincomalee. 44 extension officers working in Trincomalee district were participated
- PPS was conducted a program on IPM vegetable for the extension officers in the Batticaloa. Thirty nine officers were participated.
- 54 extension officers have been trained under the IPM training program which was held in Gannoruwa for the Officers from all the provinces except the north and east.
- A training program was held at the In-service Training Institute, Angunakolapelessa for fifty two extension officers in the southern province.

Vegetable IPM training for Farmers

- 50 farmers were trained on IPM program in Kotmale area..
- Under the guidance of PPS 450 Gherkin farmers have practiced IPM strategies in Nawagattegama, Weeraketiya Girandurukotte/Rathkinda and Dehiattakandiya areas.

Integrated Pest Management on leafy vegetables

Expansion of IPM on leafy vegetable was further explored. Technical support especially on nematode control was given to the growers dealing with leafy vegetables in Colombo district. Under this component many training programmes and awareness program were done on nematode control

and mite control, correct application of fertilizers and manure etc., in Centella and Mukunuwenna.

Pilot Scale testing of pesticides

Following new herbicides were evaluated under farmer field conditions for bio-efficacy. These herbicides have the added advantages over recommended herbicides that they are more targets specific and applied at relatively low rates.

Herbicides for weed control in rice:

- Fenoxyprop-p-ethyl69g/EC – Recommended as an alternative to the already recommended formulation of Fenoxyprop -p- ethyl (Ricestar) for the control of grass weeds in wet seeded rice cultivation.
- Metamifop 10 EC – Recommended for the control of annual grasses in wet seeded rice fields.
- Mefenacet+Bensulfuron methyl(Bencinate 53WP) - Recommended for the control of grasses, sedges and broad leaf weeds as a “One shot” weedicide in wet seeded rice culture.
- Metsulfuron methyl 20WP - Recommended for the control sedges and broad leaf weeds in wet seeded rice fields.
- Bispyribac sodium 20% WP (Kensolo) - Recommended as an alternative to the already recommended Bispyribac sodium (Nominee) for the control of grasses, sedges and broad leaves in rice cultivation.

Herbicides for weed control in maize

- Topramazone - Recommended 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 time of application is around 15 days after

seeding of the crop. Herbicides for weed control in maize

- Diuron 80% WP - Recommended as an alternative to the already recommended formulation of Diuron 80% WP for the control of all herbaceous weeds in pineapple cultivation.

Biological Control programme

PPS is maintained biological control agent units specially to control of Invasive Aquatic Plant species to release on request and the requirement.

Biological control of Salvenia (*Salvinia molesta*)

Biological control agent *Cyrtobagus salviniae* was introduced to 5 tanks in north central province, 5 tanks in Kurunegala district, 2 tanks in Polonnaruwa district, 3 tanks in Matale district and 2 tanks in Kandy Districts.

Awareness program and field demonstrations for farmers and field officers were conducted parallel to the above programmes.

Biological control of Water hyacinth (*Eichornia crassipes*)

Biological control agents of Water Hyacinth *Neochetina bruchi* and *Neochetina eichhorniae* were introduced into 6 major tanks in Anuradapura, Matale and Kurunegala Districts.

Invasive / Newly Introduced pest controlling programme

Awareness programmes were conducted to control of papaya mealy bug for farmers in Magammana Welmilla area in Colombo district

Controlling of Guava moth (*Dichocrocis punctiferalis*)

PPS was conducted an awareness programme on 'Identification and controlling' of Guava moth in the North Central Province. Twenty five farmers were participated to the programme.

Control of Banana mealy bug (*Dysmicoccus neobrevipus*)

- Thirty Eight extension officers from the Interprovincial areas in the North Central Province were trained on controlling of Banana Mealy bug.
- A training program on identification and controlling of Banana mealy bug was conducted for 65 farmers in North central province
 - PPS conducted an awareness programme for 45 officers in Anuradhapura district.
- Awareness programme was conducted for 19 Assistant Directors of Agriculture in Anuradapura district.

Control of Dragon Fruit Diseases

- In the north Central province, 23 Dragon fruit cultivators, Nursery owners were trained on identification and control of Dragon fruit disease.
- Identification and control of Stem Spot disease in Dragon fruit cultivation. Forty five officers in the Department of Agriculture in Anuradapura District were trained on identification and control of Dragon fruit stem spot disease

Seed Fumigation

Seed fumigation is one of the main activities conducted by the PPS on the requests of the SPMDC and private farms,

Following amount of seed materials in Government farms were fumigated during 2011.

Type of seeds	Amount (mt)
• Seed paddy	903
• Paddy for consumption	408
• Seeds of other field crops (maize, cowpea, etc.)	07
• Vegetable seeds	0.30

Household pest control

In 2011 PPS was involved to control termite infestations in six main places in the several government complexes.

Rodent control

Many rice growing farmers have been faced in difficulties in controlling rodents in their fields. In this year PPS has successfully involved to control rat problem in six major farms in response to their request.

60 rice farmers in Colombo and Kaluthara district have been trained.

30 research officers in Bombuwala Research Station were trained.

Other activities

Identification and control of Root knot Nematodes in Guava plantations in the NCP. In addition the unit has conducted training programmes for the 55 technical officers, who are working in the area.

An awareness training programme was conducted to the 85 Guava cultivators and the plant nursery owners.

Video programmes

- Root knot Nematode damage on guava: 'Govibimata arunalu', Sri Lanka Rupavahini.
- Programme on 'Vegetable IPM in Weeraketiya' was telecasted in Sri Lanka Rupavahini.
- Program on 'Dragon fruit disease management' was telecasted.
- TV programme on 'Vasavisanethi krushikarmaya' was telecasted in ITN.

PLAN FOR 2012

- Implementation of the Plant Protection Act
- Promotion of IPM in rice
- Promotion of IPM in vegetables
- Promotion of IPM in leafy vegetables
- Development of a Data bank on district wise pest incidences in rice & vegetable Rat control in rice fields
- Biological control of Invasive Aquatic weeds
- Control of Alien Invasive weeds in Agricultural habitats
- Pilot scale testing of weedicides
- Seed fumigations
- Establishing model villages
- Other special activities such as Termite control in government buildings
- Establishment of a permanent exhibition unit at the Agro park in Gannoruwa

STAFF LIST

Designation	No.
Deputy Director	01
Research Officer	01
Agricultural Officer	03
Programme Assistant	01
Agricultural Instructor	08
Public Management	04
Assistance Service	
Driver	04
Store Labourer	01
Lorry Cleaner	01
Labourer	05
Total	29

3.1.3 NATIONAL PLANT QUARANTINE SERVICE (NPQS)

KATUNAYAKA

The mandate of the National Plant Quarantine Service of Sri Lanka is to facilitate the import and export of pest free plants and plant products, for the development of agriculture and related industries in the country. To achieve this, emphasis were given to both research and service oriented quarantine activities.

Phytosanitary certification, inspection and treatment of import and export plants and plant products, testing of detained samples,

dissemination of knowledge on all aspects of plant quarantine via training and awareness programmes for interested groups are the main activities with national research institutes, universities and institutes and centers of DOA. This report gives the achievements made on financial, technical and service oriented activities carried during 2011.

BUDGET

Allocation given and expenditure incurred under recurrent, capital and projects are given in Table 3.1.3.1.

Table 3.1.3.1: Annual budget – 2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	6,811,0000	3,410,038	5
Recurrent	6,208,0000	5,431,464	9
NARP projects	3,000,0000	650,069	2
Total	160,190,000	9,491,571	6

PROGRESS

Plant Quarantine Operations

Activities carried out by the plant Quarantine Operation division within the year 2011 are listed in the Table 3.1.3.2.

Table 3.1.3.2: Activities carried out in 2011

	Activity	Achievements
01	Registration of interceptions	301
02	Number of interception reports sent	297
03	Registration of inspections	689
04	Number of inspection reports sent t entry points	677
05	Registration of coir products for testing	159
06	Reports for tested coir products	144
07	Registration of submitted samples for testing	27
08	Issue of phytosanitary certificates	03
09	Number of questionable consignments destroyed	1102

Except for the these activities which are related to the plant quarantine operations, the division has coordinated and carried out 14 comprehensive training programmes on plant quarantine activities and procedures.

Entomology

Testing for pathogens in exports and imports consignments

a) Exports

- 10539 export foliage plant samples collected from 15 export foliage nurseries and tested for plant parasitic nematodes. 403 samples were contaminated with Plant parasitic nematodes.
- 5026 export foliage plant samples and strawberry samples tested for insect pests and mites. No contaminations were recorded.
- 79 export coir samples collected from 13 coir factories were tested for insect pests, mites, soil contaminants and plant parasitic nematodes. No contaminations were recorded.
- 157 other special samples submitted by the foliage exporting nurseries were tested for plant parasitic nematodes and insect pests for the facilitation of their pest monitoring program.

b) Imports

- 76 imported seed potato consignment were inspected at the sea port. These samples were collected and tested fro insects pests and plant parasitic nematodes. No contaminations were recorded.

359 imported plant materials including hybrid maize, ground nut, cashew nut, *Sphagnum* peat

moss, Liliulm bulbs, fermented cocoa beans etc. Were tested for insect pests, mites and plant parasitic nematodes and 07 samples were found to be contaminated with common stored pests. Further an imported from Indonesia was found t be infected with *Araecerus fasciculatus* (Betel nut Weewil).

Trainings

A large number of students belong to the universities, technical colleges and schools were under the Entomology division.

Pathology

Testing for pathogens in exports and imports consignments

a) Exports

Foliage and Coir

2098 samples were tested and following pathogens were found; *Mucor sp.*, *Aspergillus sp.*, *Fusarium sp.*, *Colletotrichum sp.*, *Thalaviopsis paradoxa*, *Macrophomina sp.*, *Rhizopus sp.*, *Xanthomonas sp.* Out of these pathogens *Thalaviopsis paradoxa* is considered as a quarantine important pest

Tissue culture plants

1,350,547 plants were examined during 69 inspections. Contaminated containers with sample Were rejected during inspections and necessary instructions were given to improve the quality of products.

b) Imports

Seed potatoes

77 seed potato samples were tested and following pathogens were found, Silver scurf, Common scab, Soft rot, Black scurf, Netted scab and *Erwinia carotovora*. No quarantine pathogens were found.

Seeds and other plant materials

379 samples were tested and no quarantine pathogens were found.

Testing of submitted samples

12 samples were checked and suggestions/findings were given to the responsible parties.

Trainings

Three training programs and five workshops were conducted.

Two sets of undergraduates and diploma students were supervised.

Research programs

A research was carried out on controlling of *T. paradoxa* with heat treatment and the results obtained were: optimum temperature (70°C) and time (5 min).

Weed Science

Testing for pathogens in export and import consignments

a) Exports

155 consignments of export coco peat products were tested and out of that 41 were found to be contaminated with viable seeds.

b) Imports

37 import consignments were tested and 05 of them were found to be contaminated. Several seeds of *Parthenium hysterophorus* were found in an onion seed sample.

Trainings

A large number of students belong to the Universities, Technical Colleges and schools were trained under the weed science division.

Research programs

A research was carried out to evaluate the factors (temperature and time periods) that destroy seed viability in an efficient manner. 08 weed species were mixed with coco peat (01 Kg) and packed them in a porous metal container and exposed to water vapour generated from a metal container. The maximum temperature of the system was 90°C

and the time taken to lose the seed viability was 10mts.

Maintenance of reference collection

- 44 new weed species were collected preserved and mounted.
- 14 new weed seed species were collected and preserved.

Treatment Technology

Commercial fumigations

- 214 Consignment of plant & plant products exports by different Companies were fumigated at NPQS using Methyl Bromide.
- 13 consignments of assorted flowers, 02 consignments of cardamom, 02 consignments of seeds and dried herbs and 01 Christmas tree intercepted by the plant quarantine units at the airport were fumigated before releasing to the importer.

Table 3.1.3.3: Commercial fumigations done at NPQS Katunayake during 2011

Commodity type	No. of fumigations
Coir & coir products	100
Wood & wooden items	29
<i>Cerbera</i>	07
Flowers	21
Dried herbs	28
Seeds	02
Spices	10
Other	17
Total	214

Supervision of quarantine treatments

37 fumigations for wood packing materials were conducted by private fumigators upon requested by exports were supervised by the officers of

treatment technology division for certification purpose.

PLAN FOR 2012

Promotion of export of quality plants and plant products

- Export nursery inspections
- Factory inspections of export plants and plant products
- Other agriculture related export inspections (individual tissue culture plant Inspections)
- Samplings
- Document check
- Laboratory testing plant pathogens
- Laboratory testing plant insects
- Laboratory testing nematodes
- Laboratory testing weeds
- Submission of final test reports

Ascertaining the quality of imported seed potato

- Entry point inspection of seed potato
- Sampling
- Document check
- Laboratory testing plant pathogens
- Laboratory testing plant insects
- Laboratory testing nematodes
- Submission of final test reports

Ascertaining the quality of imported plant and plant products

- Entry point inspections
- Sampling
- Document check
- Receipt of samples submitted by entry points to NPQS
- Laboratory testing of plant pathogens
- Laboratory testing of plant insects
- Laboratory testing of nematodes
- Laboratory testing of weeds
- Submission of test reports
- Submission of final test reports
- Release
- Treatment recommendation
- Re-export or destruction

Ascertaining the quality of imported seeds, fruits and vegetables

- Entry point inspections
- Sampling
- Document check
- Receipt of samples submitted by entry points to NPQS
- Laboratory testing of plant pathogens
- Laboratory testing of plant insects
- Laboratory testing of nematodes
- Laboratory testing of weeds
- Submission of test reports
- Submission of final test reports
- Release
- Treatment recommendation
- Re-export or destruction

Prevention of imports done without fulfillment of phytosanitary

Requirements

- Document check
- Sampling
- Testing for pathogens in intercepted plants
- Testing for insect pests in intercepted plants
- Testing for plant parasitic nematodes
- Testing for weeds
- Submission of test reports
- Submission of final test reports
- Treatment recommendation
- Treatment supervision
- Re-export
- Destruction

Post Entry Quarantine

- Field inspections
- Keeping plants at DOA premises
- Reports/recommendations
- Submission of final reports

Treatment for eradication of pests found in export and import plants and plant products

- Fumigation at NPQS
- Supervision of fumigation done outside NPQS
- Issuance of fumigation reports

Maintenance of reference collections

- Weed species and weed seed species
- Insects
- Diseased specimens
- Live aquatic plants

Training and awareness programmes for stake holders

- Trainings
- Supervision of undergraduates/Diploma students
- Awareness programmes
- Workshops
- Seminars

Quarantine related research

- Pest surveys
- Pest risk analyses
- Weed control research
- Pathological research
- Entomological research
- Quarantine treatment research

Registration of plant nurseries

- Exporting plants to designation countries
- Field inspection
- Auditing
- Submission of reports

Evaluation of facilities with treatment providers

- Inspection of sites
- Auditing

Issuing phytosanitary certificates

STAFF LIST

NPQS, Katunayake

Designation	Number
Deputy Director	01
Research Officer	08
Administrative Officer (Covering up Duties)	01
Agriculture Monitoring Officer	05
Programme Assistant	06
Research Assistant	05
Agricultural Instructor	12
Management Assistant	09
Driver	04
Electrician	01
KKS	03
Watcher	02
Special Laborer	01
Laborer	05
Laborer (Contract)	04
Total	67

PQS, Seaport

Designation	Number
OIC (AO)	01
Agriculture Officer	01
Agriculture Monitoring Officer	03
Research Assistant	06
Agriculture Instructor	12
Management Assistant	02
Laborer	01
Total	26

PQS, Airport

Designation	Number
OIC (AO)	01
Agriculture Officer	01
Research Assistant	03
Agriculture Instructor	17
Management Assistant	01
Laborer	02
Total	25

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. During the year 69 new registrations and 182 re-registrations have been completed conforming to the international guidelines and test protocols ensuring acceptability on safety, efficacy and environmental grounds. A sum of Rs. 3.8 million have been collected as revenue through registration and re-registration fees. The issuance of import approvals is entertained on

certain quality assuring protocols for pesticide products entering in to the country. Apart from procedural control measures 1534 number of formulation analyses have been carried out, prior to marketing, covering 376 of import consignments during the above period. All of our outreach activities have been integrated to cater the requirement of effective regulation of pesticides under which 32 dealer trainings and 07 officer training were conducted. Approval of pesticide labels (354) and advertising materials (193) were also efficiently utilized as information management and exchange option to ensure better management of pesticides in the field.

BUDGET

Table 3.1.4.1: Annual budget -2011 (Rs.)

VOTE EXPENDITURE	ALLOCATION INCOME	EXPENDITURE		
			%	
Capital	3,830,000	3,368,490	88	-
Recurrent	3,303,000	2,760,579	84	-
Registration & Re- Registration fees	-	-		3,121,150
Dealer Certification Fees	-	-		740,8500
Total	7,133,000	6,129,029	86	3,862,000

PROGRESS

Registration of Pesticides

During the year, the total revenue collected in this activity was Rs. 3,121,150. In order to streamline the registration aspects, and also to accommodate a wide participation in decision making, expertise from relevant ministries and institutions who are involved with pesticides, directly or indirectly, are being consulted by appointing pesticide sectoral sub-committees (e.g. agrochemical subcommittee, domestic and public health subcommittee and industrial subcommittee) under the PeTAC (Pesticide Technical Advisory Committee).

Re-Registration of Pesticides

The registration of a product is valid only for 3 years after which the product status is reassessed based on new standards, findings and safety issues. During the year, 182 applications were processed under this category. Total revenue realized under this category was Rs. 910,000. As a new decision rule of pesticide re-registration, all pesticide products registered before the year 2000 are required to submit fresh registration documents for latest safety requirements..

Product Assessment and Registration of New Molecules

Safer and environmental friendly pesticides were identified and promoted during the 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

expedient evaluation of documents. One of the advantages expressed over these approaches were to share the knowledge among diverse disciplines for effective assessment of pesticides. More than 69 formulations were evaluated during the year and 03 were registered.

- Penoxsulam 24%
- Metamipo
- Flucetosulfuron

Import approvals

This process ensures that products are imported from the correct source of supply conforming to the required quality standards and prevents importing excess volumes. During the year, 740 Quality Certificates submitted by the importers were assessed for this purpose prior to 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 350 labels and more than 190 advertising materials have been screened during the year. The number of corrective attempts placed on label approvals was doubled during the year due to recent upgrade of the pesticide recommendations. Accordingly more user-friendly directions on the “dosage Section” were introduced in pesticide labels.

Field enforcement

As an ongoing programme, the office of the ROP continued to coordinate with the Provincial, Inter Provincial and Mahaweli Authority field enforcement staff to implement the Pesticide Dealer Certification Scheme. 32 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. 740,850.

Training and Awareness Programmes

Several training classes were held during the year for dealers (32) and officers (07). About 1470 training certificates and 1347 dealer certificates were issued in 2011.

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 2011, 1534 formulation analysis have been conducted on 376 batches and thereby cleared a total of 859,455.0 kg and 5,275,914.8 liters for marketing.

Special Activities

Regulations under the Section 26 of COP

Act

Recognizing the social responsibility of ensuring safe and effective use of pesticides in the country, “Mahinda Chinthana Idiri Dekma” (page No. 50) His Excellency the President has emphasized the need to employ, properly trained sales and Technical Assistant for each pesticide dealer outlet in the country. Accordingly new regulations have been instituted under the COP Act No.33 of 1980,

on recruitment of Agrochemical Sales and Technical Assistants for pesticides sales outlets with effect from July 23, 2011 (Gazette Extraordinary No 1716/23, dated 23rd July 2011.)

A training course is organized by the Provincial Department of Agriculture under the supervision of the National Apprentice and Industrial Training Institute (NAITA), for international standards. Simultaneously, an internationally recognized certificate which is equal to the Level IV of the National Vocational Qualification System is to be given for the trainees who will be completed the 6-months long training program successfully. Eleven training modules for the training-of-trainers (ToT) have been prepared by the Extension and Training Division of the Department of Agriculture in consultation with all relevant expertise on safe and effective use of agrochemicals, with special emphasis on pesticides.

The preliminary discussions for the implementation of the program with Provincial Directors of Agriculture, Secretaries of Provincial Department of Agriculture have been conducted in the Central, Sabaragamuwa, Eastern, North-eastern and North-central provinces.

Appointing members to the Pesticide

Technical and Advisory Committee

Hon. Minister of Agriculture appointed five new members to the Pesticide Technical and Advisory Committee by the Gazette Extraordinary No. 1720/34 dated 25.08.2011 in order to streamline the functions of the above Committee. The main function of the above Committee is to advice Registrar of Pesticides in pesticide regulatory aspects. Altogether, there are fifteen members served in the Committee, with ten *ex-officio* members from various governmental and semi-

governmental institutions with pesticide related matters.

Guidelines for Accepting

Individual/Corporate Institutions to Engage in Pesticide Importation, Distribution and Sale within the Country

New guidelines have been prepared on necessary prerequisites for acceptance of new companies proposing for registration of pesticides in Sri Lanka. It is required that interested parties to submit a full institutional profile for inspection and records under this scheme. Registrar of Pesticide in consultation with the Pesticide Technical and Advisory Committee will make a decision regarding the acceptance of the applicant. These guidelines approved by the Pesticide Technical and Advisory Committee and are implemented with immediate effect.

Implementing of Agrochemical Sub-committees

In order to regularize the registration of pesticides in three categories of agro-pesticides, house hold pesticides and industrial pesticides, three sub committees were assigned under the provision of the COP Act.

New Policy for Trade Names

Considering the proliferation of trade names and confusions among farmers for commodity pesticides, a new policy was implemented to convert all trade names of all commodity-Agro pesticides to company name and common name. It is expected that farmers will make right decisions in selection of pesticides by way of an informed decision.

Banning of Alachlor and Regulatory Decision on Other Pesticides under the Rotterdam Convention

A decision was taken by the Pesticide Technical and Advisory Committee to ban the herbicide, alachlor, which has been a scheduled pesticide in the Annex III of the Rotterdam Convention.

The “no consent” decisions have been taken for several other pesticides, already banned or not-in-use in the country. They are aldrin, DNOC slats, ethylene oxide, ethylene dichloride, monocrotophos, parathion, trybutyl-tin compounds, aldicarb, endosulfan, benomyl (7% above), carbofuran (10% above) and thiram (15% above).

Arsenic and Toxic Heavy Metals in Pesticides

In response to recent chaos from environmental lobbying groups on arsenic impurities in pesticide formulation, thorough regulation of imported consignments for technical impurities has been implemented. In this activity, nine heavy metals such as mercury, arsenic, chromium, cadmium, lead, nickel, cobalt, tin and thallium and cyanide in pesticides are checked and regulated.

Initiative on Monitoring of Severely Hazardous Pesticide Formulations

An inception workshop has been organized in September, 2011 in order to discuss strategies and effective designing a study program in hospitals and the farmer fields in collaboration with the Rotterdam Convention Secretariat in Geneva. It is planned that, as a regulatory authority, Registrar of Pesticides will be guided by descriptive records of unintentional poisonings and confirmatory data by clinical studies when taking decision of highly hazardous pesticide formulations.

The pilot studies are being designed among farming communities and patients in Anuradhapura, Kurunegala, Hambanthota and NuwaraEliya districts with the collaboration of South Asian Clinical Toxicology Research Collaboration and the Rotterdam Convention.

Management of Empty Pesticide Containers

Retail containers at farmer field level

Office of the Registrar of Pesticides actively participated with the Ministry of Environment to initiate a program to develop strategies to collect empty pesticide containers on the premise of the “polluter pay principle”. This is a part of the project under the Basel Convention to implement strategies to minimize health and environmental implications from empty pesticide containers at the field level. Five stakeholder meetings have been held so far to discuss strategies and all agreed on (a) the necessity of a solution for container disposal, (b) social responsibility of all parties concerned and (c) to explore technical feasibilities for complete destruction and/ or recycling of glass and plastic containers. The preliminary discussions prompted to study public perception on the proposed activity. Separate surveys were conducted on farmers, pesticide dealers/ sellers and the general public.

Bulk pesticide containers at industry level

Accumulation of pesticide contaminated empty containers is becoming a serious problem within the pesticide industry. Various environmental and public health issues could be arisen from the accumulation of containers in yards and is also strongly appealing for misuse. There have been concerns of pesticides leaching from recycled high-density polyethylene plastics from pesticide containers. This can lead to serious public health consequences depending on the end product to be made. Incineration of contaminated plastic containers at higher temperatures is the only feasible disposal option at present.

Currently, as a precautionary practice, Office of the Registrar of Pesticides has been implementing a management strategy for empty container disposal (in formulation industry) in which steel drums are recycled as diluents in making raw iron while plastic containers are allowed for re-use by government or municipality/ rural government sponsored compost and/or garbage collection projects. Continuous attention has been given to look for all available options in order to address the issue and to safeguard the health and the environment.

Table 3.1.4.2: Progress of activities during the year 2011

Sub Activity	Annual Physical Target	Achievement	%
• Acceptance of Applications for registration after screening & allocation of application numbers	150	288	119
• Evaluation of original Registration applications	60	69	112
• Evaluation of third- party Registration applications	140	73	67
• Evaluation of Re-registration applications	140	182	101
• Evaluation of data for local trials	30	39	173
• Issue of import approvals	1300	1231	136
• Evaluation of Pesticides Quality Certificates	1300	740	91
• Screening of labels for approval	700	354	75
• Screening of advertising material for approval	225	193	86
• Inspection of factories	12	08	67
• Inspection of approved repacking facilities and stores	02	13	650
• Inspection and certification of premises for fumigation and household pest control operators.	12	14	117
• Approval of obtaining CH ₃ Br for quarantine & pre- shipment treatment on accountable basis	50	58	116
• Issue of approvals to authorized institutes for purchasing restricted pesticides	100	35	35
• Dispatch of samples to MRI & ITI for obtaining test reports on suitability for acceptance of applications	25	25	100
• Issue of packing clearance as per the quality analysis of samples on consignment basis.	700	376	54
• Inspection of sales outlets	40	85	213
• Publish of Newsletter	04	00	00
• Officer Training Classes	05	07	140
• Seminars for school children	08	01	13
• Dealer training classes	26	32	123
• Issue of dealer Training Certificates	1050	1470	139
• Issue of dealer certificates	2000	1347	67
• Field Complaints	10	20	200
• Legal Prosecutions	04	00	00
• Technical Advisory Committee Meeting	06	03	50
• Formulation analysis	700	1534	219
• Residue analysis	210	00	00
• Sample collection by ROP office for quality assurance	12	03	25
• Disposal of obsolete stocks	04	01	25
• Service or participation as technical Expertise/Members/resource persons for intra and inter Departmental organization meetings.	31	35	113
• Participation as resource personal for invitations from other institutes	10	21	210
• Collection & compilation dissemination of import statistics (Central Bank, Universities, Researches, Govt. Institutes ect)	40	16	40
• Other activities such as field surveys	04	00	00

PLAN FOR 2012

Pesticide Registration

No	Item/ Activity	Annual Physical Target	Cumulative Physical Target for the Quarter				Expected Benefits
			1 st	2 nd	3 rd	4 th	
1	Acceptance of Applications for registration after screening & allocation of application numbers	30	05	15	25	30	In order to arrive at a decision whether the products do not cause harmful effects under local conditions and to minimize agricultural input cost
2	Evaluation of original registration applications	30	05	15	25	30	
3	Evaluation of third- party Registration applications	140	35	70	105	140	In order to arrive at a decision whether the products do not cause harmful effects under local conditions and to minimize agricultural input cost
4	Evaluation of re-registration applications	140	35	70	105	140	
5	Evaluation of data for local trials	30	05	15	25	30	To release human and environmentally friendly formulations.
6	Issue of import approvals	1400	300	550	1000	1400	To assure products importing from correct source of supply, and stop importing unwanted volumes.
7	Evaluation of pesticides quality certificates	1400	300	550	1000	1400	To import quality pesticides and to ensure products conform to FAO specifications.
8	Screening of labels for approval	750	100	300	500	750	To give the correct message for the farmers and other relevant authorities on judicious use and protection.
9	Screening of advertising material for approval	250	50	100	200	250	
10	Inspection of factories	12	3	6	9	12	To assure factory standards are actually followed.
11	Inspection of approved repacking facilities and stores	2	1	2	2	2	To check whether packing activities are carried out according to standards and thereby maintain product quality.
12	Inspection & certification of premises for fumigation & house hold pest control operators	30	5	10	20	30	To regularize fumigation operations thereby avoid rejection of exports

No	Item/ Activity	Annual Physical Target	Cumulative Physical Target for the Quarter				Expected Benefits
			1 st	2 nd	3 rd	4 th	
13	Registration Pest Control services	30	5	10	20	30	To regularize Pest Control Operators in order to prevent unskilled people coming to this industry.
14	Approval of obtaining CH ₃ Br for quarantine & pre- shipment treatment on accountable basis	60	15	30	45	60	
15	Inspection of sales outlets	140	30	75	110	140	Prevention of adulteration and spurious products.
16	Dispatch of samples to MRI & ITI for obtaining test reports on suitability for acceptance of applications	25	7	15	20	25	Availability of quality products in the market.
17	Issue of packing clearance as per the quality analysis of samples on consignment basis.	800	200	400	650	800	
18	Media Programs i. TV ii. Radio iii. Print Media	2 6 4	- 2 2	1 4 2	1 5 3	2 6 4	To train the trainers and improve the awareness of the community.
19	Training / Certification of Agrochemical sales and Technical assistants.	25	5	10	20	25	
20	Awareness Exhibition	4	1	2	3	4	
21	Dealer training classes	30	5	12	24	30	To ensure pesticides are sold only through trained people and certified outlets
22	Issue of dealer training certificates	1100	200	500	850	1100	
23	Issue of dealer certificates	2000	500	1000	1500	2000	

No	Item/ Activity	AnnualP hy. Target	Cumulative Physical Target for the Quarter				Expected Benefits
			1 st	2 nd	3 rd	4 th	
24	Field complaints	4	0	1	2	4	To take legal action against persons contravening the provisions or regulations in the Act.
25	Legal prosecutions	2	0	1	2	2	
26	Technical Advisory & Committee Meetings	6	2	3	5	6	To advise the Registrar on all matters relating to the COP Act
27	Meetings with industry representatives to inform PeTAC decisions	6	2	3	5	6	Scrutinizing matters in relation to recommendation and use of pesticides use in industry sector
28	Pesticides Subcommittee meetings of three Subcommittees	9	3	6	9	9	Scrutinizing matters in relation to recommendation and use of pesticides use in health, Public health & domestic pest control sectors
29	Formulation analysis	800	150	350	625	800	To analyze the quality of pesticides and residues in food and water.
31	Random checking of pesticide impurities	12	4	8	12	12	
32	Analysis for generate MRLs						To assure residue levels in Agricultural foods
33	Monitoring of Resistant Developments						To identify the resistant development and non target effects of pesticides in the foods and programming for minimize such effects
34	Non target effects of pesticides						
35	Development and Implementation of programs for empty container Disposal	2	1	1	2	2	To minimize Environmental contamination.

No	Item/ Activity	AnnualP hy. Target	Cumulative Physical Target for the Quarter				Expected Benefits
			1 st	2 nd	3 rd	4 th	
36	Service for participation as technical Expertise/Members/resource persons for intra and inter Departmental organization meetings.	27	5	12	19	27	Reduction of pesticides related health and environmental effects.
37	Participation as resource personal for invitations from other institutes	10	2	5	8	10	
38	Collection & compilation dissemination of import statistics (Central Bank, Universities, Researches, Govt. Institutes ect.)	40	10	20	30	40	
39	Publishing revised guidelines for registration of pesticides / Biocides and guidelines for new comers for the pesticides dealing who needs to import pesticides	4	1	2	3	4	
40	Other activities	4	1	2	3	4	

STAFF LIST

Designation	No.
Registrar of Pesticides	01
Deputy Registrar of Pesticides	00
Asst. Registrar of Pesticides	00
Research Officer	04
Agricultural Officer	01
Agricultural Instructor	06
Research Assistant	04
Agriculture Monitoring Officer	02
Programme Assistant	02
Research Sub Asst	01

Designation	No.
Public Management Assistants'	
Service	06
Driver	02
Watcher	02
Contract Laborers	02
KKS	01
Labour	02
TOTAL	36

3.1.5 PLANT GENETIC RESOURCES CENTRE (PGRC) - GANNORUWA

The Plant Genetic Resources Centre (PGRC) is committed to implement programs and activities to conserve country's Plant Genetic Resources (PGR) of food crops 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 PGRC coordinated the programme on collection of data on 20 activities related to conservation, utilization, institution and capacity building of PGR in Sri Lanka.

BUDGET

Table 3.1.5.1: Annual budget-2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	10,746,000	10,099,211	94
Capital	3,480,000	2,765,849	79
Projects			
FAO-NISM-GPA	2,139,960	2,085,932	97
Project			
Total	16,365,960	14,950,992	91

Germplasm Exploration and Collection

Exploration unit of Plant Genetic Resources Centre is continuing exploration and collection of traditional varieties of all crops including their wild relatives under various programmes. A total of 194 samples were collected through the four field exploration missions conducted at each one in Jaffna district (81 samples) and Trincomalee district (36 samples) and two missions in Monaragala district (77 samples). Thirty six samples were collected under the model village programme in Monaragala district and 28 plant genetic resources were collected as sub samples from PGRC evaluation field and plant house. A total of 12 samples were received from

FCRDI, Mahailuppallama and RARDC, Bombuwela. A total of 37 samples were received as introduction from ICRISAT, India (25 samples of ground nut), CYMMIT, Mexico (6 samples of Maize) and 6 samples of maize from Indonesia through FCRDI, Mahailuppallama.

Vegetative propagated materials were planted temporarily in the field and plant house until handed over to the in-vitro conservation unit and field gene bank. The collected seed samples were sent to the gene bank for ex-situ conservation.

Passport Data

A total number of 80 entries of passport data were sent to Data management unit of plant genetic resources centre.

On-farm conservation and Model Village Programme

The programme of on-farm conservation was carried out in Monaragala district through the model village programme conducted by the Exploration unit of PGRC. Selected villages are Meegahayaya in Badalkumbura AI division and Galamuna and Thunvenigammanaya in Siyambalanduwa AI division. Thirty one home gardens were established with supplying of traditional varieties and other planting materials. Farmers were trained by the subject expertise and two field days were conducted for farmers and officials.

Conservation of Seed Materials

During the year 2011 95 new accessions and 191 multiplied samples were conserved in the gene bank. The total number of gene bank holdings at the end of year is 12,907. The gene bank conservation status is given in the Table 3.1.5.2.

Table 3.1.5.2: Conservation status of the gene bank

Crop Group	No of Accessions
Alliums	20
Other vegetables	371
Leafy vegetables	166
Root and Tubers	09
Mustard and related spp.	124
Oil crops	431
Fiber crops	66
Medicinal plants	27
Fruits	163
Total	12,907

Crop Group	No of Accessions
Rice and related spp.	4538
Other cereals and related spp.	1640
Grain Legumes and related spp.	2038
Vegetable Legumes	1300
Solanaceous vegetables & Condiments & related spp.	1206
Cucurbit vegetables	777
Brassicaceae vegetables	31

Distribution of germplasm

Nine hundred thirteen accessions of different crop varieties were distributed to Local research institutes, NGOs, farmers and Universities on request.

Import of germplasm from foreign countries

Twenty five accessions of groundnut (*Arachis hypogaea* L.) were imported from ICRSAT, India on the request made by the GLORDC Angunkolapelessa for research purpose. Twenty six accessions of mustard (*Brassica juncea* L.) were exported to Australian Temperate Filed Crop Collection, Australia.

Research on seed behavior

A series of experiments were conducted to monitor the viability of active collection of the gene bank from 1989 and 2943 accessions from active collection were tested for viability. The results of active collection revealed that viability of rice and Green gram was as same as at initial germination.

Model Village Programme

Model home gardens were conducted in two villages, Castle Milk and Niyangama in Kandy. From each village five farmers were selected. Five numbers of traditional vegetables varieties were used: Horse gram (*Macrotyloma uniflorum*), Velvet bean (*Mucuna pruriens*), Lima bean (*Phaseolus lunatus*), Hyacinth bean (*Lablab purpureus*), Sword bean (*Canavalia gladiata*), Winged bean (*Psophocarpus tetragonolobus*), local Pumpkin (*Cucurbita moschata*), Nai miris (*Capsicum frutescens*). All ten farmers have successfully cultivated the crops.

Germplasm Multiplication and Evaluation Unit

Hundred tomato accessions, 106 luffa accessions and 102 brinjal accessions have been characterized. All necessary arrangements were made to publish the catalogues. Rice (31 accessions), pumpkins (11 accessions), Cucumber (26 accessions), cowpea (42 Accessions), mustard (4 accessions) have been multiplied / rejuvenated and submitted to Gene bank for conservation. Thirty sweet potato accessions have been characterized and BT 4 accessions have been identified as promising. Thirty cowpea accessions have been evaluated against *Sclerotium rolfisii*. Results revealed that accession 008366, 008390, 008847, 009155, 009542 and two collections C2009-03-152 and C 2009-03-33 seem to be more tolerant to the pathogen.

The following crosses were made aiming the broadening of genetic base: *Memordica dioica* x *M. charantia* and reciprocals. When *Memordica dioica* was used as female parent, it was able to obtain F₁ seeds. However, the seed has shown dormancy and subjected to dormancy breaking treatments to obtain F₁ plants. When bitter gourd

was used as female parent, embryo degradation was observed around 8 days after pollination. Efforts are taken to raise the F₁ plants through embryo rescue techniques. To widen the genetic base of okra, cultivar 'Haritha' was crossed with wild variety *Abelmoschus angulosus* and F₁ seeds were obtained.

Plant Genetic Resources (PGR)

Information Management System

PGR database

Presently database contains passport data of 12,778 accessions and characterization data of 25 crops including rice, maize, finger millet, foxtail millet, sorghum, cowpea, mung bean, black gram, soybean, pigeon pea, ground nut, bean, winged bean, yard long bean, brinjal, tomato, capsicum, okra, pumpkin, snake gourd, bitter gourd, *Amaranthus*, smooth luffa, mustard and sesame.

FAO project on “Capacity Building and Regional Collaboration and Enhancing the Conservation and Sustainable Use of Plant Genetic Resources in Asia (GCP/RAS/240/JPN)”

This project has been implemented in Sri Lanka for the second time. Collection of data for the project was started in 2011. The information on activities pertaining to the Global Plan of Action (GPA) from 29 stakeholder institutes was collected from stakeholders involved in the project. They included Department of Agriculture, Department of Export Agriculture, Provincial Department of Agriculture (Northern Province), Tea Research Institute, Rubber Research Institute, Cashew Research Institute, Palmyra Development Board, CIC Agribusiness Centre, The Green Movement of Sri Lanka etc.

Biotechnology

Analysis of resistance of rice germplasm for brown plant hopper (BPH)

Objective of this was to evaluate and identify rice germplasm with BPH resistance and characterize their resistant genes in view of utilizing them for development of BPH resistant varieties. This study screened 64 rice germplasm and identified 37 as SS (susceptible), 19 as MR (Moderately resistant) and accession No. 3177 as RR (highly resistant). These results are the base for molecular characterization of resistant genes in future. About 70 new rice accessions were established in the field for multiplication for future screening against BPH.

Phenotypic and molecular characterization of rice germplasm for drought

Objectives of this study were to characterize selected rice accessions and identify donors for development of drought tolerant rice varieties and markers linked with drought tolerance for marker aided selection (MAS). Molecular characterization of 40 rice accessions (including local and exotic accessions) with 10 SSR markers has been completed.

Study the genetic relationship among exotic and locally developed maize inbred lines

This study was continued with 37 inbred lines selected from local and CIMMYT germplasm. DNA extraction was completed and preparations were made for analysis of molecular diversity using SSR markers. Distant parents are selected based on molecular diversity to develop hybrids with better hybrid vigor.

Protocol development for genetic purity testing of 3 seed stocks of Rampur onion variety, local hybrid vegetables of tomato, egg plant and maize

Out of 10 RAPD primers tested by PCR amplifications 2 (OPD 03 and OPD 10) gave rise polymorphism in between DNA of 3 seed stocks of Rampur onion varieties. Analysis of their amplified fragments showed close genetic distance between 2 samples of Rampur rose variety and distal genetic distance between Rampur rose and Rampur red variety. This analysis also showed high genetic variation among the individuals of 3 varieties indicating that they are not pure varieties. These 2 primers may be used for purity testing of Rampur onion varieties.

DNA of parental and F₁ hybrid of two tomato hybrid varieties were screened by PCR analysis over 20 SSR primers. None of them showed polymorphism among parents and F₁ hybrid. DNA extraction was done from bulk samples of inbred parental line and F₁ hybrids of 2 hybrids of egg plant. Information was collected of SSR primers for PCR analysis. Polymorphic primers are selected for protocol development for future analysis. PCR analysis was done using 10 SSR primers with DNA of parental and F₁ of Sampath hybrid variety of maize. Results showed 2 primers with polymorphism between two parents and hybrid. These 2 primers are selected for protocol development for purity testing of Sampath hybrid variety.

Conservation of PGR of *Dioscorea*, Sweet Potato, Potato and Banana species under *in-vitro* & plant house conditions

Division maintained 60 accessions of *Dioscorea* species, both under *in-vitro* form in lab and potted

form in planthouse condition, 104 accessions of sweet potato under in-vitro form and 114 accessions of sweet potato under potted form in planthouse condition and 15 accessions of potato and 7 accessions of banana under in-vitro form. These germplasm were also issued for breeding programmes upon requests.

Production of disease free planting materials of sweet orange and banana varieties

Seeds of Rough lemon and Philippine red lime collected from various locations were conserved for use in grafting of sweet orange varieties. About 20 rough lemon plants were also established in the field for use of seeds as root stocks in future programmes. Respectively, 118 and 75 root stocks were grafted by in-vitro micro grafting and semi micro grafting of rough lemon, Sour orange, Philippine red lime and Leema lime. Out of these, 78 grafted plants are at hardening and acclimatization stage.

About 92 banana plants belonging to 10 varieties collected from various locations were established in the research field for use as mother plants. In-vitro cultures were initiated with banana of Pulathisi, Kandula, Seeni and Embon varieties. They were subjected to sub culturing, multiplication, hardening and acclimatization. Out of these in-vitro cultures, 12 were at rooting phase and 17 were at hardening stage and 152 plantlets were in acclimatization phase by the end of year 2011. 220 tissue cultured plants were planted in the research field of PGRC for testing, 186 have already been delivered and 133 are ready for delivery. In addition, testing and optimization of protocols for production of diseases free plant stocks via micro propagation techniques were also conducted.

Training and awareness programme

An officer training programme on “use of GIS technology in germplasm conservation” was conducted by the Exploration unit in collaboration with the Departments of Survey, Wild Life and Botanic Gardens during year 2011. This training programme was exposed to the in-situ and ex-situ conservation, GIS technologies and types of forests. A total of forty (40) awareness programmes were organized and conducted by the Exploration unit with the help of other units to different schools and twenty five (25) awareness programmes were conducted for the groups of University students, teachers, in plant trainees and farmers.

Three students of agricultural diploma course and 4 undergraduates underwent Induction training in biotechnology. Three postgraduate and four undergraduate students underwent long term training in research projects. Division conducted a full day programme on PGR and Biotechnology for 120 undergraduate and post graduate students and the staff of the Faculty of Agriculture at Rajarata University, Anuradhapura. Division also conducted demonstration activities for 189 teachers in 3 groups, 13 lecturers in 3 groups, 1492 school children in 32 groups, 7 student groups of Agriculture Schools and 7 student groups from universities, 2 groups of farmers and 10 groups of others.

Two under graduate students completed their research for the respective degree programmes under the supervision of the Head, Evaluation unit.

PLAN FOR 2012

- Continuation of exploration and collection of Plant Genetic Resources
- Processing and conservation of seed materials from Exploration and Collection unit
- Continuation on experiments on viability of conserved materials
- In vitro conservation of plant genetic resources
- Characterization, multiplication and rejuvenation of plant genetic resources
- Maintenance and improvement of the present data management system
- Molecular characterization of plant genetic resources
- Use of plant genetic resources for crop improvement using molecular techniques
- Continuation of public awareness programme

STAFF LIST

Designation	No.
Deputy Director	01
Research Officer	09
Programme Assistant	02
Agricultural Instructor	03
Research Assistant	04
Research Sub Assistant	05
Public Management Assistant	07
Store Keeper	01
Peon	01
Driver	03
Lorry Cleaner	01
Electrician	03
Circuit Bungalow Keeper	01
Watcher	05
Cinema Machine Operator	01
Labourer (Grade I)	13
Labourer (Grade II)	06
Labourer (Contract)	19
Total	85

3.2 SEED AND PLANTING MATERIAL DEVELOPMENT CENTRE (SPMDC) - PERADENIYA

Use of high quality seed and planting material is the most important input to increase the yield and that will also minimize the production cost. The Seed and Planting Material Development Centre (SPMDC) plays a vital role in production and distribution of seeds and planting materials throughout the country. Production and distribution of required amount of seeds of all

locally recommended crop varieties of Paddy, Other field crops, Vegetables, Potatoes and quality planting materials are the main challenges faced by the SPMDC. The SPMD has 18 farms to produce seed and planting materials. However, certified seeds of rice, vegetables and other field crops are produced through selected contract growers.

BUDGET

Table 3.2.1: Annual budget -2011 (Rs. million)

Vote /Project	Allocation	Expenditure	Expenditure %
Capital	35.323	29.058	82
Recurrent	46.301	44.585	96
Special Projects	486.3	473.4	97
Seed Production & Purchasing			
Community Based Seed Production	5.0	4.61	92
Compost Production	6.0	5.05	84
Maize Hybrid Seed Production	1.05	1.05	100
Vegetable Hybrid Seed Production	0.375	0.293	78
Re-Activation of the Govt. seed farms at Paranthan & Murunkan (JAICA)	100.0	97.7	98
Accelerated Seed Farm Development programme	200.0	85.0	43
Total	895.3	740.7	83

PROGRESS

Production & Supply of Seed Paddy

Basic seed paddy production in government seed farms

Foundation seed paddy (FSP) and registered seed paddy (RSP) of 28 recommended rice varieties were produced in seven government seed farms. 112794 bu (2312.3 mt) of Registered seed paddy were produced in year 2011. RSP production was

increased by 7.17 % compared to that of the year 2010

14617 bu (299.7 mt.) of certified seed paddy (CSP) was produced in seed farms by utilizing the rice fields, which were not used for basic seed paddy production.

Table 3.2.2: Basic Paddy Production in government seed farms during 2011

Seed Farm	2010/11 Maha (mt)			2011 Yala (mt)			Total (mt)		
	FSP	RSP	CSP	FSP	RSP	CSP	FSP	RSP	CSP
Aluttarama	11.0	111.2	7.5	18.2	116.7	31.1	29.2	227.8	38.6
Ambalantota	1.9	57.3	5.2	3.0	70.9	14.1	4.9	128.1	19.3
Bata-Atha	5.2	29.6	13.0	1.5	6.1	2.1	6.6	35.7	15.1
Kantale	6.4	102.0	9.8	12.6	246.5	2.6	19.0	348.5	12.4
MI	15.0	258.2	17.9	24.2	391.6	0.5	39.2	649.8	18.3
Malwatta	3.3	60.5	14.0	5.2	108.7	66.6	8.5	169.1	80.6
Polonnaruwa	9.2	218.6	31.8	11.3	399.8	0.7	20.5	618.4	32.6
Murunkan	0.9	42.0	-	-	-	-	0.9	42.0	-
Paranthan	2.4	36.1	5.8	4.7	47.6	-	7.1	83.7	5.8
Karadiyanaru	-	4.3	36.1	-	4.7	40.5	-	9.0	76.6
Total (mt)	55.3	919.7	141.2	80.6	1392.5	158.4	136.0	2312.3	299.7
Total (bu)	2699	44865	6889	3933	67929	7728	6632	112794	14617

Certified seed paddy production through contract growing programme

Under this programme, SPMDC targeted to purchase 70,000 bu in 2010//11 maha and 2011 yala seasons (35,000 bu per season). During the

year of 2011 due to favourable weather conditions and high farm gate price offered by DOA a total of 107,030 bu were purchased from nine ADA regions as shown in Table 3.2.3 (i).

Table 3.2.3 (i): Quantity of certified seed paddy purchased under contract growing programme-2011

ADA Region	Quantity Purchased			
	2010/11	2011	Total (mt.)	Total (bu)
	Maha (mt.)	Yala (mt.)		
Aluttarama	121.8	201.8	323.6	15785
Ampara	153.4	186.6	340.0	16584
Bata-Atha	25.7	103.4	129.1	6297
Kantale	78.0	203.3	281.2	13718
Maha Illuppallama	147.8	112.4	260.2	12691
Nikaweratiya	108.9	147.2	256.2	12496
Pelwehera	146.6	138.9	285.5	13927
Polonnaruwa	62.9	208.3	271.3	13233
Kilinochchi	15.4	11.4	26.8	1308
Vavuniya	20.3	-	20.3	991
Total (mt)	880.7	1313.4	2194.1	
Total(bu)	42962	64068		107030

Distribution of Emergency seed paddy programme - 2011

As a special seed production programme conducted by SPMDC 236195 bu. of emergency seed paddy were purchased and distributed free of charge among flood affected farmers during 2010/11 Maha to cultivate 2011 Yala and 2011/12 Maha.

Table 3.2.3 (ii): Quantity of Emergency seed paddy purchased - 2011

ADA Region	Quantity Purchased			
	2010/11	2011	Total (mt)	Total (bu)
	Maha (mt)	Yala (mt)		
Aluttarama	234.9	37.1	272.0	13268
Ampara	556.1	698.4	1254.5	61195
Bata-Atha	504.5	10.9	515.4	25142
Kantale	261.5	353.1	614.6	29981
Maha Illuppallama	292.9	254.7	547.6	26712
Nikaweratiya	240.0	202.4	442.4	21581
Pelwehera	91.2	157.8	249.0	12146
Polonnaruwa	205.7	192.1	397.8	19405
Kilinochchi	62.1	143.3	205.4	10019
Vavuniya	105.5	213.3	318.8	15551
Colombo	24.5	-	24.5	1195
Total (mt)	2578.9	2263.1	4842.0	
Total(bu)	125800	110395		236195

To increase the use of quality seed paddy in commercial cultivation, SPMDC has conducted a collaborative quality seed production programme with the participation of several agencies including private sector organizations. Under this programme, RSP was issued to the relevant agencies. The resulting crops and the seed were

certified by the Seed Certification Service (SCS) of the Department of Agriculture (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 amount given because some companies did not participate in the official seed certification programme because they had their own quality control systems. During the year of 2011 quantity of CSP produced under the official certification programme was 17,624.18 mt

(934,362 bu) (Table 3.2.4) which was equivalent to 17% of the total seed paddy requirement of the country. There was an increase by around 1.37% when compared to that of the year 2010. If 15% of the total seed paddy requirement is met by using certified seed, it could be considered as a satisfactory situation.

Table 3.2.4: Collaborative Certified Seed Paddy Production Programme - 2011

Institute	2010/11 Maha		2011 Yala		Year 2011		Production	
	Qty. Issued by DOA (mt)	Extent Certified (ac)	Qty. Issued by DOA (mt)	Extent Certified (ac)	Qty. Issued by DOA (mt)	Extent Certified (ac)	mt	bu
DOA							2194.60	107030
Prov.	69.97	1547.5	63.84	1331.5	133.8	2879.0	3836.27	187135
IP	41.33	716.0	34.71	687.0	76.03	1403.0	1869.50	91195
Ag.Ser.	37.08	691.8	3.10	74.6	40.18	766.4	1021.23	49816
Mahaweli	29.79	723.6	14.80	326.0	44.59	1049.6	1398.59	68224
Coop	10.95	245.5	7.71	314.2	18.66	559.7	745.80	36381
Farmer Or.	119.47	2091.5	75.46	2476.7	194.93	4568.2	6087.13	296933
Individual Farmers	39.98	754.9	20.97	463.5	60.95	1218.4	1623.52	79196
Private Companies	22.49	478.4	60.41	1108.7	82.90	1587.1	2114.81	103162
Other	5.45	139.1	10.39	204.3	15.58	343.4	457.58	22321
Total	376.50	7388.30	291.39	6986.50	67.89	14374.8	19154.42	934362

Issue of Seed Paddy

In 2011, total seed paddy issued by the DOA for seed production and commercial cultivation 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. During 2011, total supply of registered seed was 1984.4 mt (96,802 bu). Supply of Certified seed paddy was 2197.9 mt (107,215 bu).

Table 3.2.5: Quantities of Seed Paddy Issued by the DOA (mt)

Season	Programme	Foundation	Registered	Sub Total	Certified	Grand Total	
						mt	bu
2011 Yala	Farm	22.45	23.84	46.29	0.08	46.37	2262
	Cont.Growing	1.68	54.00	55.68	12.14	67.81	3308
	Private	1.46	395.94	397.39	49.08	446.47	21779
	Extension	2.50	348.36	350.86	1120.10	1470.96	71754
	Sub Total (mt)	28.09	822.13	850.22	1181.39	2031.61	99103
	Sub Total (bu)	1370	40104	41474	57629	99103	
2011/12 Maha	Farm	21.63	14.80	36.41	0.12	36.53	1782
	Cont.Growing	2.58	85.44	88.03	0.68	88.70	4327
	Private	1.76	326.95	328.72	29.50	358.22	17474
	Extension	1.19	735.13	736.32	986.21	1722.53	84026
	Sub Total (mt)	27.16	1162.31	1189.47	1016.51	2205.98	107609
	Sub Total (bu)	1325	56698	58023	49586	107609	
Issues for the year 2011	Farm	44.08	38.62	82.70	0.21	82.90	4044
	Cont.Growing	4.26	139.44	143.71	12.81	156.52	7635
	Private	3.22	722.89	726.11	78.58	804.69	39253
	Extension	3.69	1083.49	1087.18	2106.31	3193.49	155780
	Total (mt)	55.25	1984.44	2039.69	2197.91	4237.60	206712
	Total (bu)	2695	96802	99497	107215	206712	

Production and distribution of Other Field Crops

Thirty varieties of ten Other Field Crops were used to produce four different classes of seeds (Foundation, Registered, Certified and Commercial seeds) during year 2011.

Basic seed (Foundation and Registered seeds) production

During 2011 total quantities of Foundation seed produced during this year in Government seed farms and registered seed produced under Government farms and contract seed farms are given in Table 3.2.6. In the same year total basic seeds (Foundation and Registered) produced was 85,520 kg, and it is 33% higher than that of the previous year (64,369 kg.). This is mainly due to higher amount of basic seeds produced of all crops (cowpea, black gram, sesame, greengram, maize and finger millet) except chilli, soyabean and groundnut. Expansion of contract Registered seed

production programme contributed significantly for this achievement.

Certified Seed production

Certified seeds of OFC were mainly produced through contract seed farms. However, hybrid seed of Maize variety “Sampath” was mainly produced in Government Seed farms at Maha Illuppallama, Alutharama and Bata Atha. During 2011, total amount of certified seeds produced was around 321.5 mt which was 14.71% higher than that of year 2010 (Table 3.2.7). This is mainly due to expansion of contract programme of greengram and groundnut seed during this year. However, targeted contract chilli seed production was not achieved, which is mainly due to unfavorable climatic condition prevailed during both vegetative and harvesting stages and high green chilli prices prevailed in the country during the podding stage. A limited quantity of commercial seeds of green manure crop sunhemp was also

produced for the use in government seed farms and research stations as a green manure crop.

Issue of OFC seeds during Year 2011

The amount of Basic (Foundation and Registered) and certified seed issued during year 2011 is given

in Table 3.2.8. Total seeds of OFC issued during year 2011 were around 268 mt, which is slightly higher than that of the previous year. This is the highest amount issued over the last 26 years by the Department of Agriculture.

Table 3.2.6: Basic Seed Production (Kg) of OFC– Year 2011

Crop	Foundation			Registered						Sub Total	Total Basic Seed Production
	Seed Farm			Seed Farm			Contract Programme				
	2010/11 Maha	2011 Yala	Total	2010/11 Maha	2011 Yala	Total	2010/11 Maha	2011 Yala	Total		
Blackgram	268	1106	1374	187	1235	1422	313	18761	19074	20496	21870
Chilli seeds	109	226	335	-	-	-	-	-	-	-	335
Cowpea	1540	274	1814	2279	787	3066	977	3059	4036	7102	8916
Sesame	253	-	253	148	527	675	306	779	1084	1759	2012
Greengram	162	310	472	674	666	1340	203	16168	16371	17711	18183
Groundnut	346	751	1097	1387	1071	2458	85	540	625	3083	4179
Fingermillet	408	-	408	1586	687	2273	885	-	885	3158	3565
Maize (OPV)*seeds	121	1189	1310	1414	3618	5032	2037	9373	11410	16442	17752
Soyabean	67	665	732	432	447	879	2098	5000	7098	7976	8708
Total	3274	4521	7795	8106	9038	17144	6902	53681	60582	77726	85521

*OPV= Open pollinated varieties

Table 3.2.7: Certified and commercial seed production (kg) in government seed farms and under contract growing - Year 2011

Crop	Contract Programme						Seed Farm								
	2010/11Maha			2011 Yala			2010/11 Maha			2011 Yala			Sub Total	Grand Total	
	Cer.	Com	Total	Cer.	Com.	Total	Cer.	Com.	Total	Cer.	Com	Total			
Black gram	7474	1908	9381	8420	4662	13081	22462	0	0	0	0	0	0	0	22462
Chilli seed	0	0	0	437	112	549	549	0	0	0	0	0	0	0	549
Cowpea	4050	676	4726	6048	1060	7107	11833	0	0	0	0	0	0	0	11833
Sesame	672	0	672	2785	1025	3810	4482	149	0	149	0	0	0	149	4631
Green gram	3891	1683	5573	77202	94684	171886	177459	8	283	291	606	0	606	897	178356
Groundnut	5592	2242	7834	18016	20939	38955	46788	0	231	231	0	0	0	231	47019
Finger millet	774	544	1318	399	0	399	1717	1398	117	1515	0	0	0	1515	3232
Maize seed (OPV)	15059	899	15957	11991	0	11991	27948	0	0	0	0	0	0	0	27948
Maize seed (Sampath)	0	0	0	0	0	0	0	2865	0	2865	0	0	0	2865	2865
Soybean	6318	0	6318	13768	0	13768	20086	0	0	0	0	0	0	0	20086
Sunhemp	-	-	-	-	-	-	-	0	315	315	0	2269	2269	2584	2584
Sesbaniya	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0
Total	43830	7952	51782	139066	122482	261548	313326	4420	946	5366	606	2269	2875	8241	321567

Table 3.2.8: Issue of OFC seeds (kg) during year 2010

Crop	2011 Yala						2011/12 Maha						Year 2011					
	Br.	Fou./Basic	Reg.	Cer/Std	Com.	Total	Br.	Fou./Basic	Reg.	Cer/Std	Com.	Total	Br.	Fou./Basic	Reg.	Cer/Std	Com.	Gran Total
Black gram	37	957	655	1176	1415	4240	18	242	7376	14031	1640	23306	55	1198	8031	15206	3056	27546
Chilli	3	143		0		146	2	68		5		75	6	210	0	5	0	221
Cowpea	6	511	5234	2199	3284	11234	79	725	2559	2302	1031	6696	85	1235	7794	4501	4315	17931
Sesame	0	78	1153	3846	535	5611	0	18	126	1388	901	2432	0	95	1278	5234	1436	8043
Greengram	51	491	5606	14236	12104	32487	60	156	6135	30782	50801	87935	111	647	11741	45018	62905	120421
Groundnut	154	589	1710	5826	2610	10889	167	2049	1617	18983	15761	38577	321	2638	3326	24809	18371	49465
Fingermillet	0	41	455	343	117	957	6	56	750	1059	3	1874	6	97	1206	1403	120	2831
Maizeseed (OPV)	0	430	3143	3739	0	7312	3	349	3944	16364	1040	21699	3	780	7087	20103	1040	29012
Maize (Hybrid)				16		16				3664		3664	0	0	0	3680	0	3680
Soyabean	35	453	1895	3426	14	5823	11	89	845	358	0	1302	46	542	2740	3784	14	7125
Sunhemp					1896	1896					563	563					2459	2459
Sesbaniya					0	0					0	0					0	0
Total	287	3692	19850	34806	21975	80610	346	3751	23352	88935	71739	188122	633	7443	43202	123741	93715	268733

Production & Supply of Vegetable Seeds

Basic seed production

There are 50 DOA recommended varieties in 18 vegetable crops grown in the country. Production of basic seed of some varieties was carried out in

seven government seed farms (Table 3.2.9). Total quantity produced in 2011 was lower than that of year 2010, which is due to the bad weather experienced during the year 2011 and smaller production programme due to the availability of sufficient stocks.

Table 3.2.9: Basic Vegetable Seed Production in Government Farms - 2011

Crop	Quantity Produced (kg)		
	2010/11 Maha	2011 Yala	Total
Bean	1629.7	371.1	2000.8
Bitter gourd	–	74.4	74.4
Brinjal	18.1	53.95	72.1
Bushitavo	–	10.6	10.6
Mea	129.5	6.8	136.3
Okra	–	240.9	240.9
Snakegourd	186.9	23.2	210.1
Wingedbean	21.2	–	21.2
Tomato	3.8	69.8	73.55
Capsicum	–	37.6	37.6
Pumpkin	7.2	–	7.2
Raddish	57.2	–	57.2
Thibbatu	2.97	–	2.97
Amaranthus	–	191.8	191.8
Total	2056.52	1080.15	3136.67

Standard Vegetable Seed Production

Both public and the private sector organizations were involved in the production of standard seed. The quantities produced by SPMDC in government farms and under contract growing program are indicated in Table 3.2.10. The total production in

2011 was also much lower (around 54%) than that of previous year, which was a similar trend as in basic seed production. Lower production in contract growing was mainly due to the lower quantity of bean seed purchased under the programme.

Table 3.2.10: Standard Vegetable Seed Production (kg) by DOA -2011

Crop	Farm Programme			Contract Programme			Grand Total
	2010/11	2011	Total	2010/11	2011	Total	
	Maha	Yala		Maha	Yala		
Bean	–	–	–	6435	446	6881	6881
Bitter gourd	90.3	125.8	216.1	102.1	278.4	380.5	596.6
Brinjal	174.0	178.3	352.3	–	–	–	352.3
Bushitavo	407.8	119.1	526.9	124.0	129.2	253.2	780.1
Capsicum	109.2	308.1	417.3	–	15.5	15.5	432.8
Cucumber	13.7	53.2	66.9	28.5	65.9	94.4	161.3
Luffa	264.0	7.5	271.5	138.5	–	138.5	410.0
Mae	658.5	143.5	802.0	304.0	607.6	911.6	1713.6
Okra	549.9	1600.1	2150.0	–	1044.0	1044.0	3194.0
Spinach	86.1	90.0	176.1	–	–	–	176.1
Snake gourd	25.9	334.5	360.4	48.6	339.0	387.6	748.0
Sweet Melon	10.3	–	10.3	–	20.1	20.1	30.4
Tomato	5.3	22.3	27.6	–	–	–	27.6
Amaranthus	39.3	–	39.3	–	–	–	39.3
Winged bean	569.8	–	569.8	90.5	408.8	499.3	1069.1
Radish	–	44.9	44.9	128.4	–	128.4	173.3
Total	3004.1	3027.3	6031.4	7399.6	3354.5	10754.1	16785.5

Hybrid Vegetable Seed Production

F1 hybrid seeds of two brinjal varieties and two 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 of tomato was more or less similar to the year 2010 where as Brinjal was much higher.

Table 3.2.11: Hybrid Vegetable Seed Production in Govt. Farms (kg)-2011

Crop	2010/11	2011	Total
	Maha	Yala	
Tomato	4.0	8.18	12.18
Brinjal	16.7	28.03	44.73
Total	20.7	36.21	56.91

Vegetable Seed Distribution

Vegetable seeds were distributed through the DOA sales outlets and registered dealer network. These dealers include Agrarian Service Centres (ASCS), Cooperative societies, Farmer organizations, Provincial DOA and private registered seed merchants.

Quantities of vegetable seeds supplied by DOA are given in Table 3.2.12.

Supply of Standard seed in 2011 was slightly higher when compared to the year 2010 where as supply of basic seed was remarkably lower in 2011. However, overall supply is slightly higher than that of year 2010.

Table 3.2.12: Vegetable Seed Supplied by DOA – 2011

Crop	Quantity Supplied (kg)						Grand Total
	Basic			Standard			
	Yala 2011	Maha 2011/12	Total	Yala 2011	Maha 2011/12	Total	
Amaranthus	1.45	0.75	2.2	180.83	21.42	202.25	204.45
Bean	1105.50	320.0	1425.50	9144.79	6422.70	15567.49	16992.99
Bitter gourd	85.65	38.30	123.95	224.87	189.95	414.82	538.77
Brinjal	1.45	1.90	3.35	56.01	38.37	94.38	97.73
Bushitavo	95.60	205.0	300.60	668.85	323.72	992.57	1293.17
Capsicum	5.05	5.93	10.98	214.47	155.08	369.55	380.53
Cucumber	6.10	8.00	14.10	174.70	211.70	386.40	400.50
Luffa	14.70	22.80	37.50	391.60	381.28	772.88	810.38
Mea	146.90	137.00	283.90	1389.11	650.00	2039.11	2323.01
Okra	106.50	176.75	283.25	215.07	821.45	1036.52	1319.77
Pumpkin	112.35	3.78	116.13	3.06	-	3.06	119.19
Raddish	36.50	6.50	43.00	139.15	206.50	345.65	388.65
Snake gourd	119.68	79.25	198.93	530.28	451.05	981.33	1180.26
Spinach	3.15	2.00	5.15	124.75	253.11	377.86	383.01
Sweet Melon	-	0.20	0.20	21.30	28.60	49.90	50.10
Tomato	38.78	7.86	46.64	215.36	21.85	237.21	283.85
Winged bean	69.00	38.00	107.00	849.21	349.23	1198.44	1305.44
Total	1948.36	1054.02	3002.38	14543.41	10547.43	25090.84	28093.22

Production and Issues of Seed Potato in 2011

The production of pre-basic (G0) basic (G1, G2, G3) and certified seed of variety Granola were 0.75 mt, 78.26 mt and 23.42 mt respectively during the Maha season in year 2011.

Basic seed production of variety Disiree was 5.03 mt.

During year 2011, the production of pre-basic, basic and certified seeds of variety Granola were 0.62 mt., 284.14 mt. and 126.23

mt. The total quantity produced in year 2011 was 518.4 mt. and 422.93 mt of certified seeds were issued for potato growers.

1.4 % yield increase was observed in 2011 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 increase.

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 (mt) during year 2011

Variety	Pre-basic Seed			Basic-Seed		
	2010/11Maha	2011Yala	Total	2010/11 Maha	2011 Yala	Total
Granola	0.75	0.62	1.37	78.26	284.14	362.40
Desiree	-	-	-	5.03	-	5.03
Total	0.75	0.62	1.37	83.29	284.14	367.43

Table 3.2.14: Production of Certified Seed Potato (mt) during year 2011

Variety	2010/11	2011 Yala	Total
	Maha		
Granola	23.42	126.23	149.65
Total	23.42	126.23	149.65

Table 3.2.15: Seed Potato Supplied by DOA (MT) during year 2011

Variety	2011	2011/12	Total
	Yala	Maha	
Granola	128.38	294.55	422.93

Production and Supply of Planting Material in 2011

Seed and Planting Material Development Centre produced quality planting material under the categories of budded plants, seedlings, rooted and stem cuttings as well as suckers to fulfill the demand of planting material of fruit plants cultivated in the country. During 2011, planting material production programmes were conducted in ten seed farms of the SPMDC and eight horticultural farms of the HORDI. Accordingly, 230,000 plants of 30 varieties of twenty fruit crops were produced and distributed.

Table 3.2.16: Production and Supply of Planting Material in DOA Farm in 2011

Crop	Production	Issues
Budded Plants		
Avacado	11,203	7,698
Beli	1,151	948
Durian	7,764	8,289
Guava	753	448
Jack	8,590	5,108
Ugurassa	439	384
Lime	2,200	2,103
Mango	162,825	130,351
Mandarin	1,715	1,637
Mangusteen	470	67
Orange	6,504	6,123
Rambutan	51,352	38,103
Sapadilla	1,053	702
Starfruit	1,609	1,191
Other	9,951	16,808
Sub Total	267,579	219,960
Rooted Cuttings		
Grapes	196	658
Jambu	2,277	1,837
Permogranate	1,020	854
Lemanine	5,169	2,164
Dragonfruit	3,413	1,446
Other	12,417	9,021
Sub Total	24,492	15,980
Seedlings		
Amberalla	16,104	11,154
Starfruit	2,044	1,115
Papaya	8,946	10,301
Pomegranate	32,932	18,293
Guava	5,432	5,016
Kathuru murunga	2,692	1,590
Mangosteen	3,786	2,390
Lime	18,809	10,163
Miti murunga	15,936	3,341
Anoda	1,008	800
Passion fruit	5,404	4,851
Other	21,175	11,778
Sub Total	13,4268	80,792
Total	426,339	316,732
Vegetable pots	60,674	60,549

3.2.17: Production of Other Commodities

Product	Quantity
Banana (kg)	27,408.4
Mango (kg)	5,562.5
Papaya (kg)	1,857.8
Grapes (kg)	24.7
Pineapple (kg)	92.7
Guava (kg)	198.5
Ranbutan (kg)	648
Consumption potato (kg)	84,282.5
Consumption vegetable (kg)	73,126.7
Cassava (kg)	504
Coconut (Nuts)	24,510
King coconut (Nuts)	3,923
Animal Products	
Milk (L)	31,935
Curd (Pots)	1,341
Compost (kg)	673,000
Consumption OFC	
Maize (kg)	2,033.4
Maize green cobs (No.)	2,565
Dry chilli (kg)	596.5
Green gram (kg)	468.4
Cowpea (kg)	1589.2
Sesame (kg)	449.5
Soybean (kg)	510
Fingermillet (kg)	1,304
Black gram (kg)	669.9
Groundnut (kg)	1,202

Table 3.2.18: Performance of the Advance Accounts

Farm	Income (Rs.)	Expenditure (Rs.)
Aluttarama	6,347,974.28	32,401,476.71
Ambalantota	1,443,866.75	9,489,056.57
Bataata	1,240,043.13	26,002,035.69
Kantale	1,442,985.80	20,854,087.05
Maha- Illuppallama	13,581,685.81	55,989,144.14
Malwatte	1,432,883.60	19,994,031.38
Polonnaruwa	6,740,386.11	38,250,988.99
Ambepussa	4,132,580.39	14,921,154.30
Kundasale	3,308,134.40	15,260,136.72
Middeniya	1,758,294.50	11,329,124.91
Piduruthalagala	4,421,907.00	16,127,695.83
Sita Eliya	2,101,619.90	22,147,141.80
Uderadella	1,018,915.00	10,285,817.92
Meepilimana	1,757,455.00	10,622,928.29
Karadiyanaru	-	8,034,407.98
Kandapola	810,693.60	11,661,484.21
Murunkan	256,554.54	2,614,786.25
Paranthan	260,607.40	4,321,496.05

Performance of the Advance Account in 2011

The production of seed and planting material was carried out using the Advance Account.

Performance of the advance account during the year is given in Table 3.2.18.

STAFF LIST

Designation	No.
Director	01
Deputy Director	04
Assistant Director	14
Agricultural Officer	10
Accountant	01
Agricultural Instructor	114
Farm machinery Instructor	01
Agriculture Monitoring Officer	03
Programme Assistant	02
Administrative Officer	01
Management Assistant	87
Farm Clerk	18
Driver	43
Tractor Operator	15
Electrician	03
Machine Operator	09
Mason	01
Carpenter	04
Budder	03
Circuit Bunglow Keeper	03
KKS	05
Storeman	10
Watcher	59
Lorry Cleaner	09
Special Store Labourer	01
Sanitary Labourer	04
Labourer (Grade III)	377
Total	803

3.3 SOCIO ECONOMICS AND PLANNING CENTRE - PERADENIYA

The main functions are conducting socio-economic research and agricultural policy analysis. 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.

BUDGET

Table 3.3.1: Annual budget - 2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	3,243,450	1,897,137	58
Recurrent	3,239,000	3,091,818	95
Total	6,482,450	4,988,955	77

PROGRESS

STUDIES

Cost and returns of crop production

The costs and returns study of *Maha* 2009/2010 and *Yala* 2010 for paddy and subsidiary food crops, root and tuber crops and vegetables were published in February and August 2011 respectively. The data include average yield, gross and net returns, total and unit cost of production and farm gate price.

Adoption of new rice varieties in Sri Lanka

This study examined the adoption of newly released rice variety groups in the farmers' field; measured the replacement rate of newly released varieties using data on varietal spread of RRDI database. Data showed that Bg 94-1, Bg 300 and Bg 352 are enduring varieties from 1970s, 1980s, and 1990s respectively and Bg 358, Bg 359 and at Bg 362 are widely planted new varieties. The new

improved varieties released from mid 1960s were popularly planted with an observed decrease of the use of old improved varieties and traditional varieties. Replacement period of new rice varieties has declined over time and current replacement period is around 16 years with lower adoption rates of newly released rice varieties. While policy makers are encouraged to continuously support and strengthen the current efforts of rice breeding research and extension, policy of variety release and promotion need to be strengthened focusing the emphasis on accessibility of seed and information on new varieties to farmers.

Need assessment of cold storage facility for Sri Lanka

At present attention is paid for the establishment of cold storage facility as a remedial measure for the excess supply of vegetables in to the market periodically. The shelf-life of fresh agricultural produce can be extended with cold storage but in the context of Sri Lanka it will be challenging as

tropical fruits and vegetables specially; tropical vegetables have lower duration in cold storage. Past experiences in establishment of cold stores in Sri Lanka were utter failures. In order to estimate the real importance of establishment a cold store facility a detailed cost-benefit analysis should be conducted to estimate economic feasibility together with technical feasibility of storing temperate fruits and vegetables.

Consumer Preferences for Quality

Attributes of Rice: A Conjoint Analysis

Rice production in Sri Lanka has already achieved the self sufficiency status with an average per capita annual consumption of 110 kg.. Meantime the structural changes occurred in the Sri Lankan society such as income increase and urbanization has modified the preferences for quality of rice. In this context, consumer preferences for different quality attributes of rice were assessed based on conjoint methodology. ANOVA results indicate that of the four attributes type, colour and purity were significant, but price was not significant. Part worth estimates revealed that the purity is the most important attribute when selecting a type of rice.

Seasonal price variations and market integration of rice market in Sri Lanka

Consumers like to enjoy stabilized prices over a considerable length of time without fluctuations. This study investigates the level of integration in Sri Lankan rice markets using weekly prices of rice. The results suggest the existence of deeper market integration and the price signals are carried out efficiently among markets.

Youth perception on farming as an occupation: Case Study in Polonnaruwa District

This study was conducted to identify the youth perception on value of farming, the factors influencing their engagement in farming and their willingness towards agriculture. The study was based on a primary survey conducted in Polonnaruwa district in year 2011. The total sample size was 144 within youth age range of 15 – 29.

Availability of agricultural lands, possessing skills and training influences the willingness to be a farmer. Therefore vocational training programmes, specific agricultural extension programmes and well planned agriculture land policies are recommended for inducing youths for farming.

Review of citrus cultivation

Sensitivity analysis of ‘Improvement of citrus cultivation in Bibila and Moneragala district’ that was implemented during 2006-2008 period, to farmer-field level performance during the initial three years of the project and changes in macroeconomic variables is evaluated and changes of potential contributions to national goals of poverty alleviation and foreign exchange savings were extrapolated. Adoption levels of inorganic and organic fertilizer, shade control, pruning and training of plants are relatively low. The increased production from the project and national growth of orange extent during recent years are likely to suppress farm-gate prices. If the project had components to organize marketing and to provide subsidized fertilizer, such components would have led to higher farmer incomes and higher net contributions to goals of poverty alleviation and foreign exchange savings, even though inclusion of

such components would have increased project costs.

Crop Enterprise Budget (Paddy OFC and Vegetable crops)

The enterprise budget for selected fruits crops (Orange, Lime, Banana, Passion fruit, Pineapple, Rambutan, Papaya, Cashew, Pomegranate, Dragon fruit, Pears, Mango and Durian) and floricultural crops (Anthurium, Alstromeria, Gerbera, Carnation and Madona lily) were prepared and the document is due to be published. The budget includes benefit cost analysis of commercial cultivation of these crops adopting recommended technology. The latest economic information such as in-put quantities, costs, returns, benefit cost ratios and net present values have been given. . The benefit cost ratios for cultivation of fruit crops are mentioned below in the parenthesis. Orange (3.59), Lime (2.25), Banana-Embon (3.59), Passion fruit (1.92), Pineapple (4.4), Rambutan (5.9), Papaya (1.3), Cashew (1.9), Pomegranate (6.6), Dragon fruit (16.74), Pears (5.98), Mango (1.69).

PUBLICATIONS

AgStat 2011

The booklet on agricultural statistics comprising of salient features of information on food crop sector was compiled and published in August-2011, AgStat 2011- Vol. VIII contained numerous information such as socio economic data, land use types, extent and production, import and export, per capita availability, wholesale and retail prices.

Crop Forecast

Crop forecast is a monthly publication of SEPC which monitors the monthly cultivation progress of paddy, other field crops and vegetables and forecast

on the production levels. This report provides information related to prevailing situation on crop cultivation, forecasted production, regional distribution of production, harvesting periods, occurrence of extreme weather, pests and diseases, etc.

WORKSHOPS AND CONFERENCES ORGANIZED

Organized a international capacity building Workshop on agricultural policy research in collaboration with Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA). This workshop was held at board room of Faculty of Agriculture, University of peradeniya from 14-18 November 2011 with the participation of around 30 Participants (28 local participants and 2 Foreigners).

OTHER ACTIVITIES

Conducted "Model Village Programme"

SEPC conducted the "Model Village Programme" in two villages namely Imbulalgama and Giragama in Kandy district belong to the Agrarian Service Division of Giragama. The villages were visited and conducted a SWOT analysis in order to develop the villages. Identified 15 farmers from Imbulalgama and 13 farmers from Giragama for the programme.

- Coordination of the project "Enhancement of utilization and production of organic fertilizer" funded by the Ministry of Agriculture and implemented by the Institutes and Centers of the DOA.
- Coordination of the disciplinary working group meetings of the DOA.

PLAN FOR 2012

Table 3.3.2: Total Number of Projects under Different Categories

Category	No.
Socio Economic Research	12
Agricultural Policy Analysis	06
Production and Marketing	05
Collection, Analysis and Publication of Agricultural Information	07
Project Handling and Planning	04
Human Resource Development	02
Special program	01
Small scale project	01
Total	38

STAFF LIST

Designation	No.
Director	01
Deputy Director	01
Agricultural Economist	11
Agricultural Monitoring Officer	01
Economist Assistant	09
Programme Assistant	05
Agricultural Instructor	02
Management Service	08
Driver	05
Labour	03
K.K.S.	01
Total	47

3.4 PROGRESS MONITORING AND EVALUATION UNIT (PMEU) – PERADENIYA

The PMEU is responsible for monitoring and evaluation of activities and programmes conducted by all institutes and centers of DOA. In addition it holds the responsibility of preparing Annual Action Plan, Annual Performance Report, monthly

progress reports and other relevant reports for the Ministry of Agriculture and other institutes. Progress review meetings are also convened by the PMEU in order to streamline the activities of the DOA.

BUDGET

Table 3.4.1: Annual budget -2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	651,000	331,523	51
Recurrent	1,293,315	896,109	69
TOTAL	1,944,315	1,227,632	63

PROGRESS

Compilation of Action Plans

Action plans for the year 2011 were compiled under following categories.

- Capital expenditure
- Recurrent expenditure
- Special projects funded through DOA
- Special projects funded through the Ministry of Agriculture

- Technical programme of the DOA
- Procurement plan of the DOA

Progress Monitoring of Capital and Recurrent expenditure

Monitoring the physical and financial progress of capital work and recurrent expenditure was continued during 2011. Monthly progress reports on each for Capital and Recurrent expenditure were prepared and submitted to the Ministry of Agriculture.

Table 3.4.2: Summary of progress of DOA during 2011

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	884.8	685.4	77
Projects under Ministry votes	615.59	441.97	72
Total	3,459.29	2,910.47	84

Progress Monitoring of Special Projects

Special Projects under DOA votes

Progress of 12 special projects under DOA votes were monitored and monthly

reports including physical and financial progress was submitted to the Ministry of Agriculture. Financial progress of special projects under DOA votes is given in Table 3.4.3.

Table 3.4.3: Progress of special projects under DOA votes during 2011

Project	Institute	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure %
1. Hybrid seed development	HORDI/ FCRDI/ RRDI	9.3	8.1	87
2. Tissue culture laboratory facilities for planting material production	HORDI	20.0	13.9	69
3. Small scale agricultural research	HORDI/ RRDI	6.2	6.0	97
4. Infrastructure development	RRDI	49.0	19.4	40
5. Media programme	ETC	20.0	19.9	99
6. Agricultural School farm development Programme	ETC	17.0	15.7	92
7. Training & capacity building	ETC	10.0	9.7	97
Agro Technology parks	ETC	4.5	4.2	94
Annual Symposium of the DOA	ETC	2.5	2.15	86
8. Seed production & purchasing	SPMDC	452.0	452.0	100
9. Accelerated seed farm development programme	SPMDC	200.0	152.5	76
10. Community based seed production programme	SPMDC	20.0	8.64	43
11. Implementation of Seed Act	SCS	15.0	10.8	54
12. SL-USDA Germplasm development programme	PGRC	4.3	1.1	26
13. Implementation of National Agricultural Research Plan (NARP)		50.0	34.5	69
Total		884.8	758.9	86

Special Projects under Ministry votes

Progress of 25 special projects under Ministry of Agriculture votes were monitored and monthly reports including physical and financial progress

were submitted to the Ministry. 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 %
1. Production and application of organic manure	ETC	41.07	32.07	78
	HORDI	7.50	6.43	88
	RARDC/ Makandura	8.0	3.77	47
	RARDC/ Bandarawela	0.90	0.58	64
	ARS/ Sita Eliya	1.15	1.0	87
	ARS/ Telijjawila	0.20	0.2	100
	FCRDC	0.97	0.8	82
	RRDI	5.0	2.83	73
	SEPC	1.50	0.24	29
	SPMDC	6.0	3.07	51
	FCRDI	2.0	1.13	64
GLORDC	1.0	0.86	86	
2. Vegetable cultivation-FTF	ETC	1.61	0.80	50
3. Maize cultivation	ETC	0.36	0.27	75
Big onion seed production	ETC	8.53	6.38	75
4. Land development-SOA	ETC	0.50	0.45	89
5. Media programme	ETC	10.0	9.15	92
6. Micro irrigation	ETC	9.0	7.66	85
7. Mid season-legume cultivation	ETC	13.0	12.06	93
8. Model village	ETC	28.10	16.6	59
	HORDI	4.70	1.55	33
	RRDI	1.20	0.95	79
	FCRDI	0.70	0.07	10
	SCPPC	0.70	0.22	31
	NRMC	0.30	0.1	33
	SEPC	0.20	0.1	49

Project	Institute	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure %
9. National farmer week	ETC	5.13	5.13	100
10. OFC cultivation	ETC	6.61	2.9	44
11. Off season red/big onion production	ETC	4.07	2.46	60
12. Rice productivity improvement	ETC	1.0	0.88	88
13. Vauniya SOA	ETC	8.0	6.63	83
14. Vauniya SOA- Irrigation facility	ETC	1.5	1.44	96
15. Vauniya-SOA- Museum	ETC	0.82	0.82	100
16. Land development	FCRDI	2.0	1.8	90
	GLORDC	3.0	2.8	99
17. Agri. Product marketing	FRU	4.0	3.0	75
18. Agri. entrepreneurship development	FRU	2.0	0.3	0.15
19. Improve local food consumption	FRU	1.0	0.83	83
20. Factory development	FRU	1.0	0.11	11
21. Seed paddy production	ARS/ Girandurukotte	0.40	0.4	100
22. Bio diversity garden	HORDI	6.62	4.19	86
23. Mahinda Rajapaksa sports complex	HORDI	0.15	0.11	73
14. Parliament premises	ETC	0.20	0.19	95
15. Seed potato production	HORDI	5.37	4.6	93
16. Fruit planting material production	HORDI	10.0	6.89	69

Project	Institute	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure %
17. Research farm development	HORDI	5.0	1.53	79
18. Implementation of Soil Conservation Act	NRMC	2.70	1.09	40
19. Rain water project	NRMC	1.81	0.89	49
20. Community based seed production villages	SPMDC	20.0	4.7	24
	ETC	6.0	3.04	51
	SCPPC	3.2	0.89	28
21. Parantha/ Murunkan farm development-North	SPMDC	100.0	48.5	49
22. Seed paddy purchasing	SPMDC	231.8	209.26	90
23. Fruit plant production	ARS-Thelijjawila	2.38	1.9	80
24. Cultivation of bare land	GLORDC	4.0	2.04	62
	FCRDI	7.38	6.86	93
	HDTI	1.0	0.46	46
	DTC - Polonnaruwa	0.2	0.2	100
	ISTI - Angunakolapelessa	1.6	0.04	2
25. Irrigation development-Agro well	FMTC	1.4	1.4	100
	SOA - Angunakolapelessa	1.4	1.4	100
26. Deyata Kirula payments	AVC	1.4	1.4	100
27. Land development -Bataatha	Agro park	0.38	0.38	100
28. Divineguma	ETC	6.88	2.57	37
Total		615.59	441.97	72

Achievements of DOA

Achievements of DOA in the year 2011 were compiled and submitted 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

Annual Performance Report of the DOA for the year 2010 was prepared in and distributed to the Parliament, all relevant Ministries, Universities, libraries and other relevant institutions.

Other Reports

Progress reports of activities under ‘Mahinda Chintanaya’ and projects of which the total estimated cost exceeds Rs. 50 million were prepared and submitted to the Ministry of Agriculture.

STAFF LIST

Designation	No.
Deputy Director	02
Translator	02
Programme Assistant	02
Agricultural Instructor	01
Management Assistants ¹	
Service	02
Driver	03
KKS	01
Labourer	03
Watcher	01
Total	17

PLAN FOR 2012

- 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

3.5 NATURAL RESOURCES MANAGEMENT CENTER (NRMC) - PERADENIYA

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 with minimum damage to the environment. Activities of this centre include research on soil and water conservation, watershed management, land suitability evaluation, crop monitoring and forecasting, agro - meteorological and climate change,

productivity enhancement of land, 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, and provision of technical assistance to clients on related subjects and environmental impact assessment of various development projects.

BUDGET

Table 3.5.1: Annual budget – 2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	3,965,000	1,904,604	48
Recurrent	2,545,000	2,112,304	83
Projects			
Rain Water Harvesting Project	1,810,000	1,039,141	57
Implementation of Soil Conservation Act	2,700,000	1,871,414	69
NARP	3,400,000	3,205,384	94
Model Villages	300,000	128,075	43
Wari Pubuduwa	100,000	35,764	36
Kalu River (Mahaweli H zone)	77,297	77,298	96
Establishment of Horana Fruit Garden	171,000	146,620	86
TOTAL	15,071,273	10,520,603	70

PROGRESS

RESEARCH

Adaptation to the Vulnerability of Climate Change on Paddy Cultivation through Identification of Seasonal Characteristics

Agriculture is extremely vulnerable to climate change and farmers will be able to cope with the uncertainties brought by climate change through adaptation. Therefore, a study was conducted to identify the seasonal characteristics of rainfall in Dry and Intermediate zones where major rice growing areas are located. The spatial distribution of onset time of seasonal rains and the length of the

season in *Yala* and *Maha* seasons were determined using weekly rainfall data. Also identified the number of dry weeks within seasons. Cropping calendars were prepared for short duration rice crop for each agro-ecological region (AER) in Dry and Intermediate zones based on the seasonal characteristics.

Study has shown that there is a high spatial variability of onset time of both *Yala* and *Maha* seasons. *Yala* rains in the Dry zone are highly variable and most probable length of the season may not exceed four weeks of duration from onset time. Many AERs in the Dry zone and some AERs in the Intermediate zone do not have a distinct *Yala* season. There is usually enough water to sustain the cultivation of almost all rice lands in both climatic zones during the *Maha* season.

A cropping calendars has been proposed and can be used as a tool in farming activity from the early stage of land preparation to the harvesting stage and next planting cycle. Such information could assist irrigation system managers in relevant authorities to reduce the amount of irrigation water and to water issues from the tanks in respective regions without wide margin of errors. It is also helpful to access and make available quality seeds of specific rice varieties for a particular agro-ecological zone at the appropriate sowing or planting time. It also can be used as a decision support tool in planning rainfed upland agricultural systems as well. The dry periods during crop season necessitates the farming community to be aware and adapt to recent advances on reduced water use for sustained rice production. However, periodical checking and revision of cropping calendars are recommended.

Identification of suitable areas for inter-season cultivation in DL1a agro-ecological region

Productivity of land has to be increased in order to meet the ever increasing demand for food and this could be accomplished by planting high yielding varieties while adapting best agronomic practices. However, farmers have already excelled in this approach in most areas of the country. Therefore, alternative approaches have to be tested in order to increase the land productivity.

Agro-ecological map reveals that some parts of the country have good soil moisture regimes owing to receipt of considerable amount of rains in between two cultivation seasons with a potential of growing a sandwich crop. Hence, a study was undertaken to identify the areas in DL1a agro-ecological region where the remaining residual moisture in the fields and rainfall can be used for a short duration crop during conventional fallow period between *Yala* and *Maha* season and vice versa. Weekly rainfall data of 15 locations in DL1a agro-region and the adjacent areas were analyzed taking standard week No. 6 and the week No. 32 as the start of the fallow periods after *Maha* and *Yala* seasons, respectively. Weekly cumulative rainfall at the 50% probability level were calculated and used to identify the onset and duration of the fallow periods and to trace suitable areas for inter-season cultivation in DL1a agro-ecological region. Prepared maps for both fallow periods using Arc-view 3.2a software are available for use.

Evaluation of different moisture regimes for growth and yield performances of two Banana (*Mussa spp*) varieties in the mid country wet zone of Sri Lanka

The temporal and spatial variability of rainfall distribution and variation of moisture storage in soil profiles according to landscape hydrology are responsible for growth and yield performances in different banana varieties.

Field experiment conducted in alluvial soils at Gannoruwa in the WM2b agro climatic region of mid country to evaluate different moisture regimes for growth and yield performances of two different banana varieties (Ambul and Amban) was completed. Observations and data collections made with respect to appearance of the plants growth, external appearance of the fruits, harvesting age of the plants, weight of fruit bunches, finger length of a fruit and girth of a fruit. In addition, root zone water balance was evaluated to assess the effect on irrigation and drainage requirements, water economy and productivity. Data analysis and report writing is being progress.

Study the impact of Rainwater harvesting measures on soil moisture storage and its spatial distribution

Impact of rain water harvesting measures on increasing soil moisture storage and ground water recharge under the dry zone conditions was studied. The research work initiated in 2010 at Palugasweva in Huruvila DS division in DL_{1b} was continued where the major soil type found is Reddish brown Earth and the agro climatic conditions prevailing. Analysis of data collected in Yala 2011 shows the effect of rainwater harvesting measures on moisture storage in first 75 cm soil depth is not significant under heavy rains. The

spatial variability of moisture distribution in this profile depth is not significant. During small showers (RF>10mm), moisture storage and its spatial distribution in first 25cm depth of soil profile was not affected by the different rainwater harvesting measures implemented. However the rains of 15 - 50mm range showed over 85 % uniformity distribution of soil moisture and the soil moisture storage increased in both terraces and contour bunds in compared to untreated land.

Study the impact of rainwater harvesting practices on crop productivity

A study was designed and initiated to quantify the impact of rainwater harvesting on crop yields in low rainfall areas. The collected data during last Maha (2010//2011) was badly affected due to low rainfall at the onset of *Maha* season.

Assessment of shallow ground water on crop cultivation in Vavuniya District

A survey was imitated in Maha 2011 to assess the shallow ground water in qualitative and qualitative for crop production in Vavuniya District. Water samples were collected in one DS division and analysis is in progress. This program will be continuing in other DS division during the year 2012.

Development of a vegetable growing structure for raising vegetables under home gardens

Vegetable production in home gardens has been restricted due to limitations in space, light, moisture and damages from small wild animals. A vegetable growing structure was developed and tested in 2011. The structure can hold 32 pots in three levels (Upper, middle and lower) for planting crops. Lettuce crop was planted and their

performance was assessed. A yield of 82 g/pot and 2.6 kg/rack was obtained for lettuce in one crop. The leaf yield was higher in pots in the upper ring, moderate in middle and low in lower level showing the shading effect on the crop yield.

Testing the yaya approach in soil testing in minor tank system in the Dry Zone

The yaya based soil testing for important soil parameters and making recommendations for crops grown in the yaya was continued. The method was further refined for paddy tracts in the village tank system at Maradankalla village in the Huruluwewa area. A total of 30 soil samples from the 0 – 20 cm depth were collected on a 90 m grid interval and the samples were analyzed for pH, EC, Available P, Exchangeable fractions of K, Ca and Mg, available fractions of Zn, Cu and S and thematic maps were prepared. Maps revealed a possibility of developing two fertilizer recommendations for upper and lower portions of the yaya in the village tank system. The upper portion of yaya showed limitations in Zn and the lower portion showed limitations of P. In addition, the lower portion showed excessive levels of Ca and Mg and soil salinity.

Development of a method for protection of land surfaces exposed due to landslides

An appropriate low cost method for protection of land surfaces exposed due to landslides is not available in Sri Lanka at present. A low cost method was developed and tested since 2010 at the land slide areas at Peradeniya town. This low cost method includes insulation of the cut slope with a growth media to a depth of 15 cm, placement of straw mulch over the growth media, fixing of media and mulch to the surface by a metal mesh, growing creeping type of plants over the media and

maintenance of plant cover in providing fertilizer, water etc. The introduced method was successful and the experiment was maintained in 2011. Irrigation and weed control are the main activities in maintaining the land surface protection measure.

DEVELOPMENT

Model village development program at Wattappola, Panabokke and Yakalla villages

A model village development program initiated in 2010 was continued in 2011 in Wattappola, Panabokke and Yakalla villages. In wattappola and Panabokke, jack and rambutan plants were given to farmers, trained farmers on mushroom production, home gardening and soil conservation, on site demonstration of compost making, establishment of lock and spill drains and percolation pits. Also provided them with quality seed paddy. Trained farmers in Maradankalla village on betel and pepper cultivation, pest management in chilli, cultivation of export agriculture crops, soil testing for fertilizer recommendation, soil conservation, compost making and production of certified seeds. Also provided quality seed paddy to farmers.

TECHNOLOGY DISSEMINATION

Training on soil and water conservation and related areas

- Conducted two five-day training on soil conservation and watershed management for Agriculture Instructors in the Kegalla district at Wagolla farm and another one for field officers of the Ceylon Tobacco Company at Mawilmada.
- Conducted two, three-day training for farmers on soil conservation and watershed management for private individual cultivators

at Gannoruwa and another one for farmers at Kothmale.

- Conducted two-day program for technical officers of the Hadabima Authority of Sri Lanka.
- Conducted twenty eight one day trainings programs for field officers, farmers, school students and teachers at Kandy, Ukuwela, Imbulgodayagama, Meepilimana, Muruthalawa, Nugawela and Gampola.
- Conducted a training programme for school children of Mahawa Vidyalaya under UNDP.
- Conducted a training programmers on Soil of Sri Lanka for 100 teachers at ISTI Gannoruwa
- Conducted training programme for Villages in Doluwa D.S. divisions under IFAD Project(5 Programmes and 65 Officers)
- Conducted a training programme on Rainwater harvesting for the students of Agriculture Faculty, University of Rajarata. (27 Students)
- Conducted 2 Training on moisture conservation in Home gardening for the officers of DOA (63 Officers)

Workshops

- Successfully held the world water day workshop under the theme “ Water for Urban Communities” on 23rd March 2011 at ISTI, Gannoruwa and 128 participated the programme.
- World environmental day was held on 6th June 2011 at Unawatuna Temple in Buttala with the participation of 78 Farmers, and Government Officers and NGOs
- Conducted two workshops on land terracing to stabilize rain-fed uplands in agriculture for 34 DOA officers
- Workshop on soil Conservation Act at ISTI, Gannoruwa and 56 Officers from different stakeholders participated the programme.

- Conducted a workshop for Extension offices and farmers (40) of the Provincial Department of Agriculture, NWP at Kurunagala on Water harvesting and well irrigation.

Demonstrations on soil and water conservation

Updating and maintenance of soil conservation demonstration at Gannoruwa

Completed the annual maintenance work such as weed control, de-silting soil conservation structures, filling vacancy in biological structures, maintenance of agronomic structures during 2011 of the Soil Conservation demonstration site at the A park at Gannoruwa.

Soil conservation demonstration at other locations

Maintained the soil conservation demonstrations at Yakalla village in Anuradapura district and Wattappola and Panabokke villages in the Kandy district.

Radio Programmes

- Conducted four radio programs on soil conservation, mitigating landslides effects, integrated approach in soil conservation and maintenance of soil conservation structures in farmer fields.

Rupawahini programmes

- Prepared four Rupawahini programs on Over Knee technology (OK Technology) for raising vegetables under home gardens, soil conservation in Kandyan Home gardens, raising high value fruits under Kandyan forest gardens and diversity of the Kandyan forest gardens and telecasted by Rupawahini's Rata Nagana Govigedara programme.

Hoardings for awareness creation on Soil

Conservation Act

- Six hoardings were erected in six locations within the Conservation Area to create an awareness regarding the Soil Conservation act.

Technical Assistance

One of the main activities of the centre is to provide technical assistance for different clients and support services for development works of various agencies. This centre provided the following technical assistance and services during year 2011.

- Designed a hose irrigation system instead of existing canal irrigation facilities to improve irrigation efficiency at Ambepussa seed production farm. The system was designed

base on existing terraces and soil types located in the cultivated areas. Also designed a storm water management plan and field drains to overcome periodic drainage problems occurring in cultivated land especially in Alluvial soils in the farm. Identified and demarcated conservation structures as effective soil conservation measures and improvement of efficient water management for quality seed production.

- Provided technical assistance to successfully complete following projects under the Community Based Adaptation to Climate Change Project of UNDP/SGP with the financial Assistance from AusAid by executing through three selected NGOs by the UNDP.

Table 3.5.2: Projects conducted during 2011

Project	No. of beneficiaries	Cost (Million Rs.)
Rehabilitation of a village tank in IL3 agro-ecological region - Kurunegala	200	3.5
Increasing land productivity through soil and moisture conservation and providing alternative livelihood options in degraded lands of IM1c agro-ecological region - Nuwara Eliya	1000	4.0
Increasing productivity of paddy lands in a flood prone area of WL1a agro-ecological region - Ratnapura	400	4.1

- Provided technical advisory on land development and soil conservation at Nillamba Government Farm.
- Prepared soil conservation plan for the Ambepussa farm
- Prepared a plan and estimates for land development work at Kanthale farm.
- Completed a Land development and land suitability survey of Galkulam, farm.
- Provided technical assistant to find the location and designed agro well for Ulpothagama farm of HORDI
- Completed a land suitability survey and prepared a crop recommendation report for a commercial farm at Bandaragama.

- Completed soil and land suitability survey and prepared crop recommendation report for Niraviya and Moragahakanda farms of the Moragahakanda / Kalu Ganga Project.
- Completed land suitability survey for Doluwa DS divisions for IFAD Project
- Completed soil and land suitability survey of FCRDC, Horana and prepared soil maps and crop recommendation report..
- Prepared crop recommendation reports for Kanthale and Meepalimana farms.
- Prepared detail digitized maps of interprovincial areas on request of ETC.

Exhibitions

- Participated three exhibitions with exhibits and officers on soil conservation and natural resources management; Buttala for Devata Kirula Program; Rattota Maha Vidyalaya on soil conservation and at Seethadevi School, Kandy.

OTHER ACTIVITIES

Implementation of Soil Conservation Act

The centre has taken necessary steps to repeal the existing soil conservation Act with a new Act and the draft was already completed. The new Act, with the title “Soil Conservation and Land Productivity Protection Act”, which covers a broader spectrum of activities compared to the earlier version. Conducted one day workshop at Gannoruwa In-service Centre with nearly fifty participants attached to relevant stakeholder agencies. Suggestions came from the workshop are been incorporated and is ready for the onward transmission to the Department of Legal Draftsmen through the Ministry of Agriculture.

Maintenance of Agro-meteorological observation network

Maintained agro-meteorological observation network consisting of 29 agro-meteorological observation stations and 85 rain gauge stations scattered throughout the island as per the national standard.

Representations in technical committees

During the year 2011, the staff of the NRMC served in the followings as representatives of DOA.

- National Thematic Research Programme (NTRP) – Climate Change, National Science Foundation
- Advisory committee on Development of National drought Mitigation Plan, Ministry of Disaster Management
- Technical evaluation committee of Proposed Uma Oya Multipurpose Development Project (UMDP)
- Committees for granting Environmental Clearance for various National and Regional projects i.e., Moragahakanda Development Project, Kaluganga Development Project, Getambe Mini-hydro Project, Haldumulla Golf course and Villa Project, Gohagoda Soild Waste Disposal Development Project, Land Blockin out& Hotel Projects (35), Metal quarries (40), Mini Hydro power Projects (25), and Tree felling Projects (27).

PLAN FOR 2011

Research

- Introduce efficient water management practices to cultivate same land in both seasons
- Encourage inter – seasonal cultivation identification of suitable land areas
- Preparation of Digital Version of GN based crop recommendation

- Identification of mapping of paddy lands in the wet zone for productivity improvement
- Crop forecasting assessment of food security situation.
- Development of appropriate natural resources management technologies
- Improvement of soil map of Sri Lanka(Digital Soil Series map of northern region)
- Evaluation of drainage management practices in Low Country Wet Zone(LCWZ)
- Assessment of shallow ground water and water quality in Vavunia District
- Development Drought Risk Profile of Sri Lanka.
- Deployment of land based technologies for drought mitigation
- Implementation of Soil Conservation Act
- Dissemination of soils water conservation technology

Technology dissemination

- 3,000 copies from the second version of Agro-ecological Map of Sri Lanka (2003) were re-printed.
- The text book in Sinhala titled “Rainfall and agro-ecological regions of Sri Lanka” (2008) was re-printed with 2,500 copies.
- Training of officers and farmers on soil conservation, and other natural resources management
- Demonstration of soil conservation and water harvesting measures

Technical assistance

- Preparation of soil conservation and storm and drainage management plans for development projects
- Provision of technical assistance on soil and water conservation to various agencies

Other activities

- Implementation of Soil Conservation Act
- Maintenance of agro meteorological observation network
- Representation in technical committees for granting Environmental clearance for Development Projects and Environmental Monitoring Committees

STAFF LIST

Designation	No.
Additional Director	01
Research Officer	09
Agricultural Officer	02
Subject Matter Specialist	01
Research Assistant	02
Agricultural Instructor	08
Programme Assistant	03
Soil Surveyor	05
Research Sub Assistant	01
Management Assistance	
Service	07
KKS	01
Driver	06
Watcher	02
Laborer	03
Total	51

3.6 EXTENSION & TRAINING CENTRE - PERADENIYA

Achievements of the division are focused on four main areas: extension, training, communication and agricultural education & examination. Following activities are conducted to achieve the objectives of the division by the respective units.

- Direct extension programmes under major irrigation schemes conducted by six inter provincial units
- Collaborative extension programmes with provincial and Mahaweli areas.
- Conduct 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 Farm Broadcasting Units, Audio Visual Centre, Press and Information Centre.
- Conduct mobile extension programmes and Young Farmers Club activities.
- Conduct agriculture development work at two Bee Development Units.
- Conduct Organic farming programmes by plant nutrient and organic agriculture Unit.
- Conduct agriculture enterprise development, OFC development programmes and women's Agricultural Extension work.
- Horticultural crops development and training activities at Bibile Horticultural Crops Training & Development Institute.
- Conduct training programmes for Agriculture Research and Production Assistants at Special Training Centers.

BUDGET

Table 3.6.1: Annual budget -2011 (Rs million)

Vote	Allocation	Expenditure	Expenditure %
Capital	82.21	60.27	73
Recurrent	136.98	128.89	94
<i>Special Projects Under DOA Vote</i>			
• Training and capacity building	10	10	100
• Agricultural Training Farms	17	15.33	90
• Media Programme	20	19.93	100
<i>Special Projects Under Ministry Vote</i>			
"Api Wawamu Rata Nagamu" Programme			
• Media programmes under "Api Wawamu Rata Nagamu"	10	9.15	91

Vote	Allocation	Expenditure	Expenditure %
• Rice Productivity Improvement	1	0.88	88
• Increasing local food production by cultivation bare lands at school of Agriculture	0.5	0.45	90
• Establishment of micro irrigation systems to achieve higher yield from fruit and vegetable cultivation	9	7.66	85
• Cultivation of maize for seed production	0.36	0.27	75
• Production and application of organic manure	41.07	31.05	76
• Agriculture school development programme at Vavunia	10.26	8.89	87
• Cultivation of Big onion & Red onion- new areas and off season	4.07	2.46	60
• Mid season Legume cultivation in Inter-Provincial areas	13	12.06	93
• Other Field Crop cultivation in Inter-Provincial areas	6.61	2.90	44
• Model village programme	28.1	9.92	35
Total	390.16	350.11	90

PROGRESS

Special Projects

1. Training and capacity building

Training & capacity building at ARPA Training Centers

In year 2011, 270 No. of students passed out from the one year practical agricultural training (Training for Agricultural Research & Production Assistants) and 229 No. of students are being trained.

Training & capacity building at schools of Agriculture

Under this project Rs.1.417 million valued new equipments and library books were provided to improve the quality of teaching for agriculture diploma course and Rs1.583 was spent for the

induction training of the newly recruited Sri Lanka agriculture service officers.

A foreign training programme (In Thailand) was conducted for 11 officers.

2. Agricultural Training Farms

Rs.17 million was spent for improving farm lands at Agricultural Schools, In-service Training Institutes and District Agricultural Training Centers.

3. Media Programme

Production, editing and telecasting of 99 of TV programmes, 1277 No. of radio programmes, printing and distribution of technical publications; 3 types of books (4825 No. of copies), 1 type of technical leaflet (6000 No. of copies), 1 type of posters (6000 No. of copies), and 2 types of leaflets

(10500 No. of copies) and other printing materials (3080 copies) were done under this project.

4. Agro Technological Parks – Gannoruwa & Bata atha

Agro parks are being maintained for,

- Technology transfer to the farmer through live specimens
- Demonstration of new & old agricultural technologies
- Promotion of agro tourism for local & foreign tourists
- As a Centre to distribute agricultural technology information & instructions.

During the year 2011, total number of visitors visited the Gannoruwa & Bata A-Parks was 138,301 and Rs. 2.13 million has been earned from A-parks.

5. Rice development programme

This programme was funded by the Ministry of Agriculture and a fund allocation of 1 million rupees was used for currently important few topics that are highly related with productivity of paddy cultivation in inter provincial areas. A financial progress of 0.89 million rupees was recorded at the end of year.

Table 3.6.2: Progress of activities under the Rice development programme

Topic	Financial progress (Rs. million)
Sheath mite control programme	0.141
Integrated pest management training for officers	0.129
Adaptability testing for new breeding lines	0.099
New technology transfer activity	0.51
Total	0.879

6. Increasing local food production by cultivation bare lands at school of Agriculture

6 acres of uncultivated lands were cultivated under this project.

7. Establishment of micro irrigation systems to achieve higher yield from fruit and vegetable cultivation

To increase fruit and vegetable productivity through introduction of micro irrigation technology, 145 micro irrigation systems were provided to farmers at concessionary rates. 25 No. of training programmes on use of micro irrigation systems were conducted for officers and farmers.

8. Cultivation of maize for seed production

7 acres of maize were cultivated under this project.

09. Production and application of organic manure

Under this project, 3314 No. of IPNS demonstrations were established. 50 training programmes were conducted. 6625 No. of soil samples were tested. Also 14 TV programmes were telecast and 5520 of short messages were broadcast.

10. Agriculture School development programme at Vavunia

Rs. 8.89 million was spent to develop the School of Agriculture at Vavunia and Rs. 0.815 million was spent to develop the exhibition site for 'Govi Sathiya'.

11. Cultivation of Big onion & Red onion- New areas and off season

Supply of Red onion for 9.5 acres, supply of red onion true seeds for 2 acres, establishment of 197 No. of Red onion and 194 No. of Big onion demonstrations, and supply of Big onion true seeds for 13.625 acres were done by this special project.

12. Mid season Legume cultivation in Inter-Provincial areas

Total of 7,524 ha were cultivated under this programme. The major crops cultivated are green gram, Soy bean and Meneri.

13. Other Field Crop cultivation in Inter-Provincial areas

Supply of seeds & other inputs and providing technological assistance for 7,524 ha were done under this project.

14. Model village programme

281 No. of Model villages were established. Seed and planting materials were provided for 13,981 farmers, 5,252 demonstrations were established and 2,247 training classes/Field days/field visits were conducted under this project.

Extension Activities Inter-Provincial Areas

Six Inter-Provincial areas namely Anuradhapura, Polonnaruwa, Ampara, Monaragala, Hambantota and Kandy are under the purview of the Extension & Training Division of the DOA. Achievements and highlights during the year 2011 given below.

- The paddy extents cultivated in 2010/2011Maha and 2011 Yala were 194,612 ha and 141,886 ha respectively. The cultivated extent has shown an increase by 33,887 ha and 15,620 ha during these two cropping seasons

when compared to 2009/2010 Maha and 2010 Yala in Inter –provincial areas.

- Under field crops; Big onion, Red onion, Maize, Green gram, Groundnut, Gingelly, Cowpea, Soybean, Chili, Finger millet, and Black gram were grown in an extent of 43,547 ha and 11,344 ha during 2010/2011 Maha and 2011 Yala respectively. The extents grown during 2009/2010 Maha and 2010 Yala in Inter – provincial areas were 1,909 ha & 21,496 ha respectively. This significant achievement is due to cultivation during a third cropping season.
- A third cropping season between Yala & Maha was declared in year 2011. The major focus was on Green gram. An average yield of 750 kg/ha was obtained during this cropping season providing a new dimension in crop production.

Progress of the rice sector Development programme

In the year 2011 total paddy production in Sri Lanka was recorded as 3.8 million metric tons. It was contributed by 2.0 million metric tons from 2010/11 Maha season and 1.8 million metric ton from 2011 Yala. The cultivation extents of 2010/11 Maha and 2011 Yala were 613,492 ha and 477,557 ha respectively. Paddy extent during 2011 Yala showed a 13.9 % increase compared to 2010 Yala season.

But during early 2011 (January & February) heavy rainfall caused flood conditions in major paddy production areas specially Eastern, Northern and North Central provinces. The extent subjected to flood damage could be classified according to the severity of damage as 100%, 75%, 50% and 25% and area under these categories were 146,451 ha, 25,602 ha, 26,030 ha, and 17,802 ha respectively.

Flood damage directly reduced the paddy yield by 0.15 million metric tons and another 0.36 million metric tons of yield was lost due to other unfavorable weather conditions.

In-Service Training Institute, Gannoruwa

In-Service Training Institute, Gannoruwa, is the main agricultural training institute at national level and is responsible to improve knowledge skills and attitudes of agricultural officers, entrepreneurs, farmers and others interested in agriculture.

A total of 328 training programmes were undertaken in 2011 (22,713 man days) of which 70 were for officers (11,251 man days), 10 for farmers (577 man days) and 101 of field training programmes (2,085 man days). Also 124 of workshops / seminars / meetings / discussions, (8,507 man days) and 3 outdoor training activities (293 man days) were conducted.

In-Service Training Institute – Angunakolapelessa

Institute offers in-service training for officers, entrepreneurs, farmers and others interested in agriculture in Galle, Matara, Hambantota Provincial Districts and Hambantota Inter Provincial area. During the year a total of 91 training programmes were undertaken (4633 man days) and this included 33 for officers (2808 man days) and 41 for farmers (935 man days). And also 3 work shops/seminars/ meetings/ discussions (94 man days), 11 field training programmes (688 man days) and 3 outdoor training classes (108 man days) were conducted.

In addition, the Post Harvest & Processing unit located at ISTI provides food technology trainings for officers and small to medium scale entrepreneurs.

In-Service Training Institute, Hansayapalama – Aralaganwila

This Institute offers services especially for farmers and officers of Mahaweli B, C, D & G zones. And also conducts programmes specially identified to solve specifically identified problems in Mahaweli Agricultural areas, Ampara, Polonnaruwa, Mahiyangana and Batticaloa areas. In 2011; 67 training programmes (2514 man days) were conducted of which 31 programmes (1324 man days) were for officers, 03 programmes for farmers (122 man days), and 33 field training programmes (1068 man days).

Farm Mechanization Training Centre (FMTC)

FMTC located in Anuradhapura is the sole national level training institute on farm mechanization.

Training mandate of the FMTC is mainly focused on following aspects,

Operation and maintenance of 4 Wheel Tractors - 10 days

Operation and maintenance of 2 Wheel Tractors -5 days

Operation and maintenance of Water pumps -2 days

Operation and maintenance of Sprayers - 2 days

Operation and maintenance of combined harvesters - 2 days

Micro Irrigation introductory course- 2 days

Micro Irrigation design course- 5 days

Agricultural hand tools

Home gardening

Target groups are officers of the DOA, PDOA and other institutes, farmers and students from schools, universities, Schools of Agriculture and Technical Colleges.

During the year 2011, FMTC conducted 14 training programmes (652 man days) for officers, 13 programmes for farmers (426 man days), 54 training programmes for students from Universities, schools, Technical Colleges, and Schools of Agriculture (5476 man days).

FMTC grants its support to the field extension staff in carrying out extension activities related to farm mechanization. Apart from that, advisory services on farm mechanization are provided for the institutions whenever required.

District Agricultural Training Centre - Weerawila

During the year 2011, this Center provided 15 trainings for farmers (512 participants) and 11 trainings for officers (521 participants). Also, one year training for 21 No. of Agricultural Research & Production Assistants was started on 07th September 2011.

District Agricultural Training Centre - Ampara

During the year a total of 33 training programmes were undertaken (3324 man days) which included 13 trainings for officers, (512 man days), 18 for farmers (608 man days), 05 other technical trainings, (232 man days), 06 workshops (139 man days) and 16 farmer field visits (111 man days) and 6 outdoor training for farmers (228 man days).

Women's Agricultural Extension Programme (WAE)

Mission of Women's Agriculture Extension programme is to increase women's contribution to agricultural development through improvement of standard of living and nutritional level of family units. Objective of this programme is to promote better home environment and initiate income

generation activities for households focusing on women. WAE programme is implemented at grass root level by WAE officers attached to the office of the Deputy Director at each agricultural administrative district.

Extension activities performed in 2011

2986 No. of District Extension Officers were trained under Women's Agricultural Extension programme. 16,069 No. of farm women were trained on food & nutrition and entrepreneurship development. In addition 229 No. of women's organizations (11,148 No. of members) were established. 3394 No. of households were developed through home gardening and kitchen improvement. 38 No. of articles were published, 01 television programme, 31 field days, 7 exhibitions, and 20 study tours were also conducted.

Agro Enterprise Development & Information Unit

Mandate of the Agro-Enterprise Development and Information Service (AgEDIS) is assisting to promote agro based enterprises. Following activities are being conducted by the Unit.

- Conducting agro-enterprise related short term awareness and skill development training programmes for potential entrepreneurs
- Providing on-farm technical advisory services for agricultural property owners and investors by a team of experts.
- Providing technical information and data as required by the entrepreneurs and linking them with the relevant stakeholders.
- Establishing agricultural service centers (Krushi Sewa Piyasa) which provide reliable inputs and services to the farmers through technical collaboration with DOA.

- Support District Agricultural Extension Officers to promote entrepreneurial skills of farmers by introducing “Farm Business School” (FBS) approach and conducting related trainings.

Extension programmes conducted during year 2011

a. Agro-enterprise related training programmes

Table 3.6.3: Agro-enterprise related training programmes conducted

Topic	Duration (Days)	No. of Trainees
Mushroom production & related services	02	36
Organic manure production	02	10
Production of high quality planting materials	02	16
Bee honey production & related services	03	14
Home gardening & related services	02	27
Development of agricultural lands as commercial farms	03	15
Fruit & vegetable related value added products	03	12
High value cropping with protected agriculture & related services	05	21
Rice flour based value added products	02	14
Micro irrigation	03	10
Total Number of Trainees in 2011		175

b. Provision of on-farm technical advisory services

Three property holders from Mirigama, Bandaragama and Galkulama have been served to develop 46 acres of agricultural properties.

c. Establishment of new ‘Krushi Sewa Piyasa’

Eight new ‘Krushi Sewa Piyasa’ were opened in Maspotha, Dankotuwa, Wijayabahupura, Pubbogama, Jayanthipura, Athurugiriya, Waliweriya and Ukuwela areas

d. Promotion of Entrepreneurial skills of Extension Officers and Farmers (Farm Business Schools)

Forty eight extension officers from 10 districts were trained as master trainers on FBS. They are in a process of conducting FBSs for selected farmer groups since 2011/12 Maha season onwards in their respective districts.

Bee Development unit Bindunuwewa - Bandarawela

This unit is responsible for the development and extension of bee keeping among farmers. In order to disseminate modern apicultural technology, following facilities are provided by the unit.

- Training of farmers, officers, students and other interested people.
- Manufacture of bee keeping equipments.

- Training and registration of bee keeping equipment producers and certification.
- Technical support for government and non government institutions to implement bee keeping projects.
- Research work

During the year the unit produced 375 kg of bee honey, 240 bee colonies, 911 bee boxes, 280 smokers, 780 brood frames, 740 honey frames and 1263 No. of queen guards. Also 20 training programmes on Bee Keeping were conducted.

Young Farmers Club (YFC) & Mobile, Extension Service Unit

There are nearly thousand Young Farmers Clubs formed and one third of them are registered at the head quarters.

During the year 2011, island wide programmes were conducted to promote participation of young farming generation in agricultural extension.

A total of 03 training programmes for officers and 75 training programmes for YFC members were conducted. 103 cultural programmes, 150 religious programmes, 95 educational programmes and 92 social programmes were conducted by YFC.

Irrigation Management and Advanced Agricultural management Unit

Irrigation Management and Advanced Agricultural Management Unit is dealing with following subjects.

- Irrigation & Irrigation management
- Micro irrigation management and fertigation
- Controlled environment agriculture (Protected Agriculture)

- Commercial farming (Advanced planning of commercial farms) for annual & perennial crops.
- Advanced nursery Management

During 2011, a financial allocation of Rs.9 million was spent mainly for distribution of micro irrigation material among farmer beneficiaries (500 farm families). Technical support for rain shelter vegetable cultivation under “Divi Neguma” programme was provided. (Designing & agronomy)

Technical support was provided to developed the six large (100 ha) farms of the Seed & Planting Material Development Center of DOA and to the Mahaweli Authority of Sri Lanka with respect to designing and agronomic component of the micro irrigation technology.

Planning and progress monitoring unit

The Planning and progress monitoring unit focuses on preparing action plans, monitoring and evaluating financial and technical activities, and special projects conducted by the Extension & Training Division.

Farm Broadcasting Service

The main objective of this unit is creating awareness on agricultural technologies market places, price of agricultural goods current affairs & demand in agriculture, government policies and to motivate people to use these information to enhance income and to solve the problems encountered by farmers. The farm broadcasting programmes are available throughout the country via different radio channels in all three languages.

Table 3.6.4: Progress of FBS Programmes – 2011

Activity	Sub Activity	Progress
Radio Programmes	Saruketha	48
	Rajarata Gewaththa (Live)	36
	Live Discussion	1
	Wayamba Gewaththa	12
	Wayamba Gewaththa	36
	Thuneththa	49
	Athwela (Short Message)	125
Radio Programmes	"Govigedara"	47
Daily	Govithenata Peyak (Live)	52
Colombo Unit	."Sara-Bumi"	51
	Andaheraya (Short Message)	768
	Govi Pena	52
	Seilama	49
	Isuru piyasa	72
	Govigedarairn Mahagedarata	13
	Saru Bimata Arunalu (short messages)	4240
	Short Message	138
	Tamil	Vitta Thottam(Live)
Colombo Unit	Wanna Maradam	44
	Ulavar illam	44
	Valamana Pomikku Puthiya Uthayam	1020
	Short Messages	178
	Conversation	23
Farm Broadcasting	Training	5
	Advisory	515
Radio Programmes (Sinhala)	Kankariya	45
	Govibima	53
	Aswanna Live	50
	Isuru Soya	47
	Daily	Kalavita
Kandurata Unit	Rasamusuwa	22
Kandurata Tamil	Kurangi Malarhal	47
	Muhatahal	48
(Sinhala) Daily	Divimagata Athwalak	49
	Ruhuna Gewatta Live	45
	Govi Dathata Ape Saviya	181
	Hath Adiya	49
	Kavi Kolaya	51
	Salupaliya	41
	Kada malla (Ruhunu Bimai Govi Dethai)	49
	Ruhunu Bimai Govi Dethai	47

Audio Visual Centre

Audio Visual Centre (AVC) is the main media unit of the Department of Agriculture (DOA). It involves in production of wide spectrum of instructional media material ranging from traditional low cost media to Hi-tech Information and Communication Technology (ICT) activities for instructional purpose. In addition AVC conducts trainings for various levels of agriculturists of the DOA.

Activities of the AVC

- Production of two TV documentary programmes weekly (*Govibimata Arunalu* on Sunday at 6:25 pm *Mihikatha Dinuwo* on Friday at 6:15 pm)
- Design and production of agricultural publications, leaflets, posters, large format hoardings, banners, etc.
- Management of Agro technology park at Gannoruwa
- Organizing agricultural exhibitions at regional and national level
- Agricultural Advisory Service “Govi sahana Sarana Sevaya” (Short code 1920)
- Implementation of ICT initiatives in agriculture (websites, IMM CDs, cyber extension and networking)
- Conduct training on Audio visual media (presentation technology)
- Activities related to establishment of National Agricultural Information Network and Agricultural Information and Communication Centre.

Progress of activities conducted during 2011 are as follows.

Training

Training programmes 11 (Man days - 1056)

Graphic Communications

Technical publications	16
Leaflets/ Brochures	76
Hoardings/ Display Boards	15
Paper supplements/ Posters for offset printing	29
Desktop presentations	28
Colour pages/ Invitation/ Greeting cards	135
Lables/ Stickers/ Name board	4203
Banners	36

Video/Photography

<i>Mihikatha dinuwo</i>	50
<i>Govibimata Arunalu</i>	49
Other Documentaries	02
TV spots	12
Copying Video Programmes	232
Digital Photography	11,034

Information Technology

IMM CD ROMs	03
DOA website (pages updated)	521
RKB website (pages updated)	594
Wikipedia website (pages updated)	50
Developing new Database 02 (No. of hrs - 332)	
Toll free advisory (No. of queries)	40,834
New Cyber units	17
Networking (LAN)	11
Hardware software maintenance (No. of jobs)	102

Exhibitions

Exhibitions	05
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Agro parks

Number of visitors - Adults	46,574
Number of visitors - School Children	67,048
Income	Rs. 1,235,955/=

Information center

The responsibility of this unit is to distribute printed publications of the DOA. The main sales center is located at Peradeniya and 34 sub sales centers are located island wide. A new sales center

was established in July, 2007 at Gannoruwa to cater the visitors of Agro-Technology park of DOA.

DOA Press

Following publications were printed during 2011.

Books, Magazines & Booklets etc.

-	186,480
Posters	- 108,900
Labels	- 1,038,525
Certificates	- 5,146
Forms, Letters etc.	- 324,707
Leaflets	- 3,096,400

Agricultural Education

The five Schools of Agriculture located at Kundasale, Pelwehera, Angunakolapelessa Vavuniya and Karapincha are offering two year programmes 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.

The number of students in different SOAs are given in Table 3.6.5.

Table: 3.6.5: No. of Students in Schools of Agriculture - 2011

School of Agriculture	Year	Medium						Total	Grand total
		Sinhala		Tamil		English			
		Boys	Girls	Boys	Girls	Boys	Girls		
Kundasale	1 st	45	25	6	11	13	15	115	221
	2 nd	33	27	16	12	08	10	106	
Angunakollpellessa	1 st	28	19					47	70
	2 nd	22	1					23	
Pelwehera	1 st	35	14					49	89
	2 nd	29	11					40	
Vavuniya	1 st			27	08			35	52
	2 nd			9	08			17	
Karapincha	1 st							21	21
	2 nd	21							
Total		213	97	68	39	21	25	453	453

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 Services. This

course was started at eight training centers in 2005 and continues till all the ARPAs complete the course. The first group of 676 ARPAs completed the training in 2006, the second group (246) in 2008 and the third group (278) in 2011. Details of ARPAs trained during 2011/2012 are given below.

Table 3.6.6: Progress of training programmes during 2010/2011

Training Center	No. of ARPAs trained		Total No. of ARPA trained
	Batch I	Batch II	
	2011/I	2012/II	
School of Agriculture - Anuradhapura	18	-	18
School of Agriculture - Wariyapola	25	-	25
School of Agriculture - Labuduwa	13	24	37
District Agricultural Training Center - Weeravila	22	20	42
Horticultural Training & Development Center - Bibile	39	24	54
Total	117	68	185

Examination Unit

Exams conducted by the Unit during 2011 are given below.

New admission for schools of agriculture (270 – No. of applicants)

Exams of Diploma course (1740 – No. of students)

Departmental exams for Agricultural Instructors (380 – No of AIs)

Exam for one year course in School of Agriculture (552 – No. of ARPAs)

Efficiency bar exams for SLAgS officers, Agric engineers

Oral exams for language proficiency (Sinhala & Tamil)

Organic Agriculture and Plant Nutrient Unit

The aim of this unit is to coordinate environmental friendly agriculture in the country. The two special projects funded by the Ministry of Agriculture, ‘Production and application of organic manure’ and ‘Community based seed production

programme’ were coordinated by this unit. Achievements of other projects are as follows.

1. ANSOFT (Asian Network for Sustainable project)

Establishment of 10 organic villages, Selection of 1500 farmers from 10 villages and establishment of 1500 organic home gardens.

Germination tested seed programme

Production of 35,000 bushels of seed paddy using germination tested seed paddy programme.

PLAN FOR 2011

Special Projects

1. Media programme - Fund allocation Rs.20M
2. Land development at Schools of Agriculture & Training Centers
3. Training & Capacity Building at Schools of Agriculture & Training Centers
4. Agro parks – Gannoruwa / Bataatha
5. Mid Season Legume crop Cultivation in Inter provincial Areas
6. Production and use of organic fertilizer
7. Media program under “Api Wawamu Rata Nagamu” Programme

8. Other Field Crop cultivation in inter-provincial areas
9. Enhancing Bee Honey Production
10. Paddy productivity improvement
11. Community based seed production programme
12. Production of citrus plants at HTDI Bibile
13. Maize cultivation at HTDI Bibile
14. Establishment of Model villages

Other routine agricultural programmes

Extension activities (in 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 classes	551,437
Certified Seed Paddy production programme extent	9,116 ha
Self seed paddy production programme	44,388 No. of farmers

Activities on strengthening 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

Activities of agricultural education

No. of Diploma students - 480 (1st & 2nd years)

Training

33,087 No. of training programmes have been planned for officers, farmers, school students, and others on different agricultural subjects.

STAFF LIST

Designation	No.
Director	01
Additional Director	01
Deputy Director	05
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
Mechanic	05
Machine Minder	03
Cinema Operator	04
Librarian	01
Administrative Officer	02
Public Management Assistants' Service	109
Translator (English)	01
Store Keeper	03
Book Binder (Press)	01
Farm Clerk	05
KKS	15
Time Keeper	01
Steward	01
Cook	30
Watcher	60
Sanitary Labourer	09
Driver	71
Lorry Cleaner	04
Welder	01
Blacksmith	01
Electrician	02
Painter	01
Earth Mover Operator	11
Water Pump Operator	01
Machine House Assistant	02
Labourer (Class III)	250
Total	1161

4.1 ADMINISTRATION DIVISION

The role of the Administration division can briefly be defined as the performance of various matters of establishment during the period from an appointment to the retirement. Matters involving grant of study leave and general conduct are also included in the tasks of the division. The division has to deal with organizational such as Public

Service Commission, Human Rights Commission, Attorney General's Department, Parliamentary Advisory committee office of the Commissioner of Parliamentary Affairs regarding various appeals and also with other ministries and departments. The important data and statistics pertaining to the year 2011 are presented herewith.

BUDGET

Table 4.1.1.: Annual budget -2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	5,487,412	4,253,278	78
Recurrent	11,676,500	12,519,216	107
Total	17,163,912	16,772,494	98

PROGRESS

Appointments

Table 4.1.2: Appointments made during 2011

Designation	No. of appointments
Additional Directors	03
Registrar of Pesticides	01
Deputy Director	24
Agricultural Officer	82
Research Officer	87
Lecturers	22
Agricultural Economist	04
Programme Assistant	03
Agricultural Instructor Class III	01
Labourer	151
Appointments made by the Director General of Combined Services	
Librarian Service Class III	03
Public Management Assistants' Service Class III	86

Promotions

Table 4.1.3: Promotions made during 2011

Designation	No.
SLAgS 11/1	05
SLAgS Class 1	10
SL Accounting Service Class 1	04
Agricultural Instructor, Class 1	76
Agricultural Instructor, Class 11	109
Carpenter	01
Promotions made by Director General of Combined Services	
PMAS Class I	12
PMAS Class II	12
PMAS Class III	09
KKS Class II	03

Retirement from the service

Table 4.1.4: Retirements during 2011

Designation	No.
Agricultural Officer	07
Research Officer	12
Lecturer	01
Subject Matter Specialist	01
PMAS (Supra)	02
Economist Assistant	02
Agricultural Instructor	21
Work Inspector	01
Draughtsman	01
Research Assistant	01
K.K.S.	02
Special Labourer	01
Budder	01
Watcher	22
Cook	02
Sanitary Labourer	03
Labourer	02

Deceased while in service

Table 4.1.5: Employees deceased during 2011

Designation	No.
Agricultural Monitoring Officer	01
Agricultural Instructor	01
Lecturer	01
Watcher	01

Release of officers to other posts

Agricultural Monitoring Officers	60
Programme Assistant (Agri)	23
Agricultural Instructor	10
Research Assistant	11
Soil Surveyor	01
PMAS Class III	02

Vacation of Post

Agricultural Monitoring Officer	01
Programme Assistant	01
Agriculture Instructor	03

Resignation from Post

Agricultural Instructor	11
Research Assistant	04

Termination of Service

Agricultural Instructor	01
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Officers released to provincial Council

Agricultural Officer	01
Agricultural Instructor	07

Disciplinary Inquiries

Table 4.1.5: Disciplinary inquiries during 2011

Category	Number of inquiries pending at the beginning of the year	Number of inquiries initiated during the year	Number of inquiries completed during the year	Number of inquiries pending as at 2011.12.31
Formal Disciplinary Inquiries	34	31	13	52
Preliminary investigations and Inquiries of petitions	21	25	11	35
Total	55	56	24	87

F.R. 104 Inquiries

No. of inquiries pending at the beginning of the year - 540

No. of inquiries initiated during the year - 118

No. of inquiries completed during the year - 118

No. of inquiries pending as at 2011.12.31 - 540

Amount of loans granted and types of salary advance

Table 4.1.6: Details of loans and salary advances

Type of Loan	No. of vouchers approved	Amount Paid
Distress Loans	1217	153,258,440
Bicycle loans	12	72,000
Property loans	85 (No. recommended)	208,491,000
Motor bicycle loans	07 (No. recommended)	700,000

Agrahara Insurance Scheme

No. of Applications Submitted for reimbursement of hospital charges and spectacles - 941

Value of bills - Rs. 8,242,041.30

No. of death claims Submitted - 03

No. of natural death claims submitted - 14

Benefits for natural death - Rs. 700,000.00

Total amount of reimbursements and claims applied - Rs. 8,942,041.30

Security Deposits

- No. of security deposits released after retirement - 67

Amount released - Rs: 1,140,892.04

- Credited to the Government Account - Rs. 1,616, 846.77
- Number of Security bond recommendations traded to the Ministry for deposit of Securities - 99

Pensions

- Files received for payment of pensions - 257
- Files received for death gratuity - 12
- Files received for ex-gratia payment - 03
- Files received for reversion of pensions - 226

Number of payment made in the year – 2011

- Pensions - 224
- Death gratuity - 05
- Ex-gratia payment - 02
- Revised pensions payment - 24
- Released of minority receipts - 15
- The cases to be completed in the future - 202

Study Leave

Table 4.1.7: Study leave granted during 2011

Discription	Research officer	Ag. Economist	AMO	AI
No of Officers gone abroad for PhD	02	01	-	-
No. of Officers completed Ph.D./M.Sc. within the island	02 Ph.D.	01 M.Sc.	-	-
No. of officers released to follow PhD/Msc	-	-	02 Ph.D.	10 M.Sc.
No. of officers completed B.Sc.	-	-	-	06

Overseas visits abroad for training, workshop and other conferences

Table 4.1.8: Oversease visits during 2011

Designation	No. of visits
DGA	03
Director	13
Chief Engineer	02
Additional Director	01
Deputy Director	10
Asst. Director of Agriculture	08
Agricultural Economist	10
Research Officer	41
Agriculture Instructor	10

Designation	No. of visits
Programme Assistant	10
Subject Matter Specialist	02
Media Assistant	01
Research Assistant	01
Audio Visual Assistant	02
Carpenter	01
Welder	01
Labourer	01

Local Training

- Training on Storing – stage- II - 54 Officers
- Training of Officers for preliminary investigation/ formal disciplinary inquiries/ F.R. 104 Inquiries - 75

PLAN FOR 2012

Table 4.1.9: Action plan of Capital Expenditure

Object Code	Description	Allocation (Rs. Mn.)
2001	Building and Constructions	2.00
2102	Furniture and Office Equipments	9.00
2104	Surveying Department Lands	3.00

STAFF LIST

Designation	No. of personnel
Director General	01
Director (Admin)	01
Deputy Director (Admin)	01
Assistant Director (Admin)	01
Administrative Officers	05
Translator	03
Legal Assistant	01
Public Management Assistant	101
K.K.S.	19
Driver	06
Watcher	05
Sanitary Labour	02
Unskilled Labour	21
TOTAL	167

- Induction training for new recruits to Management Assistants' Service -73
- Training on office work and finance management for newly recruited technical officers - 17 Officers
- Workshop on land laws and settlement- 64 Officers
- Training for improvement of technical knowledge of drivers - 70 drivers
- Practical training for 27 apprentices in the Department
- Participation of officers in training conducted by Department of National Archives - 07 Officers
- Participation of officers in training conducted by Institute of National Labour studies- 16 Officers
- Participation of officers in training conducted by ICTAD- 11 Officers
- Participation of officers in training conducted by NIBM- 11 Officers
- Training conducted by SLIDA - 17 Officers
- In addition 61 officers had participated in various types of training with in the island.

Officers Participated in local conferences

Participation of 125 officers to the training at Public Service Training Institute.

Recoveries

The total recoveries to the Government from officers who have breached agreements are Rs.5,036,906.59.

4.2 ENGINEERING DIVISION – PERADENIYA

The main functions of the Engineering Division can be categorized as follows:

- Procurement of Capital Assets - preparation of estimates, awarding contracts and work supervision for civil engineering constructions and procurement of machinery, vehicles and office equipment
- Providing engineering advisory services for construction and maintenance of infrastructure facilities, which includes- maintenance of vehicles, machinery and office equipments, other services, operation and maintenance of the drinking water supply scheme, vehicle repairs

In order to improve and expand the service of the Division, regional mechanical workshops were established to repair and servicing of vehicles in four locations (Kundasala, Sita Eliya, Polonnaruwa and Angunakolapelessa). The working capacity, the efficiency and the performance of the Division were seriously affected due to lack of trained technical staff in the Division. At present, the division does not have a sufficient number of Inspectors of Work, Building Overseers and Draughtsman.

BUDGET

Table 4.2.1: Annual budget -2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	2,691,533	2,499,202	93
Recurrent	8,568,000	6,608,080	77
Total	11,259,533	9,107,282	81

PROGRESS

Progress of Civil Engineering Works

The summary of the Civil Engineering works carried out by the Division in 2011.

Requests received

- New constructions: 112
- Repairs: 424

Total work carried out:

- Estimates Sent : 268
- Tender Called : 186
- Minor repair in maintenance: 150
- Estimates Prepared : 536

Table 4.2.2: The value of the civil Engineering works (Division wise summary) carried out during the year

Division/ Description	Awarded Value (Rs.)
Administration	5,318,033.74
Finance	12,457,659.00
RRDI	3,164,125.38
SCPPC	62,30,999.46
Extension & Training	431,80,066.37
SEPC	1,591,026.40
HORDI	20,107,682.07
SPMDC	20,409,553.88
NRMC	2,585,928.58
FCRDI	44,64,797.23
Engineering	2,062,726.96
Total Amount (Rs.)	1215,72,599.07

Progress of Mechanical & Electrical Engineering works

Vehicle repairs and maintenance

Table 4.2.3: Details of vehicle repairs during 2011

Location of workshop	Major	Minor	Work in		
	Repairs	Repairs	Recommendations	Progress	Total
Kundasale	32	176	71	24	303
Head Office	-	-	580	-	580
Polonnaruwa	41	48	53	3	145
Angunakolapelessa	16	33	117	0	166
Sita Eliya	6	13	117	2	138
Total	95	270	938	29	1332

Procurement of Machinery and Equipment

Table 4.2.4: Value of Goods Procured by the Engineering Division in 2011

Division	Value (Rs.)
Engineering Division	420,849.00
Administration Division	963,627.60
Finance Division	983,480.00
Extension & Training Division	7,492,287.00
Socio Economics & Planning Centre	920,412.00
Seed & Planting Material Development Centre	41,934,825.80
Natural Resource Management Centre	724,648.40
Horticulture Research & Development Institute	6,589,027.00
Seed Certification & Plant Protection Centre	6,855,168.40
Field Crop Research & Development Institute	2,875,814.60
Rice Research & Development Institute	3,185,182.40
Progress Monitoring & Evaluation Unit	129,561.20
Ministry of Agriculture	139,838.00
Total	73,214,721.40

Table 4.2.5: Value of total capital works handled by the Engineering Division

Category	Value (Rs.)
Civil Engineering Constructions	121,572,599.07
Procurement of Equipment	73,214,721.40
Procurement of tyres	1,045,290.53
Total Rs	195,832,611.00

Water Supply Scheme at Kundasale

This scheme pumps approximately 200,000 gallons of water from the Mahaweli river daily. The pumping station works 18 hours per day and the power consumption is 60Kw approximately. This water is supplied to the various institutions under DOA as well as non-DOA premises. Chlorinated water is supplied for drinking and domestic usage throughout the year while non chlorinated water is

supplied to the lake of the agriculture farm during drought period according to the requirement.

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 also carried out by the division. The division actively participated in technical evaluation and provided advisory services to the tender boards.

STAFF LIST

Designation	No.
Chief Engineer	01
Mechanical Engineer	02
Civil Engineer	02
Electrical Engineer	02
Engineering Assistant	02
Inspector of Works	07
Engineering Foreman	01
Farm Mechanical	
Instructor	03
Public Management	
Assistants	16
Drivers	05
Mechanic	12
Electrician	03
Carpenter	02
Mason	01
Welder	01
Tinker	01
Machine Operator	01
Store man	03
Labour (Special- Stores)	01
KKS	01
Watcher	02
Labour	12
Total	81

4.2.1 FARM MECHANIZATION RESEARCH CENTER (FMRC) - MAHAILLUPPALLAMA

The major objectives of FMRC is to introduce effective agricultural mechanization technologies compatible with the socio economic & field conditions prevailing in different parts of the country. The activities carried out by FMRC includes identifying mechanization needs according to priorities & constraints in different farming system, selection & testing of Agricultural machinery & implement with regard to their constructions, functions, safety, economical & sociological factors, development,

modification & adaptation of agricultural machinery & implement to suit local condition, prepare technical drawings ,test reports & instruction manuals for selected implements, transfer technology to local manufactures & enhance their capabilities in production of appropriate agricultural machinery & implements, cooperate with agricultural extension agencies to popularize agricultural mechanization, technologies among farmers & other end users.

BUDGET

Table 2.4.1: Annual budget -2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	4,275,500	4,046,119	95
Capital	1,811,000	1,775,351	98
NARP	1,200,000	1,191,969	99
Dayata Kirula	1,695,000	1,682,718	99
TOTAL	8,981,500	8,696,157	97

PROGRESS

Agricultural & Industrial Extension

Table 2.4.2: Extension Activities conducted during 2011

Activity	Number of programmes
Filed demonstrations	101
TV programmes	1
Radio programmes	3
Exhibitions	6
Training programmes	4

Research & Development Activities

Table 2.4.3: Research & Development Activities conducted during 2011

Project Title	Aim of the Project	Progress during 2011
Motorizing the existing Drum seeder	Encourage large scale farmers towards raw seeding/Increase the capacity of existing drum seeder/ reduce the man power	Finalized the Power source & Power transmission system
Modifying the existing seed paddy cleaner	Increase the capacity of existing paddy cleaner, Introduce automated feeding system to the machine	Successfully completed the Drawing using AutoCAD, Brushing system was working in satisfactory level, 3.2 mm Oblong hole sheet was selected as the top sieve of the machine
Improvements to the High Land Seeder.	Improve the quality of seeding of existing machine	Completed the fabrication of Clutch & field tests were successful, Completed the fabrication of furrow closer & field tests were successful in fine tilled lands
Improvement to the existing maize thresher	Increase the capacity and threshing efficiency of existing thresher	Machine is being fabricated by FMRC registered manufactures in commercial scale
Design of 4W tractor coupled Injector planter for Maize	Increase the capacity of existing 2W coupled injector planter by changing the power source & reduce the time, fuel, and man power requirement for large scale maize cultivation.	Fabricated a prototype and field tests were carried out
Design of high land power weeder	Introduced high capacity highland weeder	Machine fabrication was done & ready for field testing.
Design of low land power weeder	Facilitate paddy cultivation with high capacity mechanical power weeding system	Selected the suitable proper power source for the weeder
Modifications to the Hydro tiller	Introduce a tilling mechanism for boggy land cultivation	Selected suitable engine for the hydro tiller,
Improvements to the axial flow water pump	Increase the water lifting capacity and the lifting head	Completed the fabrication of Axial Flow water pump & field tests were successfully done

Testing & Evaluation

Following machines were tested and evaluated to the suitability for Sri Lankan Farming condition (Table 2.4.4).

Table 2.4.4: Machines tested during 2011

Type of machine	Number of machines tested
Four wheel tractors	4
Two wheel tractors	2
Hand tools	10
Brush Cutter	1
Tractor attached implement	6
Sprayers	4
Multi Chopper	1
Thresher	1
Combine Harvesters	1

Farm Machinery Maintaining & Repairing Section

Farm Machinery Maintaining & Repairing section of FMRC provides technical guidance to other institutes regarding Farm Machinery repairs and recommendations regarding repairs.

Table 2.4.5: No. of repairs conducted

Activity	Total
Number of Recommendations	283
Number of Repairs	105

PLAN FOR 2012

Research & Development

- Design and fabricate riding type Drum Seeder
- Introduce a High Capacity 4 Wheel Tractor Powered Axial Flow Water Pump for medium and large scale farmers
- Continuation of modification of Low Land Power Weeder
- Feasibility study on coupling of Fertilizer Applicator for 4 Wheel tractor coupled injector planter
- Introduce automated feeding system for the high capacity seed paddy cleaner
- Improve existing Ground - nut decorticator cleaning device
- Modification of existing Pulse Processing Machine

Agricultural & Industrial Extension

- Exhibitions – 08
- Field Demonstrations – 55
- Officers training programmes – 05
- Farmers training programmes on Farm Machinery – 05
- Training programmes for University and other Higher Education Institutions - 05

Testing & Evaluation

- Continuation of Testing & Evaluation

STAFF LIST

Designation	No.
Sri Lanka Engineering	
Service	
Deputy Director	01
Mechanical Engineer	03
Sri Lanka Technical service	
Research Assistant	01
Engineering Forman	01
Draftsman	01
Farm Mechanization Instructor	02
Agricultural Instructor	02
Inspector of work	01
Management Assistant	03
Driver	02
Store man	01
Machine Operator	01
Mechanical Assistant	02
Mechanic	03
Machinist	02
Welder	02
Fitter	01
Blacksmith	01
Watcher	01
Tinker	01
Carpenter	01
Unskilled Laborer	09
Laborer (Contract)	15
Total	57

4.3 FINANCE DIVISION

The main objective of the Finance Division is establishment and operation of a sound financial management system to achieve the objectives of the Department of Agriculture.

BUDGET

Table 4.3.1: Annual budget -2011 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	7,105,638	5,957,917	84
Recurrent	145,454,000	58,532,453	40
Total	152,559,638	64,490,370	42

PROGRESS

Capital Expenditure

Table 4.3.2: Disbursement of Capital expenditure - 2011 (Rs.'000)

Project	Project Description	Revised Estimate	Expenditure	Progress as a %
285 – 1 – 1	Administration & Establishment Services	25,910	20,696	79.87
285 – 2 – 2	Agriculture Research & Development	237,775	173,315	72.89
285 – 2 – 3	Agriculture Extension & Training	136,211	112,065	82.27
285 – 2 – 4	Seed Certification & Plant Protection	772,300	613,939	79.49
Total		1,171,471	825,782,635	70.49

Recurrent Expenditure

Table 4.3.3: Disbursement of Recurrent expenditure - 2011 (Rs.'000)

Project	Project Description	Revised Estimate	Expenditure	Progress as a %
285 – 1 – 1	Administration & Establishment Services	201,476	197,308	97.9
285 – 2 – 2	Agriculture Research & Development	700,616	696,814	99.5
285 – 2 – 3	Agriculture Extension & Training	531,014	531,014	100.0
285 – 2 – 4	Seed Certification & Plant Protection	326004	324,219	99.4
Total		1,759,110	1,749,355	99.4

Operation of Advance Account Activities

Table 4.3.4: Operation of advance account activities – 2011 (Rs. '000)

Description	Approved limit	Actual Receipts	Actual Expenditure
	Revised Rs.	Rs.	Rs.
1. Maintenance of Agricultural Farms			
Maximum limit of Expenditure	355,000		354,750
Minimum limit of receipts	292,00	310,225	
2. Public Officers Advance Account			
Maximum limit of Expenditure	149,150		144,861
Minimum limit of receipts	100,399	149,690	

Special Projects

Table 4.3.5: Allocation Received under Department votes for Special Projects – 2011 (Rs'000)

No	Name of the project	Allocation	Expenditure	Progress as a %
01	285 – 2 – 2 – 2 – 2502 Infrastructure Development needs to improve rice research & development (RRDI)	49,000	41,840	85.39
02	285 – 2 – 2 – 3 – 2502 Development of Hybrid, Rice, Maize, Fruit and Vegetables	9,300	8,094	87.04
03	285 - 2 - 2 - 4 – 2502 Small scale Agricultural research project (US)	6,200	5,877	94.79
04	285 – 2 – 3 – 2 – 2105 Agriculture school farms	17,000	15,685	92.26
05	285 – 2 – 3 – 4 – 2502 Media programme	20,000	19,857	99.28
06	285 – 2 – 3 – 6 - 2401 Annual Symposium of Department of Agriculture. (ASDA)	2,500	2,153	86.13
07	285 – 02 – 4 – 1 - 2502 Seed production & purchasing	472,000	458,892	97.22
08	285 – 02 – 4 – 2 – 2502 Germplasm Development project (USDA)	4,300	1,102	25.63
09	285 – 02 – 4 – 2 – 2502 Seed Act	20,000	10,844	54.22
10	285 – 02 – 3 – 7 – 2502 Agro Park	4,500	4,221	93.79

Collection of Revenue

Table 4.3.6: Collection of revenue during the year 2011

Revenue Heads	Category	Actual Receipts (Rs.)
20 – 02 – 02 - 99	Loan Interest	15,727
20 – 03 – 02 - 99	Sale of Capital assets	464
20 – 03 – 99 - 00	Other receipts	84,267
20 – 02 – 01 - 01	Rent	17,751
20 – 03 – 02 - 18	Department Sale & Other charges	132,840
	Total	251,049

STAFF LIST

Designation	No.
Director (Finance)	01
Deputy Director (Finance)	06
Assistant Director (Finance)	03
Budget Assistant	02
Translator	01
PUBLIC Management Assistant	83
KKS	09
Driver	05
Unskilled Labourer	12
Total	122

5. PUBLICATIONS AND PRESENTATIONS

PUBLICATIONS

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Kaileswaran, S. (2011). Pomegranate Cultivation

Kaileswaran, S. (2011). Sweet potato Cultivation

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- Disease control in papaya cultivation – Rivira, 2011-12-26
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6. SENIOR STAFF

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Breeding

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AGRICULTURAL RESEARCH STATION, THIRUNELVELLY

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HORTICULTURAL RESEARCH & DEVELOPMENT INSTITUTE, GANNORUWA

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Soil Science
Upali Yapa B.Sc. RO, Soil Science
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Pesticides
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**PATHOLOGY RESEARCH
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Plant Pathology
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I. Dissanayake Dip. In Agric., RO,

Epidemiology

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 J.M.D.D.E. Jayamanna B.Sc., RO, Agronomy
 K.D.U. Wijewardena B.Sc., RO, Soil Science
 S.M.S.W. Wanigadewa B.Sc., RO, Tissue culture
 E.A.E.S.S. Jayasekara B.Sc., RO, Pathology
 R.M.N. Dissanayke B.Sc., RO, Agronomy
 T.K.A.I. Hadji B.Sc., RO, Entomology
 G.D.G. Chithrani M.Sc., RO, Floriculture
 E.K.E.C. Nayana B.Sc., RO, Horticulture

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 STATION, MONARAGALA**

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 STATION, RAHANGALA**

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 M.A.P. Mayakaduwa B.Sc., RO, Agronomy

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 STATION, GIRANDURUKOTTE**

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 H.M.L. Niran B.Sc., RO, Plantation Management

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 UNIT II, GANNORUWA**

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**RICE RESEARCH &
DEVELOPMENT INSTITUTE,
BATLAGODA**

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A.H. Gunadasa M.Phil., RO, Plant breeding
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P.V. Hemachanra M.Sc., RO, Plant breeding
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Engineering, Agricultural Science
J.P. Marasinghe M.Phil., RO, Entomology
C. Magamage M.Sc. Analytical Chemistry,
RO, Chemistry
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G.M.W. Chithral Ph.D., RO, Applied
Genetics
Y. Ketipearachchi Ph.D., RO, Genetics
& Entomology
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Statistics
A.S.U. Liyanage Pg. Dip., RO, Germplasm
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Vegetable
W.M. Dayawathie M.Sc., DD, Planting
Material
K.D. Pushpananda B.Sc., DD, Potato
G.W.R. Weerakoon B.Sc., ADA, Vegetable
T.M.A.K.B. Tennakoon B.Sc., ADA, Special
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D.M. Thamara Kumari Dip. In Agric., ADA,
Paddy
A.H.W.M.U.I.K. Herath Dip. In Agric., AO,
Sales Promotion

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ADA – Seed (Kundasale)
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atha)
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(Colombo)
W.M.I. Weerasekara M.Sc., ADA – Seed
(Aluttarama)
H.M.S.P. Herath M.Sc., ADA – Seed
(Kantale)
M.G. Jayasinghe B.Sc., ADA – Seed
(Nuwara Eliya)
S. Satheeswaran B.Sc., ADA – Seed
(Kilinochchi)
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ADA -Seed (Vavuniya)
A.V. Hemachandra Dip. In Agric., ADA –
Seed (Nikaweratiya)
K.S. Thushara Perera B.Sc., ADA- Seed
(Ampara)
H.M.J.K. Herath M.Sc., ADA – Seed (Maha
Illuppallama)

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AO- Seed (Kantale)

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(Bata atha)

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(Pelwehera)

S.A.S.K. Senadheera B.Sc., AO- Seed
(MahaIlluppallama)

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Development & Technology Transfer,
International Trade Negotiations

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Agric. policy analysis

M.I.M. Rafeek Ph.D., AE, Productivity
Efficiency, Comparative Advantage, Policy
Analysis

R.M. Herath Ph.D., AE, Productivity
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business, Food Security

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Policy, Trade, Agricultural Marketing

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Economics, Marketing, Environmental
Economics

W.A.C.K. Chandrasiri M.Sc., AE, Production
Economics, Trade and Agriculture Policy

A.T. Sooriyaarchchi M.Sc., AE, Production
Economics, Trade and Agric. Policy

N.G. Liyanage B.A., AE

H.K.V.M. Amarasekara B.Sc., AE, Agric.
Policy analysis & trade

J.K. Galabada B.Sc., AE, Agric.
Policy analysis & trade

K.G.C.D.B. Wijesinghe B.Sc., AE, Micro
Finance

PROGRESS MONITORING & EVALUATION UNIT, PERADENIYA

K.A.N. Kurukulaarachchi B.Sc., DD,
Monitoring & Evaluation

P.C. Peiris M.Sc., DD, Agricultural
Systems

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

K.G. Sriyapala M.Sc., Director, Extension

P.K.K.R. Perera Postgrad. Dip., DD,
Extension

R. R. Samuel M.Sc., DD, Extension

I.G. Thilakaratne M.Sc., DD, Extension

R.R. Wijekoon Ph.D., DD, Extension

S.K. Yasakethu M.Ed., ADA, Adult
Education

W.G.M.G. Dayawansa M.Ed., ADA, Adult
Education

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, Soil & 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

H.M.J. Ilankoon Manike M.Sc., ADA,
Extension

K.B. Gunaratne M.Sc., ADA,
Communication

J.R. Sudasinghe M.Sc., ADA, Natural Resource
Management

M.S. Mannapperuma B.Sc., ADA, Extension

H.M.T.B. Herath Dip. in Agric., AO,
Extension

INTER PROVINCIAL EXTENSION, ANURADHAPURA

K.A.D. Athula Kithsiri B.Sc., DD,
Agricultural Extension

S.A. Godigamuwa M.Sc., AO, Crop Science

A.M.K.B. Athapaththu B.Sc., AO, Animal
Science

B.K.S.M.G.S.K. Samaraweera M.Sc., AO, Soil
Science

INTER PROVINCIAL EXTENSION, AMPARA

A.R.A. Latheef M.Sc., DD, Agric. Extension

G.N.A. Arunathilaka M.Sc., ADA, Agric.
Extension

M.F.A. Saneer M.Sc., ADA, Agric. Extension

P.K.P. Muthukumarana B.Sc., ADA, Agric.
Extension

W.M. Gunadasa B.Sc., ADA, Agric. Extension

INTER PROVINCIAL EXTENSION, HAMBANTOTA

W.L. Hiran Peiris B.Sc., Actg. DD, Field
Crops

M.B. Weerasooriya B.Sc., ADA (Hq),
Horticulture

N.M.A. Dharmapriya B.Sc., ADA, Economics

T.H.N. Sudharshana B.Sc., ADA, Agriculture
Extension

D.P.M.N.C. Vidyarthna B.Sc., ADA, Food
Science

C. Bangamuwage B.Sc., ADA, Crop Science

INTER PROVINCIAL EXTENSION, KANDY

M.S. Abdul Kalees B.Sc., DD, Agric.
Extension

G.A.P. Wimalarathna M.Sc., ADA, Agric.
Extension

E.D.M. Sumanathilaka B.Sc., ADA, Agric.
Extension

**INTER PROVINCIAL EXTENSION,
MONARAGALA**

W.R.W.M.S.N.P. Weerakoon B.Sc., DD, Food
Science

H.D.K. de J. Sriwardhane B.Sc., ADA,
Genetics & Plant Breeding

**INTER PROVINCIAL EXTENSION,
POLONNARUWA**

I.W.K. Imbulgoda M.Sc., DD, Soil fertility
Mgt.

V.M. jayalath B.Sc., ADA, Ag. Extension
B.M.G.S. Basnayake Dip. In Agric., ADA,
Extension

**AGRICULTURAL ENTERPRISE
DEVELOPMENT & INFORMATION
SERVICE, PERADENIYA**

D. Abeysuriya M.Sc., Actg. DD, Ag.
Extension

M.H.B.P.H. Madana M.Sc., ADA, Ag.
Extension

K.H. Sarananda Ph.D., RO, Post harvest
Technology

YOUNG FARMERS CLUB

H.A. Athapaththu M.Sc., ADA, Agric.
Extension

**BEE KEEPING DEVELOPMENT
UNIT, BANDARAWELA**

A.M.D. Atapattu B.Sc., ADA, Bee keeping

RUPAVAHINI & FARM

BROADCASTING SERVICE

(Colombo, Kandy, Rajarata, Ruhuna)

D.N. de Silva M.Phil., ADA,
Devt. Communication

G.G.D. Lalani B.Sc., AO, Communication

Arundathi Valesivanadan B.Sc., Lecturer,
Nutrition

Ranjith Nanayakkara Dip. In Agric., ADA,
Extension

Hemantha Amarasinghe M.Sc., ADA,
Extension

**AUDIO VISUAL TRAINING
CENTRE, GANNORUWA**

W.A.G. Sisira Kumara M.A., ADA,
Communication, Media Planning & Design

J.K.A. Hettiarachchi M.Sc., SMS,
Natural Resource Management

D.S.A. Chandrasekara M.Sc., AO, Crop
Science

I.S.M. Haleemdeen M.Sc., AO, Ag.
Economics

I.J.K. Janaka B.Sc., AO, Agriculture

S.A.S.K. Senadheera M.Sc., AO, Agro
Forestry

**AGRICULTURAL PRESS,
GANNORUWA**

S. Periyasamy M.Sc., ADA, Communication

**INSERVICE TRAINING INSTITUTE,
ARALAGANWILA**

Keerthiratna B.Sc., ADA, Horticulture

R.C. Jayasingha M.Sc., AO, Plant Protection

S.C. Sellahewa B.Sc., AO, Ag. Extension

R.A.G. Senaratna M.Sc., AO, Soil & Water
Mgt.

**INSERVICE TRAINING INSTITUTE,
ANGUNAKOLAPELESSA**

A.W.P. Leelananda B.Sc., ADA, Education &
training

M.G. Ajith Pushpa Kumara M.Sc., Lecturer,
Environmental Economics

R.C. Jayasinghe B.Sc., AO, Plant Protection

**INSERVICE TRAINING INSTITUTE,
GANNORUWA**

S. Waththuhewa M.Sc., ADA, Ag. Education
R.P. Kasthuriarachchi M.Sc., AO,
Vegetable crops
G.D. Amarasena B.Sc., AO, Poly tunnel
cultivation
D.S. Ratnasinghe M.Sc., SMS, Fruit crops
H.M. Gammanpila M.Sc., SMS, Food
Technology
T.S. Kamiss B.Sc., AO, Ag. Extension
C.K.D. Wellala M.Phil., AO, Horticulture

**FARM MECHANIZATION
TRAINING CENTRE,
ANURADHAPURA**

S.M.A. Priyadharshani M.Phil., ADA, Soil
Science
N.A.R.J. Perera B.Sc., AO, Ag. Engineering
H.S. Seneviratne B.Sc., Lecturer, Horticulture

**DISTRICT AGRICULTURAL
TRAINING CENTRE, WEERAWILA**

W.L. Hiran Peiris B.Sc., ADA, Ag. Extension
& Training

**SCHOOL OF AGRICULTURE,
ANGUNAKOLAPELESSA**

G.C.A. Gunawardhene M.Sc., ADA/ Principal,
Environmental Management
I.R.N. Abeydheera B.Sc., Lecturer, Agric.
Biology
K.G. Ranjini B.Sc., Lecturer, Horticulture
W.L.O. Manel B.Sc., Lecturer, Food
Science
I.P. Liyanage B.Sc., Lecturer, Food
Science
R.G.S.J. Gunawardhana B.Sc., Lecturer, Agric.
Engineering
P.W.R.C. Paragahagoda B.Sc., Lecturer, Ag.
Biology

A.G. Sajeewa Kumudu B.Sc., Lecturer Food
Science
J.C.W. Jayasooriya B.Sc., Lecturer, Food
Science
D.M.U.S. Bandara B.Sc., Lecturer, Crop
Science
K.A.K. Samantha Lakmal B.Sc., Lecturer,
Animal Science
R.A.C. Wijesinghe M.Sc., Lecturer, Crop
Science

**SCHOOL OF AGRICULTURE,
ANURADHAPURA**

C. Kodithuwakkuarachchi B.Sc., ADA/
Principal, Education
H.L. Thenuwara B.Sc., Lecturer, Extension &
Training

**HORTICULTURE DEVELOPMENT
& TRAINING INSTITUTE, BIBILE**

A.M.U. Pinnalanda M.Sc., DD,
Agricultural systems
H.M.U.A.G.J. Bandara B.Sc., Lecturer,
Education

**SCHOOL OF AGRICULTURE,
KARAPINCHA**

K.N.S. Ranathunga B.Sc., ADA / Principal,
Extension & Training
I.A.D.C.T. Kumari B.Sc., Lecturer, Education
& Training
A.R.W.M.M.U. Amarakoon M.Sc., AO,
Education & Training
G.A.D. Rajapaksha* B.Sc., AO, Education &
Training
G.G.P.P. de Silva M.Sc., Lecturer, Plant
Protection
B.J.S. Fernando M.Sc., Lecturer,
Education & Training
G.A.S.A. Tennakoon B.Sc., Lecturer,
Extension & Training

R.A.T.M. Ramanayake B.Sc., Lecturer,
Extension & Training
D.S.A. Kahawattage B.Sc., Lecturer,
Extension & Training
A.S.Y.P. Ranasinghe B.Sc., Lecturer,
Extension & Training

**SCHOOL OF AGRICULTURE,
LABUDUWA**

I.D. Gunawardena B.Sc., ADA / Principal,
Plant Protection
T.H. Somadasa B.Sc., AO, Plant Protection
D.A. Palihawadana M.Sc., Lecturer,
Agricultural Extension
G.G.V. Shyamalee M.Sc., Lecturer,
Horticulture
M.P. Thamara M.Sc., Lecturer, Extension
& Training

**SCHOOL OF AGRICULTURE,
PELWEHERA**

H.M.R. Bandara B.Sc., ADA / Principal,
Education
A.L.Siriwardhana M.Sc., Lecturer, Education
K.G.W. Gunawardena M.Sc., Lecturer,
Education
K.M.V.B.G. Pamunuwa B.Sc., Lecturer,
Education
K. Seetha Violet M.Sc., Lecturer, Education
B.M.A.P. Basnayake B.Sc., Lecturer,
Education
M.A. Chandanie M.Sc., Lecturer,
Floriculture
A. Manikkrama M.Sc., Lecturer, Extension
& Training
A.M.N.K. Herath M.Sc., Lecturer, Floriculture
D.R. Kanchana M.Sc., Lecturer, Ag.
Environmental Economics
R.P. Upali B.Sc., Lecturer, Ag. Extension

**SCHOOL OF AGRICULTURE,
VAVUNIYA**

S. Kaileswaran M.Sc., ADA / Principal, Food
Science
L Pirunthavaeswaran B.Sc., Vice Principial,
Horticulture
K. Chandrakanthan B.Sc., Lecturer,
Ag. Engineering
R. Sivaneshan M.Sc., Lecturer, Soil Science
S Senthikumar M.Sc., Lecturer, Crop
Science
M.S. Rinooz B.Sc., Lecturer, Extension
& Training
S. Sangeepan B.Sc., Lecturer, Extension &
Training

**SCHOOL OF AGRICULTURE,
WARIYAPOLA**

S.B.A.M.A. Maneldevi B.Sc., ADA/ Principal,
Food Science

**SCHOOL OF AGRICULTURE,
KUNDASALE**

H.S. Kuruwita M.Sc., ADA/ Principal,
Crop Science
A.H.C. Bandara M.Sc., Lecturer, Crop Science
W.T.G. Ranjini M.Sc., Lecturer, Plant
Protection
B.A.H. Bamunuarachchi M.Sc., Lecturer, Soil
physiology
R.R. Senerath B.Sc., Lecturer, Horticulture
S.D.K. Priyadarsani B.Sc., Lecturer, Plant
Physiology
T.M.P.G.S.P. Tennakoon B.Sc., Lecturer,
Horticulture
M.A. Sandya Kumari M.Sc., Lecturer, Food
Science
A.K. Jayawardena M.Sc., Lecturer, Natural
Resource & Sustainable Agriculture

P.G. Yasamali M.Sc., Lecturer, Crop Science
 R.M. Gunawardhane B.Sc., Lecturer, Education
 U.D.D. Damayanthi M.Sc., Lecturer, Soil
 Science
 R.N.N. Perera B.Sc., Lecturer, Education
 P.C.P. Perera B.Sc., Lecturer, Education
 Y.N.P. Wijeratne B.Sc., Lecturer, Education
 B.M. Tilakeratne M.Sc., Lecturer, Engineering
 Extension

PDOA, SABARAGAMUWA

PROVINCE

K.P. Karavita M.Sc., PD, Devt.
 Communication & Extension
 J.M.D.J. Bandara B.Sc., DD, Extension
 V.P. Wimalasena M.Sc., ADA, Food
 Technology
 W.A.H.B. Wirasegoda M.Phil., ADA, Food
 Science
 B.M.U.B.S. Chandrasiri Dip. in Agric., DD,
 Ag. Extension
 Y.K. Bamunuarachchi B.Sc., ADA, Extension
 J.P. Gunawardhana B.Sc., ADA, Ag. Extension
 W.S.N. Wickramatilake B.Sc., ADA, Biology
 S.N.K. Saranasinghe B.Sc., ADA, Ag.
 Extension
 R.T.M.L. Rajapaksha M.Sc., ADA, Crop
 Science
 H.R.U.T. Erabadupitiya M.Sc., ADA,
 Biology
 A.J.N.L. Jayaratne B.Sc., ADA, Ag.
 Extension

PDOA, NORTH WESTERN

PROVINCE

B. Wijeratne M.Sc., PD, Rural agricultural
 development
 N.H. Nimalaratne M.Sc., DD, Agricultural
 Extension
 S.B.S.K. Semasinghe M.Ed., DD, Ag.
 Extension

H.M. Sirimewan Herath B.Sc., DD, Ag.
 Economics
 O.P. Kithsiri M.Sc., DD, Natural Resource
 Management
 B.L. Gunathilake M.Sc., DD, Ag. Training
 D.M.M. Dissanayake B.Sc., ADA, Agronomy
 W.A. Seelaratne Dip. in Agric., ADA,
 Extension
 I.A.R. Damayanthi B.Sc., ADA, Ag.
 Extension
 A.H.M.B. Wadigamangawa Dip. in Agric.,
 ADA, Ag. Extension
 W.M.S. Wanninayake M.Sc., ADA, Extension
 Sisira Kumara M.Sc., ADA, Water Mgt.
 B.V.T. Shyamalee B.Sc., ADA, Extension
 H.L.M. Jinadarie Lanka B.Sc., ADA, Extension

PDOA, WESTERN PROVINCE

R.P. Mahindapala M.Sc., PD, Training &
 Extension
 N.G.K.D. Pererea B.Sc., DD, Ag. Education
 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, Extension
 W.N.C. Weerakoon B.Sc., ADA, Extension

PDOA, NORTH CENTRAL

PROVINCE

P.B.L. Premnath M.Sc., PD, Extension
 A. Jayathilake M.Sc., DD, Extension
 A.M. Dharmasena Dip. In Agric. DD,
 Extension
 B.P.S.W. Pathirana B.Sc., ADA, Extension
 A.M.D.N. Abesinghe B.Sc., ADA, Extension
 H.B.D.G.C. Ratnayake B.Sc., ADA, Extension
 N.D.P.S. Gunathilake B.Sc., ADA, Extension
 H.A.R.S. Ranasinghe B.Sc., ADA, Extension

J.S.N.S. Samarakoon B.Sc., ADA, Extension
E.G.P.V. Jayasinghe B.Sc., ADA, Extension
D.P.D. Gunasinghe Dip. In Agric., ADA,
Extension

PDOA, UVA PROVINCE

R.M. Nandasiri M.Sc., PD, Education
H.K.P. Jayalath B.Sc., DD, Extension
A.B.M. Wijetunga M.Sc., DD, Extension
K.D. Siripala M.A., DD, Ag. Video
production
T.L.D. Lalith Nishendra Dip. In Agric., ADA,
Horticulture
H.L.P. Nilmini B.Sc., ADA, Field Crops
S.D. Rajapaksha B.Sc., ADA, Ag. Extension
S.M.S. Udayangani B.Sc., ADA, Ag.
Extension

PDOA, NORTHERN PROVINCE

S. Sivakumar M.Sc., PD, Agric. Extension
J. Jeganathan M.Sc., DD, Agric. Extension
A. Selvaraja M.Sc., DD, Agric. Extension
R. Kokulathasan B.Sc., DD, Agric. Extension
K. Sribalasundaram Dip. in Agric., DD, Agric.
Extension
A.M. Sukoore Dip. in Agric., DD, Agric.
Extension
T. Yogeswaran B.Sc., DD, Agric. Extension
S. Anchanadevi B.Sc., ADA, Agric. Extension
A. Sakeela Banu B.Sc., ADA, Agric. Extension
J.A. Joseph Dip. In Agric., ADA, Extension

PDOA, EASTERN PROVINCE

S.M. Hussain M.Sc., PD, 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

M.B. Dissanayake M.Sc., PD, Agric.
Extension
W.S.C. Perera M.Sc., DD, Extension/
Agronomy
M.G.N. Sandamali M.Sc., ADA, Crop
Science
R.S. Chandrasiri M.Sc., ADA, Crop Science
H.M.G.M.K. Weerasooriya M.Sc., ADA, Crop
Science
S.M.K. Dissanayake B.Sc., DD, Crop Science
P.K. Seneviratne B.Sc., DD, Crop Science
P.R.P.Y. Pallemulla B.Sc., DD, Extension/
Agronomy
M.P.K. Dodamwala B.Sc., ADA, Extension
K.A.N. Wijesinghe B.Sc., ADA, Crop Science
E.M.H.B. Ekanayake B.Sc., ADA, Extension
W.J. Samarawickrama M.Sc., ADA, Crop
Science
W.M.S.K. Weerasekera Dip. In Agric., ADA,
Crop Science
M.S. Thilakasiri Dip. in Agric., DD, Agric.
Extension
PDOA, SOUTHERN PROVINCE
S. Rathnasiri B.Sc., PD, Extension
S.K.N. Rubasinghe B.Sc., DD, Extension
Mahesh Subasinha Dip. in Agric., ADA,
Extension
I.M.T. Pushpalatha Dip. in Agric., DD,
Extension
P. Abeysinghe Dip. in Agric., ADA, Extension
M.W.S.A. de Silva Dip. in Agric., ADA,
Extension
R.H.U. Gunawardhana B.Sc., ADA,
Extension
S.D.W. Gunasekera B.Sc., ADA, Soil & Water
Mgt.
K.S. Pushpakanthi B.Sc., ADA, Extension
C. Dahanayake Dip. in Agric., ADA,
Extension

ADMINISTRATION DIVISION

L.A.D. Geetha Indrani B.A., Ph.D. (Mgt.),
Director (Administration)
P.V.M.S.B. Udovita DD (Administration)
I.W.M.C.K. Illangakoon M.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
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., AMIESL
Electrical Engineer
J.G. Janath B.Sc., AMIESL, Electrical
Engineer
J.A.D.K. Wanigaratne B.Sc., AMIESL, Civil
Engineer

FARM MECHANIZATION

RESEARCH CENTRE

B.M.C.P. Balasooriya B.Sc. (Mech.),
AMIE, Ag.Engineering
H.M.A.P. Herath B.Sc. (Eng), Production
Engineering
G.A.M.A. Wijetunga B.Sc. (Eng),
Mechanical Engineering
M.H.J.J.H. Hemachandra B.Sc. (Eng),
Production Engineering

FINANCE DIVISION

Nimal Govinna B.Sc,DPFM, Director
(Finance)
C.K. Rajapathirana B.Com., PDA, 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 B.Sc., ICASL (Lic),
PDAF, DD (Finance)
S.S.K. Liyanage HNDA, ICASL –
Certificate, DD (Finance)
M. Sridharan PDPM, Asst. D (Finance)
H. Ranathunga B.Sc., ICASL Inter,
Asst. D (Finance)
N.P. Dharmaratne B.Sc., BAD, ICASL Inter,
Asst. D (Finance)

- On study leave
- ** On no pay leave

7. TECHNICAL STAFF QUALIFICATIONS

(As at 2011.12.31)

Institute/ Centre/ Division/ Unit		Diploma	B.A./L.L.B.	B.Com./ B.Ed./ B.Ls.	B.Sc.	C. Eng./ M.I.E.	Postgrad. Dip.	M.A./ MBA	M.Sc./ M.Ed.	M.Phil.	Ph.D.	TOTAL
FCRDI	FCRDI	14			09		01		21	04	03	52
	GLORDC	15	01		04				11		01	32
	RARDC/ ARL	07			03				04		02	16
	RARDC/KIL	07			04				06		01	18
HORDI	HORDI	38		01	11				23	03	08	84
	PVIC	15			12				03	01	02	33
	FCRDC	14	01	01	08				10	04	01	39
	FRU	05			02				04			11
	RARDC/BAN	23	01		10				10	01		45
	RARDC/MK	29			06					02	01	38
	ARS/SE	09			06				05	01	01	22
	ARS/TW	07	01		03				02		01	14
	ARS/GK	07			02				04			13
	HORDI UNIT 2	05			01						02	08
RRDI	RRDI	28			15				13	08	04	68
	RARDC/BW	36			20				07	04	02	69
SCPPC	SCPPC	01			01				06	01		09
	SCS	104			14				02		01	121
	PPS	08			05					01		14
	NPQS	50			12				09		01	72
	ROP	09			10				03	02	01	25
	PGRC	07			02				05	02	03	19
SPMDC		89			40				14			143
SEPC		02	13		06			01	05	01	03	31
PMEU		01			01				03			05
NRMC		11			06				07	01	03	28
ETC		392			122		03	02	87	07	06	619
ADM		01	04		03				01			09
ENG	ENG	06			04	03						13
	FMRC	06			05							11
FIN		03	02		03		03					11
TOTAL		949	23	02	350	13	07	03	265	43	47	1692