Administration Report 2007

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ADMINISTRATION REPORT
2007

DEPARTMENT OF AGRICULTURE
PERADENIYA
SRI LANKA

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FOREWORD

The 2007 Administration Report of the Department of Agriculture (DOA) highlights all activities carried out by the Department during the year under review. The activities implemented by the six Technical Divisions and the three Support Service Divisions are highlighted in this report. Information presented in this publication reveals the current work and the status of DOA resources, which will be useful for policy makers, legislators and research managers to plan for future activities. Also, this document may provide valuable information for future readers, who will be interested in searching for facts pertaining to the activities of the DOA.

Vision of the DOA is to achieve excellence in agriculture for national prosperity. In carrying out this vision, the DOA implemented crop productivity enhancement programmes pertaining to rice, other field crops, fruits and vegetables. Programmes implemented in 2007 were mainly focused on enhancement of crop productivity and seed production, infrastructure development for agricultural research, organic agriculture, training and capacity building of the staff involved in research, extension, training and seed production activities.

With the dawn of the year 2007, the technical activities of the DOA had to be concertedly focused on the production and productivity enhancement of crops namely rice, other coarse grains including maize and finger millet, pulses, potato, oil seeds, vegetable and fruit crops, which are immensely important for the economy, with the objective of achieving the self sufficiency in those crops, as aimed by the "*Api wawamu rata nagamu campaign*" launched by the government. The DOA is actively involved in this campaign by planning out specific activities to be carried out with regard to each of the crops identified, implementing the activities with the collective support of all stake holders, providing necessary inputs in the kind of seed, planting material and technical know-how to targeted groups. Already very comprehensive work plans have been prepared for important crops such as rice, other field crops, fruits and vegetables.

Another important area, where the attention has been focused on, is the production of crops with the least burden to the economy, on which the emphasis is being directed towards the reduction of dependency on imported synthetic fertilizer and agro chemicals, by encouraging the production and application of organic manure and practice of integrated pest and disease control for improved crop production. The initiative has been already taken for the provision of required training for officers and farmers and for the building up of necessary, but inexpensive infrastructure required for launching of a mass scale programme in this regard.

The extension and mass media activities will be fully geared towards achieving the goals and objectives of the above programmes. Already, a considerable volume of work has been carried out for the promotion of home gardening, establishment of crop zones, cultivation of barren or under utilized lands, with the active participation of the provincial extension system. Many of the activities under the above two programmes have been carried out with the support from the provincial extension officers.

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In the area of planting material and seed production, the DOA has observed mixed results during the year. In spite of every effort taken by the management, the total net revenue remained low, which can be mainly attributed to high input costs of labor, fertilizer, agro chemicals and fuel, the prices of which have been significantly escalated in an accelerated manner during the year. Activities have been planned to enhance the revenue of the farms by bringing the under utilized land under plough and establishing income generating crops under the accelerated crop production campaign. In the plus side, the DOA was able to supply a quantity of more than 15% of the total annual requirement with quality seed paddy to the farmer during the year, a fact which was crucially important in achieving a higher rice production.

The benefits of investing on infra structural capacity building in numerous projects for the development of FCRDI, RRDI and FCRDC and also projects such as hybrid seed production, establishment of crop zones with perennial fruit crops etc. will take several years to realize. Similarly, investments in the development of human resources within the DOA and among the farming community will bring about dividends only in the long run.

The DOA was constrained in implementing the planned programmes due to unavailability of funds during the year and lack of human resources in research and extension which had a negative impact on the progress of technical activities. Lack of technical staff in the engineering field hampered the progress of infrastructure development activities, which in turn has negatively affected in achieving the initially identified capital expenditure targets during the year. Action initiated to fill the void in this area is yet to be accomplished.

I appreciate the efforts of all officers of the DOA in achieving the success contained in this publication. I also thank the editor for his unstinted effort to complete this publication within the stipulated period.

Dr. C. Kudagamage,
Director General of Agriculture

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ABBREVIATIONS & ACRONYMS

AER	–	Agro Ecological Region
AVRDC	–	Asian Vegetable Research and Development Centre
BLB	–	Bacterial Leaf Blight
BPH	–	Brown Plant Hopper
BSV	–	Banana Streak Virus
CABI	–	Commonwealth Agricultural Bureau International
CARE	–	Cooperative Assistance and Relief Everywhere
CARP	–	Council for Agricultural Research Policy
CNLD	–	Chilli Narrow Leaf Disorder
CRI	–	Coconut Research Institute
CRVT	–	Coordinated Rice Varietal Testing
CZP	–	Crop Zoning Project
DAS	-	Days After Sowing
DOA	–	Department of Agriculture
DRF	–	Dependable Rainfall
DUS	–	Distinctness, Uniformity and Stability
ESCAP	–	Economic and Social Commission for the Asia Pacific
FAO	–	Food and Agriculturel Organization
FSV	–	Farmer Services Vote
FTF	–	Farmer Trust Fund
GAP	–	Granary Area Programme
GM	–	Gall Midge
GPS	–	Global Positioning System
HERP	–	High grade Eppawala Rock Phosphate
ICRISAT	–	International Crop Research Institute for Semi Arid Tropics
IITA	–	International Institute for Tropical Agriculture
INFORM	–	Information for Agricultural Research Management
INGER	–	International Network for Genetic Evaluation of Rice
IPM	–	Integrated Pest Management
IPO	–	Intellectual Property Office
IRFAON	–	International Rice Fine and Aromatic grain Observation Nursery
IRRI	–	International Rice Research Institute
IRSSTN	–	International Rice Soil Stress Tolerance Nursery
ISCAP	–	Implementation of Soil Conservation Act Programme
ISPM	–	International Standards on Phytosanitary Measures
ISTA	–	International Seed Testing Association
JICA	–	Japan International Cooperation Agency
LCWZ	–	Low Country Wet Zone
LSVAT	–	Large Scale Varietal Adaptability Trial

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MAI – Moisture Availability Index
MYT – Major Yield Trial
NBPGR – National Bureau of Plant Genetic Resources
NCB – Non Calcic Brown
NCRVT – National Coordinated Rice Varietal Trial
NCVT – National Coordinated Varietal Trial
NEAP – National Environmental Action Plan
NIAS – National Institute of Agrobiological Sciences
OFC – Other Field Crops
PECRODEP– Perennial Crop Development Project
PET – Potential Evapotranspiration
PGR – Plant Genetic Resources
PTWG – Provincial Technical Working Group
PYT – Preliminary Yield Trial
RAPD – Random Amplified Polymorphism Detection
REAP – Regional Economic Advancement Project
RSC – Rooted Stem Cuttings
RTWG – Regional Technical Working Group
RYP – Red Yellow Podzolic
SLANRMP – Sri Lanka Australia Natural Resources Management Project
SLUSDA – Sri Lanka – United States Development Agency
SriLanKoRDAA – Sri Lanka – Korea Rural Development Administration Alumni Association
t – Metric tonne = 10^3 kg
VAT - Variety Adaptability Trial

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EXECUTIVE SUMMARY

The responsibility of DOA is to develop new technology through research and disseminate them to farmers and agricultural entrepreneurs for the purpose of enhancing agricultural production. In achieving the above, several programmes were conducted by different divisions of DOA and the achievements made during 2007 are presented in this report.

The routine programmes of the DOA were targeted in achieving the above goals and in addition, 43 special projects were conducted under DOA and Ministry votes with a total allocation of Rs 584.07 million.

The research and development programmes of the RRDI continued towards development of high yielding varieties and improvement of rice production technology. A new improved rice variety, Bw 364 of 3 1/2 month age class with resistance to iron toxicity was released and a white pericarped elite line, Bg 2893 of the 4 – 4 1/2 month age class with resistance to major pests and diseases and higher adaptability to diverse ago ecological conditions was further evaluated under LSVAT in farmer fields before national release. Breeding programme to develop 2 1/2 month age new rice lines initiated during yala 2005 was continued with the objective of selecting lines maturing in less than 80 days and with a reasonable yield.

In the horticultural crop sector, a new brinjal variety, a *Capsicum* hybrid, a promising open pollinated pumpkin variety and promising accessions of *Amaranthus* and *Sarana* were nominated for VAT. Quantity of breeder seeds of vegetable produced in 2007 was 10 kg consisting of seeds of 4 varieties of 3 vegetable crops. Two new varieties of *Macademia* were released as "Lanka' and 'Harsha'. Two fruit villages of bael were established in Kegalle and Polonnaruwa Districts. Under the Crop Zoning programme, 130 banana plants (Embon and Pulathisi) and 1600 pineapple plants (Mauritius) were distributed among farmers.Eight new model home gardens in different agro-ecological regions were established and in addition to maintenance of existing 3 home gardens.

Research programmes of the FCRDI continued with the focus on condiments, grain legumes, oil seeded crops, coarse grains and regionally important fruits and vegetables. A new finger millet variety ' Oshadha', resistant to blast was released and 5 high yielding quality protein maize (QPM) hybrids developed from exotic lines were selected for further testing. Two newly improved chilli breeding lines were selected for VAT and seeds were submitted to SCS for DUS test. Newly improved big onion line, 'Pusa red MI' tested in farmer fields in Dambulla, Galewela and Anuradhapura areas will be submitted for release in 2009. Five new mung bean breeding lines and four medium duration groundnut lines with large seeds were selected for testing in NCVT. To strengthen the seed production programme, breeder seeds of 24 recommended crop varieties were produced and supplied by the FCRDI.

The SPMDC produced 6845 bu of certified seed paddy in government seed farms and 26,952 bu of certified seed paddy were purchased from contract growers. Total production of

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basic seeds of OFC was 29,341 kg in 2007. In addition, 101 kg of hybrid and 6113 kg of standard vegetable seeds were produced. Total No. of planting materials produced was 322,594.

Activities under SCPPC included certification of 4624 mt of seed paddy were through laboratory tests, and a total of 153,352 fruit plants in government and private nurseries were certified and labeled by the SCS. No. of import permits issued for plants and plant products was 2205. Drafting of regulations under the Plant Protection Act No. 35 of 1999 was finalized and draft regulations under the Seed Act No. 22 of 2003 were submitted to the Legal Draftsman.

Costs and returns of the production of rice, subsidiary food crops, vegetables, roots and tubers in maha 2005/ 2006 and yala 2006 seasons were published by the SEPC and several studies were conducted on various aspects of agriculture in addition to preparation of policy documents related to agriculture.

The ETC which is responsible for conducting extension, training, communication, agricultural education and examinations of the DOA conducted several special projects. For the purpose of reviving 'Bibile' orange cultivation in Moneragala District, 106.6 ac of new orange plantations were established and 21,323 orange plants were distributed among farmers. Promoting organic agriculture, 25 new orange villages were established in addition to maintaining of 104 existing villages. A total of 452,535 publications were printed, 19 TV programmes, 5965 farmer trainings and 63 officer trainings were conducted with 91897 participants for dissemination of agricultural information.

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1. WEATHER REPORT

Meteorological data collected from 13 agro-meteorological stations representing different agro-ecological regions in Sri Lanka during 2006/2007 *Maha* (September – February) and 2007 *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 evapo-transpiration (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)

The both cumulative seasonal rainfall and monthly rainfall distribution of this region during 2006/2007 *Maha* season was up to the expectation, receiving over 4% above normal seasonal rainfall compared to the long term average. The situation was similar even during 2007 *Yala* season having more than 26% of above normal seasonal rainfall with a favorable monthly distribution. Other supplementary agro-meteorological parameters, namely, potential evapo-transpiration, wind speed, humidity and bright sunshine hours also revealed that there was hardly any chance of developing soil moisture stress in crops grown in this region during both growing seasons.

MID COUNTRY WET ZONE

Peradeniya (WM2b)

The cumulative *Maha* season rainfall was above the expected volume of rain in this region. Except February, all other months of the season received over 100 mm of rain. Hence, there was hardly any chance of developing soil moisture stress during 2006/2007 *Maha* season. However, there was a slight decrease in the cumulative seasonal rainfall during 2007 *Yala* season in this region. Nevertheless, the rainfall during each month of the season was in excess of the potential evapo-transpiration. Other agro-metrological parameters recorded in this region, sunshine hours in particular, also revealed that there was a good combination of rainfall and solar radiation during the *Yala* season.

UP COUNTRY WET ZONE

Sita Eliya (WU3)

Cumulative seasonal rainfall of 2006/ 2007 *Maha* season in this region was about 1,581 mm, which is a 42% increase over the long-term average and thus, there was hardly any chance of developing soil moisture stress during this season. Nevertheless, rainfall during January was over 100% above the expected volume and thus, it may have caused a negative impact on the high value crops grown in this region. The maximum temperature during the season ranged from 17 ^{0}C to 20^0 while the minimum temperature was in the range of 9 ^{0}C to 13 ^{0}C with a few incidences of ground frost in January.

The cumulative 2007 *Yala* season rainfall in this region was 653 mm, which is a 20%

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decrease over the long-term average. The decrease was mainly attributed to the below normal rain received during June due to weak southwest monsoonal circulation. However, distribution of rainfall within the season and other agro-meteorological parameters remained at a favorable combination for a successful cultivation in this region. The maximum temperature during the season ranged from 18 ^{0}C to 22 ^{0} while the minimum temperature was in the range of 10 ^{0}C to 14 ^{0}C.

LOW COUNTRY INTERMEDIATE ZONE

Batalagoda (IL1a)

The cumulative seasonal rainfall during 2006/2007 *Maha* season was above the long-term average with a favorable monthly distribution and it was in excess of the potential evapo-transpiration through out the active growing period. Other agro-meteorological parameters also remained at a favorable combination during the season ensuring a good harvest.

The cumulative seasonal rainfall of 2007 *Yala* season was 648 mm, which is a 12% reduction over the long-term average due to below average rainfall in June, which can be attributed to weak southwest monsoonal circulation prevailed. Rainfall during July was below the cumulative potential evapo-transpiration of the month while the rainfall in June was also merely sufficient to meet the evapo-transpiratve demand of the atmosphere. Hence, any late-planted upland crop would have exposed to this unfavorable condition of soil moisture stress.

LOW COUNTRY INTERMEDIATE ZONE

Monaragala (IL1c)

The cumulative seasonal rainfall during 2006/2007 *Maha* was 57% more over its long term average in this region due to good second inter-monsoon and north-east monsoonal rain received in this region. The potential evapo-transpiration remained well below the rainfall during each month of the season, assuring a favorable soil moisture condition for rain-fed upland crops. The state of the other agro-meteorological parameters during the season was also conducive for good crop growth.

The cumulative seasonal rainfall during the 2007 *Yala* season in this region experienced about 89% increase compared to its long-term average. This increase was mainly attributed to the highly active first inter-monsoon rain during April. This would have favored water situation in tanks of this region. Nevertheless, the cumulative potential evapo-transpiration of each month of the season was in excess of the rainfall, except in 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, as this region hardly experience well distributed rain during the *Yala* season.

Girandurukotte (IL2)

The region has experienced above normal rain during 2006/2007 *Maha* season having more than 100 mm of rain in each month of the season, except in February. Meanwhile, the rainfall during both January and February was below the anticipated volume. However, it would not have influenced the crop growth significantly as crops would have reached the maturity stage by that time. Under normal weather pattern, a rain-fed *Yala* season does not exist in this region.

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MID COUNTRY INTERMEDIATE ZONE

Kundasale (IM3a)

The cumulative rainfall during 2006/ 2007 *Maha* season was above its long-term average with a fairly good distribution. Potential evapo-transpiration and other agro-meteorological parameters recorded in this region have also revealed that soil moisture stress was an unlikely event on crops grown in this region.

The cumulative seasonal rainfall of the 2007 *Yala* season was just above the long term average. However, April and June were the only two months during the season which received rainfall in excess of potential evapo-transpiration. Therefore, it would have been impossible to raise a successful rain-fed upland crop without supplementary irrigation.

UP COUNTRY INTERMEDIATE ZONE

Bandarawela (IU3c)

This region experienced an above normal seasonal rainfall during 2006/2007 *Maha* season. The potential evapo-transpiration remained below the rainfall of each month during the season except in February. The maximum temperature during the season ranged from 21 ^{0}C to 26 ^{0}C while the minimum temperature was in the range of 14 ^{0}C to 17 ^{0}C. Availability of sunshine hours during the season was also fairly good throughout the season. In general, it can be concluded that the season was meteorologically conducive for successful crop production.

Cumulative rainfall during 2007 *Yala* season had a 12% increase over the long-term average with an expected amount of rain in each month of the season except in May. The potential evapo-transpiration remained below the rainfall during the season except in May and July. The maximum temperature during the season ranged from 26 ^{0}C to 29 ^{0}C while the minimum temperature was in the range of 12 ^{0}C to 18 ^{0}C.

DRY ZONE

Maha-Illuppallama (DL1b)

The cumulative rainfall during *Maha* season in the north-central part of the DL1b agro-ecological region was 1,024 mm, a value which is almost equal to its long term average. The potential evapo-transpiration also remained below the monthly rainfall during each month of the season except in September. Even though, there was a small reduction of rainfall in December and January, it was sufficient to meet the evapo-transpiration demand of the atmosphere during these two customary cool months.

There was a 26% decrease of cumulative seasonal rainfall during 2007 *Yala* season compared to its long term average of 396 mm. April was the only month during the season which received rainfall in excess of the potential evapo-transpiration, a common agro-meteorological phenomenon experienced in this region. The rest of the season was continued with dry and warm winds which is not an uncommon situation during this time of the year in this region.

Angunakolapelessa (DL1b)

In contrast, the southern part of the DL1b agro-ecological region, experienced about 50% above normal cumulative rainfall during 2006/ 2007 *Maha* season. The surplus was mainly attributed to the above average rainfall of October, December and January. The

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cumulative monthly potential evapo-transpiration of the season remained below the monthly rainfall of each month of the growing season and thus, upland crops grown in this region may not have suffered due to any soil moisture stress.

The cumulative 2007 *Yala* season rainfall in this region was almost equal to its long term average, receiving 417 mm of rainfall for which the contribution from rainfall during April and August was substantial. However, the potential evapo-transpiration remained above the monthly rainfall during the rest of the months of the season. Hence, rain fed upland crops may have suffered due to soil moisture stress during their maturity phase unless the crops were irrigated.

Aralaganwila (DL2b)

The region experienced an above normal rainfall with a favorable distribution. Atmospheric demand for water also remained below the cumulative rainfall of each month during the season. Hence, there was hardly any chance of developing soil moisture stress in crops grown on highlands.

As normally anticipated *Yala* rain of this area was confined to customary convectional type rain in April and the rest of the season was extremely dry with scorching daytime temperature and strong winds, a common weather pattern for the region during the *Yala* season. Under normal weather pattern, cultivation in the *Yala* season does not exist in this region and it remained true for the current season as well.

Weerawila (DL5)

There was about 112% increase in cumulative seasonal rainfall during 2006/2007 *Maha* season with a very good distribution, compared to its long-term average of 720 mm. The cumulative potential evapo-transpiration of each month of the season remained below the cumulative rainfall of each month. Thus, crops grown in this region may not have suffered significant damage due to soil moisture stress.

In contrast the rainfall in this region during *Yala* in its volume and distribution, were not conducive to raise a successful crop. The cumulative seasonal rainfall of the season was 313 mm which is almost equal to its long term average. None of the months of the season, except April received a rainfall of 100 mm threshold value. The cumulative potential evapo-transpiration of each month of the season was much in excess of the cumulative rainfall except in April. A high temperature regime prevailed throughout the season along with intense radiation and high-speed winds. However, being the driest of the country it is not an uncommon weather situation for area during that period of the year.

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Table 1.1. Total rainfall of 2006/07 *maha* and 2007 *yala* seasons (mm)

Agro-met Station	Agro Ecological Zone	*Maha* 2006/07 Sep-Feb	Ten Year Average (1995-04)	*Yala* 2007 Mar-Aug	Ten Year Average (1995-04)
Bombuwela	WL_{1b}	1603.5	1541.9	1656.9	1312.1
Peradeniya	WM_{2b}	1160.9	1037.2	852.7	905.4
Sita-Eliya	WU_{3}	1580.7	1116.2	653.2	821.2
Bathalagoda	IL_{1a}	1455.6	1039.1	647.6	739.4
Makandura	IL_{1a}	1273.3	1033.3	919	895.3
Moneragala	IL_{1c}	1961.1	1252.9	951.6	503.4
Girandurukotte	IL_{2}	2049.4	1680.2	395.3	390.5
Bandarawela	IU_{3c}	1466.9	1036.1	601.6	538.9
Kundasale	IM_{3a}	1048.5	874.6	605.2	594.3
Maha-Illuppallama	DL_{1b}	1024.2	1029.1	293.2	394.9
Angunakolapellessa	DL_{1b}	1128.8	753.4	416.5	403.0
Aralaganwila	DL_{2b}	1640.5	1418.6	395.6	309.5
Weerawila	DL_{5}	1524.8	720.7	312.9	318.2

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Table 1.2. Monthly total rainfall 2006/07 (mm)

Agro-met station	2006				2007							
	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
Bombuwela	205.9	724	423.7	155.8	81.4	12.7	51.7	269.7	570.7	196.4	232.7	335.7
Peradeniya	67.7	392.6	555.2	94.9	48.5	2.0	67	321.8	59.4	181.2	159.1	64.2
Sita-Eliya	123	333.2	501	307.7	292	23.8	36.6	170.5	90.3	220.1	83.2	52.5
Bathalagoda	39.3	625.5	586.2	105.7	55.9	43	25.8	220.8	44.3	250.7	64	42
Makandura	88.2	662.1	475.7	38.8	8.5	0	113	304.7	149.8	125.5	125.4	100.6
Moneragala	83.4	474.3	554.4	384.5	414.5	50	0	734.9	59.5	36.7	100.7	19.8
Girandurukotte	155.2	496.6	564.7	504.3	266.1	62.5	13.5	173.4	31.9	44	125.5	7
Bandarawela	117.8	473.7	438.5	265.6	154.3	17	94.7	253.2	51.3	92.5	29.9	80
Kundasale	90.6	318	391	146.4	93.3	9.2	103.5	208.5	45.4	125.2	90	32.6
Maha-Illuppallama	16.8	244.9	447.3	122	76.4	116.8	66.4	177.3	2.1	11.6	26.4	9.4
Angunakolapellessa	191	343.1	142.8	208.5	234.5	8.9	16.1	178.9	1.4	58.9	24.6	136.6
Aralaganwila	94.1	487.3	464	302.3	173.3	119.5	0.8	215	16.5	98	33.5	31.8
Weerawila	59.5	460.7	280.2	361.9	314.6	47.9	4	155.1	0	39.5	4.6	109.7

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Table 1.3. Monthly average rainfall from 1994-2005 (mm)

Agro-met station	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
Bombuwela	371.8	460.7	320.0	194.7	143.4	138.4	94.9	244.2	353.8	231.5	207.0	153.1
Peradeniya	172.6	262.5	247.4	138.2	84.0	65.0	95.4	246.9	140.3	131.1	122.3	109.2
Sita-Eliya	183.8	240.4	210.4	149.1	93.3	250.3	53.4	168.2	143.7	153.9	136.0	139.3
Bathalagoda	145.9	321.4	254.1	151.2	95.0	71.0	60.6	270.4	171.7	84.9	64.9	74.7
Makandura	181.9	340.0	291.8	91.5	71.1	69.4	67.7	253.2	213.2	138.3	106.1	89.7
Moneragala	108.5	299.0	358.6	230.0	198.5	124.4	67.5	177.9	90.3	31.2	55.4	73.5
Girandurukotte	78.3	186.5	380.1	324.7	362.3	177.1	59.5	162.9	66.2	21.6	30.8	48.7
Bandarawela	161.6	259.8	265.0	162.8	131.9	85.0	76.7	211.2	107.4	36.9	56.5	62.0
Kundasale	106.0	214.2	226.8	139.6	116.4	84.0	68.7	175.4	96.8	80.9	72.2	63.6
Maha-Illuppallama	108.4	260.8	283.4	165.1	109.1	117.1	33.8	185.4	78.7	23.5	21.8	31.4
Angunakolapellessa	111.0	163.9	244.4	100.4	62.2	74.7	71.1	107.5	90.1	44.0	47.3	40.2
Aralaganwila	78.3	234.7	384.1	312.7	274.7	162.9	36.1	122.8	74.2	20.7	34.6	31.8
Weerawila	67.5	124.1	275.7	143.7	79.0	63.7	41.3	120.8	67.2	18.3	28.9	36.7

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Table 1.4. Monthly potential evapotranspiration - 2006/07 (mm)

Agro-met station	2006				2007							
	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
Bombuwela	74	84	50	45	67	83	97	77	79	65	72	62
Peradeniya	89	67	65	84	102	99	131	84	94	74	62	74
Sita-Eliya	55	84	48	40	60	69	126	62	72	55	52	55
Bathalagoda	82	77	65	67	79	85	114	86	102	82	84	89
Makandura	82	89	74	72	94	105	117	96	79	82	77	84
Moneragala	118	99	58	62	77	85	131	53	117	79	102	109
Girandurukotte	89	89	62	42	50	65	94	89	102	86	97	102
Bandarawela	82	55	53	32	52	60	97	60	79	60	82	82
Kundasale	86	74	70	55	72	81	109	60	89	72	67	74
Maha-Illuppallama	106	84	60	50	60	72	99	79	97	98	97	107
Angunakolapellessa	91	89	77	67	92	110	139	91	124	106	122	109
Aralaganwila	127	99	74	64	74	81	92	96	131	115	149	156
Weerawila	106	94	53	74	79	101	126	89	139	101	144	119

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Table 1.5. Maximum and minimum ambient temperature 2006/07 (^{0}C)

Agro-met station	2006								2007															
	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	30.4	24.6	30.4	23.7	30.8	23.2	30.5	22.9	31.3	22.1	31.3	22.3	31.9	23.3	31.8	24.3	31.3	25.5	30.8	25.2	30.5	24.8	30.1	24.3
Peradeniya	30.3	21.3	30.5	21.2	30.2	21.1	27.9	20.9	28.3	20.0	30.9	19.3	33.2	18.5	31.8	21.8	31.3	22.3	29.6	22.4	29.0	22.3	29.5	21.7
Sita-Eliya	19.5	13.0	19.7	12.9	19.8	12.8	17.9	12.0	18.6	9.8	20.3	9.0	22.2	10.3	21.4	12.8	22.1	13.8	19.6	13.8	18.9	13.2	19.1	13.4
Batalagoda	31.9	23.7	31.5	23.3	31.3	23.2	29.3	23.0	29.5	21.5	31.8	20.9	34.6	21.6	33.4	23.9	32.1	24.9	30.9	24.4	30.3	24.5	30.9	24.1
Makandura	31.8	24.2	32.0	23.3	32.7	23.3	30.7	23.0	31.5	21.9	34.0	21.7	35.3	22.9	33.5	24.0	32.5	25.2	31.9	25.0	31.2	24.8	31.3	24.4
Moneragala	35.4	22.6	34.0	21.6	31.4	22.2	29.7	22.0	29.8	21.2	32.3	20.1	35.5	18.6	33.2	22.3	35.5	22.2	34.3	22.9	35.4	21.9	36.1	21.5
Girandurukotte	*	23.1	*	22.8	*	23.3	*	22.3	*	22.0	*	22.0	34.0	20.5	34.5	24.0	36.5	23.9	34.7	24.6	35.4	23.9	35.5	22.8
Bandarawela	26.0	17.1	25.5	15.8	24.1	16.6	21.9	16.0	22.8	14.4	24.8	14.0	27.6	12.5	26.6	17.0	28.4	16.1	26.6	17.4	27.2	16.8	27.2	16.1
Kundasale	30.6	20.4	30.6	20.3	29.7	20.2	27.4	19.3	27.7	18.5	30.2	18.4	32.6	16.7	31.2	20.8	31.1	21.8	29.8	21.6	29.1	21.5	29.7	20.9
Maha-Illuppallama	33.1	24.1	32.2	23.4	30.9	22.9	29.0	21.5	29.2	20.7	31.1	20.5	33.5	20.4	33.2	23.3	33.1	25.4	32.9	24.8	32.6	24.6	33.2	24.5
Angunakolapellessa	31.4	24.1	31.3	23.4	31.3	23.5	30.1	22.8	30.7	21.8	31.9	22.1	33.5	22.4	31.9	24.2	33.6	25.7	32.8	25.2	32.6	24.9	32.2	24.7
Aralaganwila	35.7	*	34.3	*	32.4	*	29.9	*	30.6	*	32.4	*	34.4	*	35.2	*	36.9	*	34.9	23.8	34.4	23.9	35.5	22.8
Weeravila	32.7	24.0	32.4	23.5	31.7	23.6	30.5	23.2	30.8	22.9	32.7	22.6	33.8	22.5	33.0	24.0	34.5	25.1	33.4	24.5	33.9	24.0	32.6	23.3

* - Data Not Available

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Table 1.6. Relative humidity - 2006/2007 (%)

Agro-met Station	2006								2007													
	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	85	78	84	77	84	78	87	76	84	70	82	68	79	69	84	76	84	78	84	77	87	78	86	80
Peradeniya	78	70	82	77	82	77	80	72	75	65	77	51	74	47	84	73	79	72	80	75	81	76	79	70
Sita-Eliya	88	86	89	92	90	94	87	91	78	83	70	81	56	67	84	89	81	85	90	88	93	89	90	83
Batalagoda	79	69	86	73	90	75	85	76	85	70	87	58	84	48	87	65	79	71	82	74	83	74	81	69
Makandura	87	79	89	83	89	83	86	79	87	72	88	70	91	*	88	79	90	83	89	81	86	79	89	81
Moneragala	74	69	79	79	88	89	89	89	84	84	83	75	77	64	88	84	80	69	83	73	81	69	77	65
Girandurukotte	75	55	77	68	88	82	91	83	92	75	87	65	82	52	84	61	73	53	73	55	68	54	73	49
Bandarawela	70	70	79	79	85	85	88	85	84	76	83	72	63	49	83	76	69	70	74	72	71	63	70	63
Kundasale	72	64	79	69	86	77	84	75	82	67	79	52	74	39	86	65	75	64	77	71	79	72	74	64
Maha-Illuppallama	75	57	82	68	88	78	88	75	88	69	86	60	81	49	84	65	79	63	78	61	77	57	77	55
Angunakolapellessa	83	74	83	76	85	79	88	76	85	72	83	67	80	66	84	77	81	73	83	76	79	69	82	73
Aralaganwila	68	53	73	65	87	77	87	77	87	72	86	65	83	53	83	67	69	51	71	57	68	56	68	54
Weeravila	78	69	81	72	86	79	86	79	83	72	80	63	87	63	82	74	74	65	76	70	74	64	77	69

M - Reading at 8.30 hours

E - Reading at 15.30 hours

* - Data not available

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Table 1.7. Bright sunshine hours per day -2006/07

Agro-met Station	2006				2007							
	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
Bombuwela	6.0	7.0	6.8	4.5	7.4	8.5	8.9	6.7	7.2	5.0	7.2	6.5
Peradeniya	6.8	5.3	5.1	4.3	6.2	8.6	8.8	6.4	8.4	5.1	4.5	5.7
Sita-Eliya	3.7	3.5	3.3	2.7	5.1	8.1	9.0	5.1	6.1	3.5	3.7	4.7
Batalagoda	6.6	5.9	6.1	4.6	6.5	8.9	9.6	7.3	8.4	5.2	5.9	6.7
Makandura	*	*	*	*	*	*	*	*	*	*	*	*
Moneragala	*	*	*	*	*	*	*	*	*	*	*	*
Girandurukotte	6.7	6.0	4.2	1.8	3.5	6.3	8.0	6.1	7.0	4.1	5.1	7.1
Bandarawela	5.3	4.1	3.5	2.1	4.6	6.0	8.3	5.3	7.5	4.9	6.8	6.7
Kundasale	6.7	5.1	4.7	3.5	5.7	8.5	8.6	6.0	7.9	4.1	4.3	5.6
Maha-Illuppallama	7.6	6.6	6.3	4.2	6.5	8.9	9.8	7.9	9.5	6.0	7.7	8.3
Angunakolapellessa	*	*	*	*	*	*	*	*	*	*	*	*
Aralaganwila	7.8	7.0	5.5	3.5	6.3	8.6	9.6	7.6	10.1	6.8	8.6	8.8
Weerawila	7.1	6.4	6.0	4.4	7.0	8.8	9.5	6.7	8.7	4.7	6.4	7.4

* - Data not available

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Table 1.8. Wind velocity - 2006/07 (km/h)

Agro-met station	2006				2007							
	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.
Bombuwela	3.7	2.9	1.8	0.9	1.4	2.3	2.9	2.2	3.7	2.8	2.6	2.9
Peradeniya	1.2	0.8	1.3	4.2	5.7	3.7	2.0	1.0	1.4	1.7	1.3	1.4
Sita-Eliya	14.1	8.6	6.2	9.3	10.2	5.7	7.9	5.9	9.3	16.1	15.6	14.4
Batalagoda	7.6	4.5	3.1	5.2	5.1	3.8	3.7	3.1	7.5	7.7	7.8	7.6
Makandura	5.4	3.9	3.0	5.3	5.8	4.7	3.8	3.4	4.9	5.3	5.9	5.8
Moneragala	2.8	1.9	1.5	2.5	2.9	2.2	2.1	1.2	1.6	1.3	1.4	1.8
Girandurukotte	1.7	1.3	0.9	0.8	0.9	1.1	1.1	1.4	1.3	2.4	1.9	1.8
Bandarawela	6.3	3.4	2.8	3.4	3.8	3.5	3.9	3.0	3.5	4.8	4.5	5.1
Kundasale	1.8	1.1	0.8	0.9	1.7	1.9	2.1	1.6	2.8	3.4	2.7	2.4
Maha-Illuppallama	8.3	5.4	4.0	6.1	6.4	5.0	4.2	3.5	8.0	8.3	9.1	9.0
Angunakolapellessa	4.7	3.2	2.6	4.1	5.2	4.3	4.0	2.8	6.1	5.9	6.6	6.0
Aralaganwila	3.3	2.6	2.1	2.7	2.8	2.6	2.4	2.1	3.3	4.4	5.3	4.1
Weeravila	6.5	3.7	1.7	3.5	4.0	3.0	2.8	1.7	5.7	6.1	8.3	7.3

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2.1 FIELD CROP RESEARCH AND DEVELOPMENT INSTITUTE (FCRDI) -MAHA ILLUPPALLAMA

The mandate of FCRDI, Mahailluppalama is to undertake demand driven research, develop improved technologies on condiments, grain legumes, oil seed crops, coarse grains, regionally important fruits and vegetables and collaborate with government and non government extension organizations to disseminate the technologies to increase other field crop (OFC) production in the country with special attention to the Dry Zone.

Guided by the Ten Year Horizon Development Framework based on the vision of Mahinda Chinthanaya, present research programmes of the FCRDI are focused on development of high yielding, good quality OFC varieties, improved crop management practices, crop protection techniques, plant nutrition management strategies, planting material production, contribution to regionally equitable economic growth, rural livelihood improvement, development of agro-based industries and food security.

BUDGET

Allocations received and the expenditure incurred under different votes and projects are given in the Table 2.1.1.

Table 2.1.1: Annual budget – 2007 (Rs.)

Vote	Allocation	Expenditure
Capital	4,378,350.00	3,345 823.47
Recurrent	21,013,301.30	16,179,099.67
Other Investment	38,594,400.00	35,625,700.00
Buildings / Constructions	1,300,500.00	289,523 .73
Purchasing of Machinery	8,70,000.00	4,676,612.75
CARP Project 12 / 558 / 451	577,680.00	334,361.20
CARP Project 12 / 667 / 500	490,000.00	266,058.84
Organic Farming for Export Project 285-02-03-3-2501	300,000.00	211,638.00
Hybrid Variety Development, Seed Production of Local Maize Hybrid *Sampath* Project 285-02-02-3-2502	1,367,500.00	238,320.00
Crop Zoning Project 148-2-3-8-2502/HORDI/MI	500,000.00	205,584.00
Production of Quality Planting Materials for Dry Zone Fruit Cultivation Project REAP 6000-0-3-42	870,000.00	720,453.06
Total	**78,061,731.00**	**62,093,274.72**

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PROJECTS

CARP Projects

1. Project 12 / 558 / 451 on evaluation of corn genotypes for resistance to *Aspergillus* ear rot, kernel infection and aflatoxin detection
2. Project 12 / 667 / 500 on development of agronomic package for hybrid maize variety *Sampath* developed in Sri Lanka"

Other Projects

1. Project 285-02-03-3-2501 on organic farming for export
2. Special project 285-02-02-3-2502 on hybrid variety development, seed production of local maize hybrid *Sampath*
3. Project 148-2-3-8-2502/HORDI/MI on Crop Zoning
4. Project REAP 6000-0-3-42 on production of quality planting materials for Dry Zone fruit cultivation

PROGRESS

CROP IMPROVEMENT

Coarse Grains

- **Maize**

Five Quality Protein Maize (QPM) hybrids, developed from exotic lines that recorded a yield of more than 7 mt/ha were selected. These lines are being tested in farmer fields.

Eight promising maize hybrids were selected from 35 hybrids developed with local inbred lines for inclusion in Advanced Yield Trials.

Eleven Super Sweet hybrids were selected from 30 hybrids that were developed locally from exotic lines. These hybrids will be tested in Advanced Yield Trials.

Testing of locally developed sweet and pop corn hybrids are continued. Steps have been taken to multiply the seeds.

- **Finger Millets**

A new finger millet variety, *Oshadha* that showed high resistance to Blast disease was released in 2007 for general cultivation. The variety was selected from local accessions and recorded a high yield over the existing varieties *Ravi* and *Rawana* during maha season

Condiments

- **Chilli**

Two newly improved chilli breeding lines were selected for inclusion in Variety Adaptability Trials and seeds of these lines were given to Seed Certification Service for 'DUS' testing.

Line No. 9874 is high yielding with long pod type which is suitable for both green and dry chilli production. It is ready to be submitted for Varietal Releasing Committee in 2008.

- **Onion**

Newly improved big onion line *Pusa Red MI* was tested in farmer fields in Dambulla, Galewela and Anuradhapura area. The variety is ready for releasing in the year 2009.

A new big onion line was selected for inclusion in National Coordinated Varietal Trials.Three entries of multiplier type and three entries of shallot type, two entries of seed setting type red onion were selected for inclusion in Variety Adaptability Trials.

Grain Legumes

- **Mungbean**

Two mungbean land races were tested in a Variety Adaptability Trial and these lines

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were given to Seed Certification Service for DUS testing.

Five newly improved mungbean breeding lines were included in the National Coordinated Varietal Trial.

- **Blackgram**

Short-duration (55-60 days) blackgram lines have been selected. Seed samples of the lines were given to Food Research Unit for processing quality tests.

- **Soybean**

Seven soybean germplasm were evaluated for yield and other agronomic characters. Four germplasm were selected for testing in Preliminary Yield Trial.

Six germplasm were selected on the basis of seed size, seed colour and yield, which are suitable for provender industry.

- **Chickpea**

Four chickpea lines are being tested in farmer fields.

Oil crops

- **Groundnut**

Four medium-duration groundnut lines with large-seeds were selected for testing in National Coordinated Varietal Trials.

Vegetables

- **Okra**

Two okra breeding lines with more than 14 mt/ha of yield were selected. These lines showed high tolerance to yellow vein mosaic virus.

Three locally developed okra breeding lines were selected. These lines have recorded a yield advantage of 14-20% over the recommended variety *Haritha*.

- **Tomato**

A heat tolerant large-fruited tomato line with the yield of 30 mt/ha was identified.

- **Yard Long Bean**

Two high yielding yard long bean were identified.

- **Vegetable Cowpea**

Two high yielding vegetable cowpea lines were selected.

Fruits

- **Guava**

A soft-seeded guava cultivar which was found from a farmer field was planted to investigate its yield performance.

- **Papaw**

In papaya hybridization program, nine parental lines were selected from variety Rathna and local selections. Twelve crosses were made using these lines.

AGRONOMY

Maize

Two separate crop management packages are ready to be introduced to farmers for the cultivation of hybrid maize under rain fed and irrigated conditions.

Chilli

Different Nitrogen fertilizer rates were tested for green chilli production. Results indicated that green chilli yield has increased by 85% with increasing Nitrogen fertilizer from the DOA recommended level (150 N kg /ha) to 450 N kg / ha.

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Finger millet

Major constraints on finger millet production during yala season are pest and disease problems. An experiment showed that the best time period for planting of finger millet in yala season is from March to mid June in order to reduce pest and disease damage and increase the yield.

Chickpea

A crop management package for chickpea was recommended.

SOIL AND WATER MANAGEMENT

Soil fertility

- It was found that vegetable cowpea crop residue could be used as an in-situ green manure in crop production. The application of the crop residues together with a fraction of inorganic fertilizer is found to be adequate for crop nutrient requirement.
- It was observed that the crop yield of chilli was found to be enhanced due to application of compost made out organic residues taken from the tank.
- Recommended urea level (325 kg/ha) for maize could be reduced to 225 kg/ha by incorporating Gliricidia leaves to the soil.
- It was found that there was no significant difference in the growth and yield of maize due to application of urea in prilled and granular forms.

CROP PROTECTION

Entomology

- **Onion**

Three new insecticides *Emamectin benzoate 5SG, Metaflumizone 24SC, Chromafenozide 5SC* were identified as effective against a new pest outbreak in onion in Dambulla. The pest was identified as a devastating leaf eating caterpillar (*Spodoptera exigua*).

- **Chilli**

Yellow traps placed at 0.5 m or 1 m were found to reduce the leaf curl damage in chilli by around 45 %; insecticides *Imidacloprid* 20 OD, *Imidacloprid* 70%, *Imidacloprid* 20SC-Bayer and *Imidacloprid* 20SC- Chinese were found to be effective in controlling leaf curl complex in chilli.

- **Maize**

All cultivated maize varieties were damaged by stem borers and aphids. Stem borer damage was fund to be high in Chinese maize hybrid variety Deng Hi Zing (around 60% damage) compared to the other tested varieties (around 20%).

- **Cowpea**

Two new insecticides *Imamectin Benzoate 5SG* and *Thiocyclon Hydrogen Oxalate 50SP* and already recommended *Novaluron 10EC* were identified as effective against cowpea pod borers.

Pathology

- **Banana**

Yellowing of young *kolikuttu* banana fruits was reported from Mahaweli

H' area and it was identified as anthracnose disease caused by *Colletotrichum* spp.

- **Maize**

A destructive fungal disease with rusty appearance was observed in hybrid maize variety "Deng Hi Zing" for the first time in Sri Lanka during 'maha 2006/07 season. The

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symptoms appeared in early January 2007 when the crop was at the reproductive stage and the pathogen was identified as fungus *Puccinia poysora.*

- **Chilli**

Fungicides *Champion* and *Champ* DP controlled significantly the disease incidence and severity of leaf curl over the control. The crop treated with *Champion* gave the highest yield of 1033 kg/ha compared to that of both the control and the plots treated with other fungicides.

DEVELOPMENT ACTIVITIES

Breeder Seed Production

FCRDI produced and supplied breeder seeds of 24 recommended crop varieties during the year 2007 to assist seed production program of Department of Agriculture. Those varieties were from the crops of maize, finger millet, chilli, mungbean, blackgram, soybean, cowpea, pigeon pea, groundnut, snake gourd, vegetable cowpea, melon and papaw.

Soil Testing Program

About 25 soil samples of upland and paddy soils from Anuradhapura area were analyzed and soil test based fertilizer and organic matter recommendations were made during 2007.

Technical Advice

Received 33 diseased plant samples for diagnosis. Officers visited about 25 farmer fields on request and farmers were given necessary advice to manage the diseases.

About 40 insect damaged plant samples were submitted by farmers. Officers visited about 15 farmer fields on request and farmers were given necessary advice to manage the pests.

TECHNOLOGY TRANSFER

Training programmes, Lectures, Work shops and Plant clinics

Conducted 18 training programmes for farmers and officers (550 participants); provided resource persons for 121 technology dissemination programmes including training programmes, lectures, work shops and plant clinics; about 470 university students from 4 universities and 930 school children from 19 schools visited the Institute and participated in various technology dissemination activities.

The FCRDI Conducted 2 "Field Day" programmes on 22 / 01 / 2007 and 06 / 02 / 2007 for officers and farmers, to disseminate technical information emanating from on going research activities. A total of 108 invitees participated in the programmes; organized the "National Farmers' Day" Programme and the Exhibition (12-16 October 2007) at FCRDI, Mahailluppallama on the theme "Agricultural Mechanization". Each day of the exhibition was focused on a specific topic such as Farmers' Day, Farm Women' Day, Young Farm Organization Day, School Children Day and World Food Day etc, and accordingly numerous activities were organized specifically relevant for each day.

A number of government, semi government and private organizations participated at the exhibition where agricultural mechanization had a prominent place.

A demonstration area for field crops had 23 exhibition plots with different field crop varieties, which had been developed or introduced by FCRDI, Mahailluppalama and also fruit and vegetable crops cultivated in the region. Best crop management practices in agronomy, soil fertility improving and soil and water conservation, and farm machinery

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developed by FMRC, Mahailluppalama were also included in the demonstrations.

The exhibition field guide booklet having important take home messages on crop management, *"Obe Govibimata Apen Athwelak"* was published and distributed during the exhibition. A booklet of 100 different delicious food menus of field crops was published and distributed during Farm Women's Day. Leaflets on important crop management aspects of field crops and fruit and vegetable crops commonly cultivated in the region were published and distributed (30 categories) under the programme.

Radio Programmes

- "Successfully controlling of chilli leaf curl in *yala* season" – K. N. C. Gunawardane, "Rupavahini & Radio Farmer Broadcasting Service, *Rajarata* Unit", 08 / 05 / 2007
- "Important agronomic facts that should be concerned in maize cultivation in *yala* season" – K. M. Karunaratne, "Rupavahini & Radio Farmer Broadcasting Service, *Rajarata* Unit", 08 / 05 / 2007
- "Agronomic information in plant selection and planting of big onion"- K. G. S. Seneviratne, "Rupavahini & Radio Farmer Broadcasting Service, *Rajarata* Unit", 08 / 05 / 2007
- "Controlling of fruit fly in the home garden" – S. G. Piyadasa, "Rupavahini & Radio Farmer Broadcasting Service, *Rajarata* Unit", 08 / 05 / 2007
- "Reasons for browning of fleshy part of ripen banana" – S. G. Piyadasa, "Rupavahini & Radio Farmer Broadcasting Service, *Rajarata* Unit", 08 / 05 / 2007

TV Programmes

"The role of Field Crops Research & Development Institute, Mahailluppalama" – "Ritzbury Journey Day", 12 / 01 / 2007

PLAN FOR 2008

Research

Condiments

* Production of new crosses for chilli hybrids and evaluation of newly developed hybrids
* Evaluation of chilli germplasm, selection, purification and seed multiplication of promising lines and regionally important chilli land races
* Wide hybridization to incorporate thrips resistant/tolerant characters for promising lines
* VAT for promising chilli breeding lines
* Screening of fungicides for CLS, Blossom blight and Anthracnose in chilli
* Identification of hosts harbouring major chilli viruses (CLC, CMV)
* Studies on development and management of fungicidal resistance in chilli and onion major pathogens
* Testing of insecticides to control leaf curl complex in chilli
* Survey on present status of pest control to control leaf curl complex in chilli
* Effect of different Nitrogen rates on yield of green chilli under irrigated conditions in yala season
* Comparison of green chilli and dry chilli yield on the effect of flower induction and pod yield
* Yield evaluation and adaptability testing of improved big onion variety in major growing areas
* Varietal evaluation of big onion for high yield, seed setting ability and storability

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* Development of an improved big onion variety from the variety Rampure
* Development of seeds and bulbs for the above studies
* VAT – red onion
* Control of bulb rot disease in big onion

Grain Legumes

* Development of high yielding pest and drought tolerant mungbean varieties with high consumer acceptability for rain-fed and irrigated conditions
* NCVT for promising mungbean breeding lines
* Evaluation of mungbean germplasm, selection, purification and seed multiplication of promising accessions
* NCVT cum VAT for promising mungbean selections
* Hybridization and selection programme for mungbean and preliminary yield trials for advanced generations
* Studies on improvement of quality (reduce hard seed content) of mungbean seed harvest (collaborative research with University of Peradeniya)
* PYT for promising blackgram breeding lines
* Germplasm evaluation, purification and seed multiplication of promising accessions and hybridization and selection programme for blackgram.
* Production of package and practices for short age blackgram breeding lines
* Studies on processing qualities of newly developed blackgram lines
* Evaluation of cowpea germplasm
* VAT of cowpea
* Screening of insecticides against pod borers in grain legumes (cowpea)
* Testing of insecticides against pod sucking bugs in grain legumes (cowpea)
* Evaluation of exotic soybean germplasm suitable for poultry feed production
* Evaluation exotic soybean germplasm for yield and other agronomic characters
* Hybridization and selection of soybean
* Seed multiplication of promising varieties of chickpea
* Introduction of chick pea crop for the home gardens
* Testing of different seed rates for black gram broadcasting under rain-fed in farmer fields

Oil Seeds

* NCVT of confectionary type groundnut
* Study of germination of confectionary type groundnut under ambient storage conditions
* Seed multiplication of promising lines of confectionary type groundnut
* Seed multiplication of promising sunflower varieties

Coarse Grains

* Evaluation of QPM hybrids
* Evaluation of new maize hybrids
* Evaluation of promising hybrids developed with local inbred lines
* Development of popcorn and sweet corn hybrids
* Seed multiplication of parents and hybrids
* Evaluation of super sweet hybrids of maize
* Evaluation of developed maize hybrids for Aspergillus resistance
* Evaluation of exotic hybrids in farmer fields
* Comparison of physiological traits of hybrids and OPVs

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* Evaluation of QPM hybrids in VAT
* Screening maize varieties against rust
* Identification of diseases in hybrid maize at farmer's field
* Testing the biological and chemical control integration methods for the control of collar rot in maize
* Studies on micro flora associated with hybrid maize seeds
* Studies on aflatoxin producing fungus and their strains
* Evaluation of exotic hybrids in farmer fields
* Evaluation of new finger millet germplasm in PYT
* Effect of direct seeding and row planting on growth and yield of finger millet (Oshadha) under rain fed condition in upland farmer fields
* Maintenance of promising sorghum germplasm
* Evaluation of chemical weeding for finger millet
* Development of an agronomic package for hybrid maize
* Development of an agronomic package for hybrid maize
* Nitrogen fertilizer study for hybrid maize grown at high plant density

Vegetables

* Varietal improvement of okra for resistance/tolerance to yellow vein mosaic virus (YVMV) with high yield and acceptable fruit quality
* NCVT on promising lines of okra
* Varietal evaluation of okra and selection of suitable varieties for hybrid development programme
* Evaluation of newly developed Brinjal hybrids under dry zone condition (NCVT)
* VAT of okra
* VAT of Brinjal
* VAT of mae
* NCVT on promising line of vegetable cowpea
* Evaluation of promising capsicum hybrids (NCVT)
* Evaluation of promising bitter gourd hybrids (NCVT)
* Preliminary studies on organic vegetable cultivation
* Varietal evaluation of tomato for heat tolerance
* NCVT on promising lines of tomato
* VAT of tomato
* Comparison of farmer adopted closer spacing with recommended spacing of okra on the yield and growth
* Effect of removing pod with leaf on the yield and pod characters of okra comparing with normal harvesting method
* VAT of pole-mae for yield and quality
* Varietal screening of commercially cultivating varieties of cucurbitacea family for CMV /CGMMV

Fruits

* Maintenance of grapes germplasm
* Wood apple varietal evaluation
* Varietal evaluation of guava - Observational
* Establishment and maintenance of mother plants of three grapes varieties
* Varietal development of papaya
* Maintenance of mango germplasm
* Evaluation of high density mango planting
* Evaluation of grape vine training systems
* Establishment of a demonstration block of dragon fruit
* Establishment of a demonstration block

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of pineapple

* Establishment of a demonstration block of drumstick
* Identification of suitable spacing for *Aloe vera* (Observational)

Rice

* NCVRT for 3, 3 1/2 and 4 – 4 1/2 months age groups
* VAT of rice varieties with different age groups in farmers' fields
* National Co-coordinated Herbicide Screening Test for wet seeded rice

Breeders' Seed Production

* Breeders seed production of recommended varieties of chilli (MI2, KA2 and MI Hot)
* Breeders seed production of recommended varieties of maize (Aruna and Ruwan and parental lines)
* Breeders seed production of recommended finger millet varieties of Ravi and Rawana
* Purity maintenance and breeders seed production of mungbean varieties of MI 5, MI 6 and *Ari*
* Purity maintenance and breeders seed production of black gram variety MI 1
* Purity maintenance and breeder seed production of snake gourd (MI short).
* Purity maintenance and breeders seed production of bitter gourd
* Purity maintenance and breeder seed production of vegetable cowpea
* Purity maintenance and breeder seed production of okra
* Breeders seed production of recommended varieties of groundnut (Walawa, Tissa and Indi)
* Purification of sesame (MI 3)
* Breeders seed production of recommended varieties of cowpea (Dhawala, MI 35, Wijaya,Waruni and Bombay)
* Breeders seed production of recommended varieties of soybean (PB 1 and PM 13)
* Breeders seed production of recommended varieties of papaya (Ratna)
* Breeders seed production of recommended varieties of melon (Thilini)

Weed Science

* Population study on the water hyacinth biological control agent *Neochetina bruchi* under dry zone condition
* Evaluation of chemical weeding for finger millet

Soil Fertility, Fertilizers and Environment

* Long term fertility monitoring programme in rice-OFC cropping system
* Study the soil properties and crop response of OFC in relation to organic manure levels
* Study the effect of gliricidia leaf extract on growth and yield of chilli
* Effect of rock phosphate on growth and yield of blackgram under organic farming situations
* Identification of suitable nitrogen fertilizer (urea) level with organic manure for optimum yield of maize
* Identification of suitable integrated plant nutrient (N) management system for chilli
* Evaluation of soil nitrogen supplying ability of gliricidia for maize
* Testing of Bio products
* Soil testing programme
* Technology dissemination activities under organic farming programme in farmer fields

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Water Management

* Study of drip fertigation system for chilli and maize
* Performance of micro sprinkler system for onion crop
* Study of different mulches on crop water requirement for onion crop
* Study of crop water requirements for hybrid maize
* Evaluation of soil water distribution pattern in RBE soil under drip irrigation system

Food Technology

* Survey on post harvest handling practices of OFC farmers to identify the causes of losses in quality and quantity
* Select suitable varieties for production of 'Jumbo peanut' from large seeded varieties
* Development of peanut butter
* Development of snacks and bakery products from groundnut
* Development of quick cooking pulses
* Determination of anti-nutritional factors of legumes
* Determination of protein quality of quality protein maize varieties
* Study of glycemic response of minor millet to determine the health value
* Studies on processing qualities of newly developed black gram varieties

Technology Dissemination Activities

- Technology transfer through monthly farmer awareness programmes
- Exchanging information through PTWG, working group meetings and other seasonal review meetings
- Technology dissemination by seminars, training programmes, workshops, plant clinics, field days, field demonstrations, exhibitions and technical advices
- Publishing scientific articles in news papers and participation in TV and Radio programmes

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2.1.1 FARM MECHANIZATION RESEARCH CENTRE (FMRC)- MAHA ILLUPPALLAMA

Farm Mechanization Research Centre (FMRC) has been established to promote appropriate farm mechanization in Sri Lanka by introducing farm mechanization technology to reduce cost of production, improve quality enhance productivity and increase volume of agricultural products. The Institute is presently attached to the Field Crops Research & Development Institute Maha- Illuppallama. FMRC is the National Focal Institute for Asia Pacific Centre for Agricultural Engineering and Mechanization (APCAEM) of UNESCAP and the Secretariat for the National Farm Mechanization Committee (NFMC) of the country.

The major activities of FMRC are related to aspects of identification, designing, development, testing, evaluation and introduction of appropriate machinery suitable for Sri Lankan conditions and promotion of production of such machinery locally whenever feasible.

Technical Sections

The FMRC has following sections to scruitinize all implements during their development or induction process:

1. *Research & Development Section (R &D)*

   Designs machinery and produces prototypes.

2. *Industrial Extension Section*

   Conducts training and assist local manufacturers in production of agricultural implements.

3. *Testing & Evaluation Section*

   Tests machinery developed by the FMRC as well as machinery imported or locally manufactured by the private sector.

4. *Agricultural Extension Section*

   Introduces new machinery and technology to the farmers through the demonstrations, exhibitions etc.

5. *Irrigation & Water Management Section*

   Develops and introduces low cost, effective micro irrigation systems and educates the farmer on how to manage limited water resources for agriculture.

6. *Adaptive Research section*

   Conducts trials at different locations under numerous soil and farming conditions to find out the suitability and performance of new machinery.

7. *Analysis section*

   Conducts research and experiments to evaluate the impact and effect of machinery on crops as well as their operators.

BUDGET

The allocations and expenditure under different votes for 2007 are given in table 2.1.1.1.

Table 2.1.1.1 Annual budget -2007 (Rs.)

Vote	Allocation	Expenditure
Recurrent	2,209,000.00	1,698,048.84
Capital	1,475,000.00	675,735.50
Total	8,684,000.00	2,373,784.34

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PROGRESS

RESEARCH & DEVELOPMENT (R & D) / WORKSHOP & INDUSTRIAL EXTENSION

- **Power operated groundnut Decorticator**

Developed a more efficient modified combined machine which is capable of simultaneous hulling, separation and cleaning of seeds with a capacity of 50-60 kg of output per hour.

- **Tractor Coupled High Land seeder**

Developed an improved two wheel tractor operated new highland seeder that can be used for seeding of all OFC crops and in particular more suitable in maize seeding.

- **Power Weeder**

Introduced a new power operated weeder to increase the efficiency of weeding and to reduce drudgery associated with manual and mechanical methods of the operation.

- **Modified Fruit Harvesting and Pruning Tools**

Developed a set of simple and convenient fruit harvesting and pruning tools to minimize harvesting losses; these tools can be used to harvest fruits such as mango, avocado, rambutan etc. The pruning tools can be used effectively to cut and collect scions for budding as well.

- **Low Land Drum Seeder**

Developed a manually operated lowland rice seeder to reduce seed losses; this can be used for row sowing to facilitate eventual cultural operations such as weeding, that will ultimately reduce cost of production.

TESTING & EVALUATION

Following machineries were tested and evaluated their performance to verify manufacture's specifications and adaptability and issued test reports were issued.

Table 2.1.1.2 Machinery tested during the year 2007

Type of machine	Country of origin	Number of machines tested
Two Wheel tractor	India	01
Two Wheel tractors	Peoples Republic of China	04
Four Wheel Tractor	India	01
Hand Sprayer	Sri Lanka	01
Hand Sprayer	Peoples Republic of China	01
Power Sprayers	Peoples Republic of China	02
Water Pump	Japan	01
Water Pumps	Peoples Republic of China	04
Water Pumps	India	04
Water Pump	Sri Lanka	01
Brush cutter	Peoples Republic of China	01
Brush cutter	Democratic Republic of Korea	01

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ADAPTIVE RESEARCH

Adaptability trials were carried out in various parts of the country to ascertain the suitability, general performance and the working capacity of the machinery submitted for testing.

ANALYTICAL WORK

Analytical work was carried out to find out the suitability of different crops such as maize, manioc etc. to produce ethanol as a low cost bio fuel. Also a small scale multi purpose metallic bio gas digester digester, in the volume of 478 cu. Inches, was developed to produce naturally occurring carbon dioxide and methane (bio gas), which can be utilized as fuel particulary for domestic purposes.

AGRICULTURAL EXTENSION

A large number of people including undergraduates, farmers, teachers, students and technical college staff visited to the Centre for training and studies; field demonstration and technical guidance sessions for farmers and other clients during the farmers' week (*govi sathiya*)held at the Field Crops Research & Development Institute, Maha illuppallama.

OTHER ACTIVITIES

1. Prepared and issued 22 specifications, as requested, for different institutions islanwide on verification of the technical requirements.
2. Issued 12 technical evaluation reports with technical committee approval to purchase suitable instruments and machinery for both public and private sector institutions.
3. Provided technical support to other institutions pertaining to vehicle repairs, procurement of machinery, equipment an vehicle spare parts and issued appropriate recommendations on 155 occasions.

OTHER SUPORTING SERVICES

1. Prepared and issued 22 specifications for different institutes island wide by verifying the technical requirements as a response to the requesting centers.
2. 12 number of technical Evaluation reports were issued with a technical committee approval to purchase suitable instruments / machineries for both government and private centers and departments.
3. FMRC gives technical guidance to other institutes regarding vehicle repairs, purchasing machineries and vehicle parts and issues certificates including relevant repair recommendations, price estimation recommendations and justification of quotations. Within this year FMRC was able to provide their technical support successfully to 155 cases.

PLAN FOR 2008

- Further Development and improvement of high capacity thresher driven by 12hp, two wheel tractor.
- Development of motorized rice transplanter.
- Development of mechanized low land weeder.
- Development of high land seeder.
- Development of tractor coupled potato digger.
- Design and development of bund plastering machine.
- Development of low land conical–drum seeder.
- Development of mobile bio gas system.
- Design and development of high land drum seeder for sesame and kurakkan.
- Development of maize thresher.
- Development of hydro tiller.
- Development of low cost bio fuels using different plant materials.

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2.1.2 GRAIN LEGUME AND OIL CROP RESEARCH AND DEVELOPMENT CENTRE (GLORDC)-ANGUNAKOLAPELLASSA

The mandate of the GLORDC is to conduct research and development on the aspects of crop improvement, agronomy, plant protection, plant nutrition, soil and water management related to grain legumes and oil crops. Also it conducts research and development activities on vegetable and fruit crops, which are commonly cultivated in the region. Other important development activities carried out by this Centre include production of breeder seeds and basic planting materials, recommendation of site specific fertilizer application and dissemination of technical information to the field officers and farmers.

BUDGET

The total budget allocation and expenditure of the Centre under different votes during the year 2007, are given in the table 2.1.2.1.

Table 2.1.2.1: Annual budget - 2007 (Rs.)

Vote	Allocation	Expenditure
Capital	3,793,125.00	3,539,525.88
Recurrent	5,913,000. 00	5,865,004.87
Projects		
* Other investment	7,138,000.00	6,522,729.11
* Seed production	2,000,000.00	115,600.00
* Organic crop production	2,000,000.00	154,406.00

Infrastructure Development

Activities on land development, improvement of irrigation and drainage systems and rehabilitation of roads in the research station were carried out during the year for improving the infrastructure to facilitate field and laboratory research work.

PROGRESS

CROP IMPROVEMENT

OIL SEED CROPS

Groundnut

- Conducted field trials to evaluate different varieties. It was observed that farmers in the area preferred to grow red testa groundnut due to better demand and high price offered for such varieties. Considering this fact, a short duration red testa variety suitable for rain fed cultivation was developed by the Centre.
- Bud Necrosis Disease (BND), transmitted by thrips, was found to be one of the major diseases in groundnut. A number of botanicals were screened to find out a suitable environmental friendly bio-insecticide to control the disease; the experiment is being continued further.

Sesame

- White seeded sesame varieties have a high demand. Several varieties, hence, were evaluated for yield and quality. Four mutant varieties with white seed coat color have been selected for further evaluation.

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- The major pest of sesame is leaf and pod webber. To find out a suitable environment friendly insecticide to control the pests, an experiment to screen botanicals was initiated; the experiment is being continued further.

Sunflower

- An open pollinated variety, named "*Hiru*" was multiplied for further purification; about 15 kg of seeds were produced.

Mustard

- Mustard germplasm (31 accessions), received from PGRC, were evaluated for yield and other favorable traits; screening will be continued further.

Castor

- Since there is no recommended variety by the DOA, a trial was conducted to evaluate several local varieties for their seed size and yield; two lines have been identified and about 70 kg of their seeds were produced for further multiplication.

Soya bean

- Three Soya bean varieties namely PB – I, PM – 13 and PM – 25 were multiplied to popularize Soya bean cultivation in the Hambantota District.

GRAIN LEGUMES

Cowpea

- Cowpea germplasm (18 accessions) received from PGRC were evaluated in the field to identify better accessions to be included in the future crop improvement program.

- A trial was conducted to test the effectiveness and applicability of IPM techniques for controlling the pod borer, the most serious pest in cowpea in the area; it will be continued further.

Green gram

- Four (4) green gram lines were selected from introductions (mutant lines), and those were evaluated in NCVT and VAT for their suitability for the Dry Zone conditions.

- Studies on moisture stress on hard seed formation of green gram are being continued.

- Twenty five (25) germplasm accessions were evaluated under field conditions to identify potential characteristics, which may be included in the breeding programme to improve the quality and productivity of the crop.

Black gram

- Seeds of variety MI – 1 were multiplied with the aim of popularizing black gram, a crop, which is ideally suitable for cultivation under semi arid conditions prevailing in the Hambantota District.

Horse gram *(Kollu)*

- *Kollu* is a grain legume, suitable for cultivation under arid conditions, which has potential not only for human food and animal feed but also as an ingredient in herbal medicine as well. Since, there is no variety released for cultivation, field evaluation studies were initiated to identify a local *kollu* variety.

VEGETABLES

Thumba Karavila

- Four trellising systems for *thumba karawila* were tested and the trial will be continued.

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FRUITS

Grapes

- A survey was conducted to find out the cost of cultivation of grapes in Hambanthota District. It was observed, according to the findings of the survey, the Geneva double curtain system was the most popular and profitable cultivation system out of four methods surveyed.

Medicinal Arboretum

- Medicinal plants, considered as a renewable natural resource, has an important place in the livelyhood of the rural community. To highlight the aspects of their cultivation and sustainable utilization, an arboretum of 1 ha in extent was established for future research and demonstration activities.

Data Base on Mandate Crops of GLORDC: Collection of Secondary Data

- Statistics on cultivated extents, production, export, import and price fluctuation pertaining to crops of sesame, ground nut, green gram, cowpea, maize, banana, papaw, grapes and other vegetables that are important for the region were collected up to yala 2006.

Land and Water Management

- A soil conservation demonstration site, which was established by NRMC, Peradeniya, will be utilized for continuously disseminating the recommended practices on land and water management to farmers and others.

SOIL FERTILITY

- **Performance of Chilli in Saline Conditions**

An experiment was conducted to evaluate yield performance of chilli, under different salinity levels; the trial is being continued.

Breeder Seed and Planting Material Production

Following quantities of breeder seeds and planting material were produced by the GLORDC.

- **Breeder Seeds**

Ground nut: *Tissa* 25.5 kg; *Indi* 40.5kg; *Tikiri* 40.5 kg Sesame: *Uma* 5kg; *Mali* 2kg

- **Planting Material**

Thumba karawila 1500 plantlets; Grapes 550 plants; Banana 650 suckers.

Services

Seventeen soil samples were tested and site specific fertilizer recommendations were given.

Agro-climatic Data Base

Continued work pertaining to maintaining of the data base on agro climatic conditions, in collaboration with the Meteorological Department.

INFORM Data Base

The information of the centre required for INFORM data base was submitted to CARP.

Technology Transfer and Training

- Conducted two special training programs on plant tissue culture for school teachers of Hambanthota District.
- Training work shop for DOA officers on cost of cultivation of grapes.
- Conducted two radio programs on home gardening (*Ruhunu Gewaththa*).

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- Conducted a training program for extension officers in Tsunami affected areas.
- Provided necessary information and guiding regarding soil fertility to students of Universities and Agriculture School, Angunakolapelessa.

PLAN FOR 2008

Groundnut:

- Dust testing of newly developed red testa variety.
- Yield evaluation of bud necrosis tolerant varieties.
- VAT of medium duration varieties.
- Breeder seed production of varieties namely, *Walawa, Indi, Tissa and Tikiri.*
- Multiplication of large seeded varieties
- Selection of suitable botanicals for control of thrips.

Sesame:

- Variety purification of MI-3
- Yield evaluation of mutant varieties
- Selection of suitable botanicals for control of leaf and pod webber
- Selection of suitable botanical for control of Phyllody vector.

Mustard:

- Evaluation of lines received from PGRC
- Screening of lines for major diseases under natural field conditions
- Evaluation growth and yield performance at different N, P, K combination levels.

Sunflower:

- Evaluation of lines.

Castor:

- Evaluation of local cultivars.

Cowpea:

- Collection and evaluation of germplasm for yield and agronomic characteristics
- Field evaluation of F_3 & F_4 progenies
- Identification of effective IPM techniques for the control of pod borers.

Green gram:

- Collection and evaluation of germplasm for yield and agronomic characteristics.
- Testing of different water regimes on crop performance (*Vigna radiata* L)
- Screening of lines for Yellow Mosaic Virus disease
- National coordinated variety testing (NCVT) of varieties.
- Variety Adaptability Testing (VAT) for varieties.
- Multiplication of seeds of variety "*Harsha*".

Black gram:

- Seed multiplication.

Chick pea:

- Seed multiplication.

Horse gram (*kollu)*

- Field evaluation of 18 PGRC accessions.
- Seed multiplication and selection of six accessions.
- Field evaluation of selected accessions for yield.

Chilli

- Purification of identified three cultivars of *Ruhunu miris*

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- National coordinated variety testing (NCVT) for chilli varieties.
- Evaluation for growth and yield performances at different soil salinity levels.

Banana:

- Collection establishment and maintenance of germplasm
- Basic planting material production of recommended varieties through conventional methods
- Micro propagation.

Dragon Fruit

- Establishment, maintenance and field evaluation

Pineapple:

- Micro-propagation.
- Evaluation of inter-cropping with banana

Rambuttan:

- Establishment and evaluation of orchard under agro-forestry conditions in the southern Dry Zone.

Guava:

- Evaluation of newly developed varieties under different agro-ecological regions.

Papaya:

- Trial on prevention of Ring-Spot Virus.
- Evaluation of different fertilizer (NPK) levels for variety "Red lady".

Grapes:

- Trial on the best fungicide spraying schedule to control Downey Mildew disease
- Evaluation of different vine training methods.
- Planting material production.

Wood apple:

- Establishment, maintenance and evaluation of grafted plants.

Pomegranate:

- Trial on soil fertility requirements.

Citrus:

- Establishment, maintenance and evaluation of citrus cultivation.

Thumba karawila:

- Establishment & maintenance of mother plant stocks of recommended varieties, *Visal & Keshara.*
- Planting material production of "*Visal*" and "*Keshara*" through stem cuttings.
- Maintenance of germplasm.
- Micro propagation.
- Evaluation of yields of under different trellising systems.
- Evaluation of yield under different fertilizer (NPK) levels.

Kiri Ala:

- Demonstration of *Isuru Kiriala* and sweet Potato.
- Evaluation of different land preparation methods for *Kiriala* (*Alocasia* sp.) in southern Dry Zone

Rice:

- Investigation of salinity status in tsunami affected areas in Hambantota District.
- Preparation of a manual on "Livelihood development through agriculture in the salinity prone coastal eco-system".

Finger millet:

- Evaluation for different planting spacing.

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- Evaluation for different methods of establishment under rain fed conditions.
- Multiplication of seeds of variety *"Oshadha"*

Maize:

- Basic seed production of hybrid variety *"Sampath"*

Medicinal Plants:

- Collection, establishment and evaluation of medicinal plants

Economics:

- Secondary data collection programme for mandate crops of GLORDC, Angunakolapelessa
- Study on the contribution from home gardening to family income in Hambantota District
- Preparation of data for Inform at GLORDC, Angunakolapelessa

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2.1.3 REGIONAL AGRICULTURAL RESEARCH & DEVELOPMENT CENTRE (RARDC) - ARALAGANWILA

The Regional Agricultural Research and Development Center, Aralaganwila is responsible for research and development of appropriate technology suitable for the region, which includes Mahaweli Systems B, C, D & G and inter provincial areas of Ampara, Batticaloa and Mahiyangana. In addition, the Center collaborates in the nationally coordinated research and development activities. The major thrust area of the Centre is to conduct research and development work on Other Field Crops. Also, as a regional research station, it is involved in research and development activities on rice, fruits and vegetables, which are economically important for the region

BUDGET

The annual allocation and the expenditure incurred during the year 2007 is indicated in he Table 2.1.3.1.

Table 2.1.3.1: Annual budget - 2007 (Rs.)

Vote	Allocation	Expenditure
Recurrent	4,721,000.00	4,551,014.37
Capital	2,080,800.00	1,365,720.76
Capital (Special)	6,936,000.00	5,780,545.71
Projects		
REAP (Cluster onion)	300,000.00	300,000.34
REAP (Big onion)	1,300,000.00	1,299,060.00

PROJECTS

Regional Economic Advancement Project 1: (REAP- Cluster onion)

The cluster onion seed development project "Enhancement of productivity and profitability in cluster onion using true seed technology" funded by the Regional Economic Advancement Project (REAP), Matale was completed with satisfactory outcome.

Regional Economic Advancement Project 2: (REAP- Big onion)

The project on "Rapid variety development of big onion", which was also funded by the REAP, Matale, was completed during the year; in the outcome, it was able to identify promising few lines, which will be forwarded for recommendation with further development.

PROGRESS

CONDIMENTS

NCVT of Chilli:

Seven entries were evaluated with one standard check in Non Calcic Brown (NCB) Soils under NCVT which is coordinated by the FCRDI.

Chilli Breeder Seed Production:

Breeder seeds of AW95, which was developed by RARDC, Aralaganwila, were produced.

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Selection of Cultivars of Big Onion:

Collected four cultivars, and produced mother bulbs from three lines.

NCVT of Cluster Onion:

Ten lines (ACA 13, 15, 19, 21, 39, 41, 46, 50, 51 and 57) were selected for NCVT as new entries. Another four lines of ACA 26, 35, 36 and 37 were selected for NCVT under seeding varieties.

Two lines of ACA09 (Vethalan x Kalpitiya Selection, 1998) and ACA11 (Vethalan x Agrifound Rose, 1999) were selected for VAT from the NVCT of multiplier onion sub group, which evaluated eight lines with two standard checks.

One variety (ACA18) under shallot sub group was selected for DUS test.

Breeder seeds of 101 lines were produced for research purpose.

COARSE GRAINS

Varietal Evaluation of Finger Millet:

Twelve accessions, including three from Nepal (*Kabre, Okhale, Dalle*) and five from India (HR 911, BR 202, VL 149, GPU 28, GPU 48), were evaluated with recommended varieties of *Ravi* and *Ravana*.

Hybrid Maize:

Twenty four maize hybrid lines were evaluated with standard check of *Sampath* in a variety adaptability trial, which was coordinated by FCRDI.

GRAIN LEGUMES

NCVT of Green gram:

Nine entries were evaluated with standard checks of MI-5 and MI-6 under NCVT, which was coordinated by FCRDI.

FRUITS

Banana:

Collected thirty two accessions including exotic cultivars and established them in a field gene bank. Cultivars of *Ambul*, Embon, *Etikesel* (cold banana), *Jayasuriya Puwalu, Kolikuttu, Mondan, Nethrapalam, Puwalu Alukesel, Kolikuttu, Rathkesel, Seeni Kesel*, and *Suwandel* were among them. It was found that *Alukesel, Embul, Mondan, Rathkesel* and *Seeni Kesel* could be grown easily with irrigation.

Dragon fruit:

A method of producing multi shoots was developed for mass propagation. Different spacing was evaluated in NCB Soils.

Guava:

Local hybrids were evaluated in NCB Soils under NCVT coordinated by Fruit Research Center (FCRDC), Horana.

Pineapple:

Evaluated different cropping systems with tissue cultured plants in NCB soils; it was revealed that the yield was increased by 25 - 30% under banana crop.

Mango:

Selected 10 accessions were further evaluated with the objective of identifying a new variety.

Papaya:

Papaya cross of Rathna and Red Lady was further evaluated for yield and quality aspects.

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Papaya:

Produced breeder seeds and nuclear seeds of Rathna variety

LOW COUNTRY VEGETABLES AGRONOMY

Bitter gourd:

Five entries were evaluated with one standard check under NCVT, which is coordinated by the HORDI.

Brinjal:

Three hybrids were evaluated with one standard check under NCVT, which is coordinated by the HORDI.

Okra:

Conducted a FCRDI coordinated Varietal Adaptability Trial (VAT) of three promising lines with Haritha as the standard check.

RICE

NCVT:

Tested 4 varieties of 3 months age with At 307, Bg 305, Bg 300 and At 303 as standard varieties under NCVT coordinated by RRDI; the variety Bg 03-1451 yielded 6.1 and 7.7 mt/ha. during *Maha* and *Yala* respectively.

Also tested seven varieties of 3.5 months age class with recommended varieties (At 353, Bg 358 and Bg-359) under the NCVT coordinated by RRDI; the variety Bw 03-1040 yielded 7.6 and 5.7mt/ha during *Maha* and *Yala* respectively while Bw 04-992 yielded 5.7 and 7.9 mt/ha during comparable seasons. Tested several promising varieties selected from VAT under different age groups of 3, 3 1/2 and 4 months in the *Mahaweli* system B. The variety Bg 04-2236 from the 3.5 months age group recorded a higher yield compared to that of others during both seasons.

Weed Control:

Evaluated ten treatments, which included one-shot, a mixture and new chemicals under National Coordinated Herbicide Screening Tests, a programme coordinated by RRDI; it was found that Flucetosulfuron 10% WG, Fenoxaprop-p-ethyl + Isoxadifen ethyl fb MCPA 60%, Azimusulfuron 50WG and Orthosulfuron 1.25% + Propanil 60 WG performed well in NCB soils.

Cultivation in Ill Drain Soils:

Land preparation to form dikes to grow vegetables and ditches to grow rice was found to be a solution to overcome the limitation in crop cultivation due to poor drainage in wet lands found in the region.

Selection for Resistance to Thrips and Drought:

Fifty accessions were evaluated for resistance to thrips and drought in a trial, which was coordinated by the PGRC.

Selection for Salt Tolerance:

Twelve commonly grown paddy varieties were evaluated for salt tolerance.

GENETICS AND PLANT BREEDING

Dioscorea:

Maintained the field gene bank.

Spine gourd:

Maintained the field gene bank and produced breeder seed materials (potted vines from cuttings).

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***Tibbatu*:** Mutation breeding for *Titta tibbatu* (*Solanum indicum*) continued up to M_2 generation and produced breeder seeds of the variety *Bindu* (*Solanum violaceum* Ortega).

PLANT PATHOLOGY

Brinjal:

Remedial measure for bacterial wilt caused by *Ralstonia solanacearum* was developed by grafting *Thinnaveli* purple on *Amanda* variety.

Ground nut:

Fungicides on Tebuconazole, Flutolanil and Thiophanate methyl + Thiram were screened to manage root/collar rot caused by *Sclerotium rolfsii* as soil drenches.

Rice:

Poison Food Technique was tested to manage the rice sheath blight fungi, *Rhizoctonia solani* with different fungicides. Paddy husk charcoal application as soil amendment to manage grain discoloration was continued. Application of 1,250 kg / ha of paddy husk charcoal was found to be effective in the management of grain discoloration.

SOIL AND WATER MANAGEMENT

Banana:

Four cultivars of *Alukesel, Ambul, Kolikuttu* and *Seenikesel* were tested for the response to secondary nutrients of Mg, S and micronutrients of Zn and Boron in different mixtures.

Green gram:

An irrigation schedule with three days interval was found to be effective on growth and yield of MI-6 during *Yala* season in the Dry Zone.

Papaya:

The nutrient management regime was found to be critical when cultivating the crop in NCB soils; lateral canals with 0.6-1.0m depth and 20-30m in length were found to be adequate for draining out the excess moisture from the entire root zone.

Rice:

Addition of organic materials was found in enhancing soil fertility in the early stage of crop growth.

DEVELOPMENT

Papaya:

Papaya established over 25 crop zones (growing villages) with several hundred farmers in Ampara, Badulla, Hambantota, Moneragala and Polonnaruwa districts.

Spine gourd:

Potted vines (Thumbika 44, Perakum 20) were distributed to establish mother vines.

Tibbatu:

Four kilo grams of seeds were distributed among farmers on requests from all over the country.

ADVISORY SERVICE

Field Days:

Two field days during both seasons were conducted for the farmers.

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Leaflets on Papaya Cultivation:

Five types of color leaflets *viz.* Papaya management practices, Effective drainage system for papaya, Problems and problem solving of papaya, Papaya ring spot virus eradication and Papaya seedlings production were prepared.

Solutions for Field Problems of Farmers:

Provided technical solutions to the field problems reported by farmers from System B and C of Mahaweli.

Soil Testing Service:

Analyzed 564 soil samples and provided site-specific fertilizer recommendations to farmers.

PLAN FOR 2008

CONDIMENTS

Onion

- Varietal development and improvement of cluster onion
- National Coordinated Varietal Trial of Cluster onion
- Varietal Adaptability Trial of Cluster onion
- Varietal development and improvement of big onion

FRUITS

- **Banana:**
  Collection, establishment and evaluation of available banana varieties
- **Dragon fruit:**
  Performance evaluation of dragon fruit under NCB soil; evaluation of multi shoots production method.
- **Guava:**
  Evaluation of hybrid varieties
- **Papaya:**
  Evaluation of papaya breeding lines
- **Papaya:**
  Production of nucleus and breeder seeds of Rathna variety
- **Pineapple:**
  Performance evaluation of tissue cultured plants
- **Commercial Orchards:**
  Development of land and establishment of large scale orchards

VEGETABLES

- **Spine Gourd:**
  Breeder seed (planting material) production
- **Tibbatu:**
  Breeder seed production

RICE

- National Coordinated Varietal Trials
- Effects of Aswawaligaya (*Leptochloa chinensis*) weed on growth and yield of rice in NCB soils
- Efficacy of Siratro (*Macroptilium atropurpeurum)* as a free growing plant on weed control and contribution to green manure production

ENTOMOLOGY

- **Brinjal** :
  Management of *Tibbatu* stem borer through grafting to Brinjal
- **Rice:**
  Screening of germplam for resistant to thrips and drought

PLANT PATHOLOGY

- **Brinjal:**
  Grafting of Brinjal as a management strategy for bacterial wilt caused by *Ralstonia solanasiarum*

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- **Ground nut:**

  Screening of selected fungicides against root / collar rot in groundnut caused by *Sclerotium rolfsii*

- **Cluster onion:**

  Evaluation of selected fungicides against purple blotch and anthracnose of onion

- **Rice:**

  Evaluation of new rice varieties for grain discoloration.

- **Rice:**

  Screening of selected fungicides against grain discoloration; study on grain discoloration

PLANT PHYSIOLOGY

- **Chilli:**

  Management of Chilli Narrow Leaf Disorder (CNLD)

SOIL AND WATER MANAGEMENT

- **Banana:**

  Evaluation of the effect of secondary and micro nutrients on growth, yield and fruit quality of different varieties

- Ground nut:

  Effect of S fertilizer on pod yield, protein, oil content and disease resistance

- Papaya: Fertilizer requirements for improved papaya varieties under NCB soils

- **Papaya:**

  Effective drainage system for commercial cultivation of papaya under ill drained conditions

- **Land utilization:**

  Utilization of wet land for crop diversification

- **Water resource management:**

  Determination of soil water distribution pattern in NCB soil under drip irrigation

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2.1.4 REGIONAL AGRICULTURAL RESEARCH AND DEVELOPMENT CENTRE (RARDC) - VAVUNIYA

The mandate of the Regional Agricultural Research and Development Center/Kilinochchi (Northern Region) together with its satellite stations located at Thirunelvely, Paranthan, Vavuniya and Murunkan is to conduct agricultural research and development activities on other field crops, which are economically important for the region (DL 1, DL 3 & DL 4). This centre, affiliated to the FCRDI/Maha Illuppalama, is currently involved in research and development activities on integrated pest management (IPM), soil fertility, water management and on-farm demonstrations on condiments, grain legumes and vegetables. During the year the Centre established a Field Gene Bank to revitalize maintenance of field crops and fruits.

BUDGET

The budgetary allocations and expenditure under different votes are presented in the Table 2.1.4.1.

Table 2.1.4.1: Annual budget-2007 (Rs.)

Vote	Allocation	Expenditure
Capital	1,777,300.00	1,316,501.00
Recurrent*	2,475,500.00	2,398,524.28
Projects		
Special Project (2502)	1,335,000.00	1,112,677.15

* Staff salaries not included.

PROGRESS

Research trials were satisfactorily carried out during the year in satellite stations under both rain-fed and irrigated conditions and results of which are indicated below:

CROP IMPROVEMENT

- **Multiplier Onion**

  Developed natural hybrids originated from 04 types of multiplier onions and tested for their agronomic traits; 16 lines found to be promising will be advanced for future development; lines and single bulbs were harvested and stored for further improvement.

  Also, 06 promising lines developed from simple selection were tested under NCVT in both seasons in 5 locations; those lines were submitted for inclusion in VAT.

- **Brinjal**

  Traditional cultivars (16) collected from farmer fields were evaluated under field conditions on which characterization was completed; 01 collection with green calyx (*Sanguvely* collection, long type) gave the highest yield 26.4 mt/h and *Madduvil Mutti* (round type, white fruit) gave the lowest yield of 12.2 mt/h; other lines tested gave a higher yield than that of recommended *Thirunelvely* Purple.

VARIETY ADAPTABILITY TRIALS, NCVAT, MULTI-LOCATION AND TECHNOLOGY ADAPTATION TRIALS

- **Rice**

  Varieties of 3 months, 3 1/2 months, and 4 months age groups were tested in RARDC/Vavuniya, Paranthan, Kilinochchi and Murunkan under both rain-fed and irrigated conditions; promising agronomic trials were reported to the coordination center at RRDI.

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- **Black gram**

  Cheddikulam area was identified for black gram under crop zoning program; farmer training classes were conducted; semi indeterminate types were selected for future breeding development program.

AGRONOMY

- **Shallot Onion**

  Promising lines (6) developed by simple selection were tested under NCVT during both seasons in 5 locations. All lines yielded more than 17 t/ha while TVS 4 yielded 18.03 t/ha. However, TVS 1 was early by 5 days compared with others and yielded 17.07 t/ha while the TVS 1 had more desirable bulb color and consumer preference; TVS 1 also exhibited field tolerance to Anthracnose.

- **Hybrid Onion**

  Tested 08 natural hybrid lines for their yield and adaptability in a preliminary yield trial; 06 of them were selected for NCVT.

- **Multiplier Onion**

  Tested 06 promising lines developed from simple selection under NCVT in both seasons in 5 locations. Incidence of Anthracnose was not observed among them; they were handed over to the Pathology Division for further screening against anthracnose; two lines, TVM 2 and TVM, were nominated testing under VAT.

- **Other Field Crops**

  A trial was conducted at Thirunalvely to identify a more suitable crop under low management with rain-fed conditions; crops of black gram, green gram and finger millet gave significantly higher financial returns than that of cow pea.

ENTOMOLOGY

- **Brinjal**

  A significantly higher marketable yield (12.5 t/ha) of brinjal was obtained from the plot treated with Acetamiprid over the plots treated with Thiomethosam, Fibronil and Etofenprox; incidence of shoot and fruit borer was found to be minimum in the cultivar '*Madduvil purple*'; Profenophos and Choromafenozides were found to be more effective against shoot and fruit borer and Carbosulfan also effectively minimized the pest damage.

- **Chilli**

  In an evaluation trial of chemicals to control thrips in chilli, the efficacy of chemicals Thiamethoxime, Acetamiprid and Lufanuron was found to be comparatively acceptable.

- **Bitter gourd**

  Neem seed water extract was effective in controlling fruit flies in bitter gourd.

PATHOLOGY

- **Brinjal**

  It was found that by establishing a dried banana leaf barrier around the plant could reduce incidence of little leaf disease.

SOIL AND WATER MANAGEMENT

- Tested soil samples in the districts of Vavuniya (01), Mannar (02), Kilinochchi (13), water samples (02) in Mannar and 01 vermi-compost sample in Vavuniya and submitted reports with recommendation for crop cultivation.
- Poultry manure gave the highest yield (25 t/ha) in brinjal in both field and pot experiments conducted at the RARDC, Vavuniya.

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HORTICULTURE

A gene bank of horticultural crops was established at ARS, Thirunalvely.

Pomegranate

Seedlings of new varieties '*Daya*' and '*Nimali*' were produced and distributed to farmers and extension staff.

Lime

Continued maintenance of local lime collection at ARS, Thirunalvely.

Banana

Maintained the collection of 34 cultivars of banana from Jaffna District in the field; characterized 09 of them with the aid of banana descriptors.

BASIC SEED PRODUCTION

Produced pre-basic seeds of the following crop varieties during the year:

Chilli KA$_2$ 2.25 kg; brinjal TV Purple 2.0 kg; bitter gourd Thirunelvely white 3.6 kg; snake gourd Thirunelvely long 1.1 kg; tomato KC$_1$ 0.7 kg; winged bean SLS$_{44}$ 3.0 kg; winged bean UPS$_{122}$ 2.5 kg; winged bean SLS$_{44}$ 1.0 kg; amaranthus Chadaichchi 4.4 kg.

Nuclear Seed Production

Egg-plant (brinjal), chilli, long bean (hawari-mae), bitter gourd, snake gourd, okra, tomato, amaranthus, winged bean, pumpkin, melon and ash pumpkin were maintained *in-situ.*

ADVISORY SERVICE

Received and identified 13 and 05 disease samples from farmers in Jaffna and Vavuniya Districts, respectively; recommended remedial measures for all.

Conducted 02 classes on soil testing for students of College of Education and University.

Training

Conducted two training programmes on black gram development and red onion improvement under Crop Zoning Project.

PLAN FOR 2008

Condiments

- Variety Adaptability Trial (VAT) in shortage and long age onion.
- Preliminary yield trial of selected superior lines of multiplier onion.
- Evaluation and characterization of landraces for preliminary yield trial and NCVT (Short age group).
- Performance of tomato TVT/HT – 2123.
- Effect of spacing, bulb size and depth of planting on growth and yield of red onion.
- Evaluation of eco-friendly insecticide against thrips in chilli.
- Population dynamics of thrips in chilli.
- Screening of fungicides for onion leaf twister disease (Research & Farmer field).
- Screening onion land races for onion leaf twister disease.
- Screening brinjal land races for little leaf disease.

Grain Legumes

- National Coordinated Variety Adaptability Trial (NCVT) in cowpea, black gram, green gram and hawari-mae.

Oil Crops

- National Coordinated Variety Adaptability Trial (NCVT) in groundnut.
- Variety Adaptability Trial (VAT) in groundnut.

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Coarse Grains

- National Coordinated Variety Adaptability Trial (NCVT) in finger millet.
- Adaptability Trial (VAT) in Finger millet.

Rice

- National Coordinated Rice Variety Trials (3, 3 1/2, 4 and 4 1/2 Months)
- Variety Adaptability Trial (3, 3 1/2, 4 and 4 1/2 Months)
- Large scale Variety Adaptability Trial.
- Seed production and purity maintenance.

Vegetables

- Breeder seed production and purity maintenance in long bean (*hawari-mae*), tomato (KC 1), okra (TV 6 & TV 8) and onion (TVS 1).
- Inclusion of promising brinjal lines developed at Thinnavely.
- Submission of promising red onion lines for DUST.
- Promotion of promising chilli lines to NCVT.
- Expansion of vegetable germplasm.
- Yield potential of local land races of Brinjal under minimum spraying conditions.
- Management of yellowing in bitter gourd.
- Management of yellowing in long bean.
- Assessment of shoot and fruit borer in the local cultivars of brinjal.
- Evaluation of eco-friendly insecticide against shoot and fruit borer in brinjal.

Fruits

- Evaluation of agronomical characters in dense planting of banana (*Kappal)*

Natural Resource Management

- Development of *Mini valleri.*
- Vegetable propagation of watermelon by stem cutting.
- Pesticide properties of *Panchagoviya.*

Factor Research & Analytical Services

- Evaluation of efficiency of different organic manure in brinjal cultivation.
- Development of soil and water management strategies for sustainable crop production in Mannar District.
- Performance of *Panchagoviya,* the organic liquid manure on onion, chilli and brinjal.
- Monitoring of salinity in farmer field.

Information Management

- Monitor and evaluate research projects – INFORM

Extension and Technology Transfer

- Farmer advisory service and field days on regional crops.

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

The mandate of HORDI is to undertake demand-driven research on fruit, vegetable, root and tuber, mushroom and floriculture crops to develop new technology, which will be productive, eco-friendly, sustainable, economically viable and socially acceptable. The main objective of research and development programmes conducted by HORDI scientists is to accomplish the above mandate. Other responsibilities of HORDI include training of agriculture undergraduates and diploma students, implementation of awareness programmes to disseminate new technology to the farming community and other clients.

BUDGET

The total allocation and the expenditure during the year 2007 are indicated in the Table 2.2.1

Table 2.2.1: Annual budget - 2007 (Rs.)

Vote	Allocation	Expenditure
Capital	4,438,465.00	3,178,033.94
Recurrent	17,765,123.00	13,612,946.33
Projects:		
Hybrid	4,384,000.00	3,457,207.23
SL-USDA	2,714,935.00	1,173,684.60
CARP	2,538,045.00	2,094,655.75
DFID	50,000.00	48,675.00
REAP	900,000.00	678,934.62
Hybrid Seed production for fruit and Vegetables	2,455,100.00	1,857,136.86
Tsunami (CIDA)	137,063.30.00	69,435.00
Crop Zone	32,480,000.00	26,938,838.09
Infrastructure Development for Seed Production	15,345,500.00	13,390,412.83
IAEA	450,000.00	44,788.62
INIBAP	150,000.00	149,505.00

PROJECTS

Hybrid Development:

Provided funds for development of hybrid crop varieties of tomato, Brinjal, rice and maize.

Small Farm Development (SFDP):

Promotion of home gardening for enhancing family nutrition, food and financial security.

SL-USDA:

Funded activities of exploration, collection and characterization of germplasm of under utilized fruit crops.

Organic Agriculture for Export (OAE):

This project funded research activities on soil fertility improvement, management of pests and diseases using non chemical methods in organic fruit and vegetable growing systems.

CARP Contract Research:

Following research projects were implemented with CARP funding:

- *In vivo* establishment and field performance of tissue cultured banana.
- Selection of resistant varieties and identification of biological and chemical control methods for *Fusarium* wilt of banana (CARP/12/573/434).

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- Identification of *Tristeza* virus and greening bacteria in citrus germplasm using molecular techniques and development of healthy mother plant stock (CARP/12/676/507).
- Development of new ornamental plants from indigenous and introduced species using mutation-breeding techniques.

Department of International Development of British Government (DFID):

Funds were channeled through AVRDC, Taiwan for the development of an integrated pest management strategy for the control of fruit and shoot borer in eggplant.

Regional Economic Advancement Project (REAP)

Funds received were utilized to implement the following projects in Matale District:

- Awareness programme on newly developed or released tomato hybrids through *yaya* demonstrations.
- Determination of fertilizer requirement of vegetables.
- Popularization of mushroom cultivation.
- Production of high quality mango through proper crop management.

International Potato Centre (CIP)

This project funded research work on evaluation of exotic sweet potato varieties; under this 13 salt tolerant accessions received from CIP, Peru, were multiplied and tested at HORDI, Wagolla, Matale, Matara and Hambantota.

FAO Tsunami OSRO/SRL/512/CHA:

Funds were utilized for reclamation of land affected by Tsunami in Sri Lanka.

Crop Zone:

The objective of this project was to produce high quality fruits and vegetables and their value added or processed products for local and international market by introducing high quality varieties; progress: implemented activities for the identification and establishment of specific fruit and vegetable crop zones.

Infrastructure Development for Quality Seed Production:

Funds received were utilized to upgrade laboratory facilities and to develop the field.

Small Scale Agriculture Research Project (IAEA):

Funds were utilized to control Melon fly, *Broctrocera cucurbitae,* by irradiation using gamma rays.

Orange Cultivation in Monaragala District:

Carried out activities to develop a method to rehabilitate existing trees and establish new plants in the field.

Rain Water Harvesting & Distribution System:

Funds were utilized to develop a rain water harvesting system at HORDI, Gannoruwa.

PROGRESS

VEGETABLES

CROP IMPROVEMENT

Tomato

Conventional Breeding:

Five bulk population and three progenies were selected for generation advancement.

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Heterosis Breeding:

A promising indeterminate F1 hybrid HF 02 was tested in farmer fields. Three other F1 hybrids were identified for yield evaluation studies.

Mutation Breeding:

A cherry type tomato variety, M 65-1, was tested in farmer fields and for which the preference and acceptance by farmers were found to be high as it could be sold in the super market at a higher price.

Demonstrations in Farmer Fields:

The newly developed F1 hybrid, Maheshi, was introduced to farmers in Matale District. It was found that the acceptance of this local hybrid is high. There is a high demand for seeds of this local hybrid.

Brinjal

New Varieties:

Two new Brinjal varieties, a F1 hybrid and the other an open pollinated variety, were nominated for NCVT and VAT.

Capsicum

A new Hybrid:

A *Capsicum* hybrid was nominated for VAT.

Seed Purification:

The seeds of the *Capsicum* variety Bull Nose were purified and distributed among farmers.

Luffa

New Hybrids:

Two Luffa hybrid varieties were identified.

Bean

New Variety:

One new and promising bean variety was identified in NCVT trials.

Cucumber

Hybrid Development:

Promising donors for cucumber hybrid variety development were identified.

Pumpkin

New Variety:

One promising open-pollinated pumpkin variety was identified and nominated for VAT.

Yard-long Bean

Hybrid Development:

Promising parents for yard long bean hybrid variety development were identified.

Leafy Vegetables

New Varieties:

Promising accessions of *Amaranthus* and *Sarana* were nominated for VAT.

Breeder Seed Production

The following quantities of Breeder seeds were successfully produced.

Table 2.2.2: Quantities of breeder seeds produced in 2007

Crop	Variety	Quantity Produced
Tomato	Rashmi	460g
	Lanka sour	330g
Bitter guard	Matale green	2.1kg
Mae	Bush polon	7.5kg

Genetic maintenance of the parents of newly released hybrid varieties of tomato (Maheshi) and Brinjal (Amanda and Anjali) was carried out successfully.

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ROOT & TUBER CROPS

CROP IMPROVEMENT

Sweet potato

Testing of Varieties for Saline Soils:

Two salt tolerant sweet potato accessions yielded more than 15 t/ha. These accessions will be tested in Ampara, Hambantota, and Galle area.

Planting Material Production:

Nucleus units of sweet potato varieties were established in research units and in farmer fields to distribute planting material among farmers.

New Varieties:

Two high yielding, high carotene varieties were identified for advance yield trials.

Dioscorea

New Varieties:

Two *Dioscorea alata* varieties namely 'Raja ala' and 'Kekulala', with a higher yield and quality characteristics, were released officially for cultivation as recommended varieties by the DOA.

Cassava

New Variety:

A new high yielding cassava elite clone, HORDI – 6, with high quality and moderate branching habit and suitable for mixed cropping, was selected for VAT programme.

Kiriala

Planting Material Production:

In a multiplication study on *Xanthosoma* variety "Isuru", it was found that there was no significant difference in the number of suckers produced due to different treatments.

Germplasm Maintenance

Genetic material of sweet potato, *Dioscorea*, artichoke, cocoyam, ginger and turmeric as minor root crops were maintained in the field as a germplasm pool.

Recommended root & tuber crops were maintained in the field for basic planting material production for distribution among targeted beneficiaries on request.

FRUITS

Macademia

Two varieties of *Macademia* were released as 'Lanka' and 'Harsha' in the year 2007. The varieties were propagated by cleft grafting and distributed to DOA farms for further multiplication; 2000 grafted plants were also planted in a private sector plantation at Hunuwala Estate.

Grafting of Bread Fruit

Success of cleft grafting of breadfruit on Kos Del stock was significantly high as 87% (p=0.05), when seedlings of Kos Del were grafted at the age of 45 days; the grafted plants were successfully grown in the field and started bearing two years after planting.

Uguressa

Studies were conducted to develop a suitable method of propagating *Uguressa* to conserve the germplasm in a shorter period. Seed germination was carried out and found that it took itself 120 days. Therefore asexual propagation through cuttings was tried. Success rate of semi hard wood cutting was significant (72%) (P=0.05); also there was no significant difference in propagation between the cultivars.

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Ceylon Olive (*Veralu*)

Studies were conducted on germination and propagation of Ceylon olive. There was no significant effect on germination due to different treatments (oven drying at 40° C for 1/2 hour, sun drying for 1 & 3 days, soaking in water). The control (i.e. without any treatment) gave the highest percentage of success (45%). In propagation, success in cleft grafting was significantly higher (87%) when seedlings (stocks) were at 8 weeks old.

Banana (var. Ambon)

The effect due to application of High Graded Eppawala Rock Phosphate (HERP) in Ambon banana was studied; a combination of HERP with TSP (1:1) was found to be the best for sustained yielding; the HERP application was suitable only up to the third crop cycle; application of ERP was effective only up to the second crop cycle; application of cattle manure with ERP gave similar results.

Under-utilized Fruit Species

Exploration, Collection, Characterization and Conservation

Explorations were carried out in 17 areas in the districts of Kandy, Kegalle, Matale, Kurunagala, Anuradhapura and Polonnaruwa; potential crop distribution maps pertaining to 12 crop species were prepared and improved using geographical data; 62 accessions of 19 crops were collected and characterized; selected 10 promising accessions for further studies.

Twenty-eight seedlings, 19 stem cuttings and 27 grafted plants of potential crop species and recommended varieties of 3 guava varieties were newly established in the field gene bank at Unit 2 of HORDI; at present there are 341 plants from 183 accessions belonging to 29 crop species in the inventory of the field gene bank; the total land area developed for the gene bank is about 3 ha; studies on growth performance and characterization of harvest of second-generation are being continued.

Propagation

Ber, Jammu, Longan and Rose apple could be successfully propagated in a trial; propagation of Ceylon olive (*veralu*) and Velvet Tamarind (*Gal-siyambala*) by stem cuttings was also successful; the study on the possibility of producing of planting material of Bael fruit, Longan, Jamun, Rose apple and Velvet tamarind with true seeds was found to be successful.

Ceylon olive (*Veralu*) (*Elaeocarpus serratus*) can be propagated by seeds but seed germination takes about 6-12 months and the percentage of germination is very low. Studies showed that stem cuttings can be used for the vegetative propagation of veralu.

Development Activities

Two fruit villages of Bael in Kegalle and Polonnaruwa Districts were established; training classes on crop cultivation were conducted for relevant farmers and extension officers.

TISSUE CULTURE

FRUITS

Production of Foundation Stocks Banana & Pineapple

Research studies on *in vitro* establishment of plant tissues, micro propagation, soil transfer and acclimatization of banana (var. *Ambon, Rathambala, Pulathisi, Nethrampalam, Seeni kesel*) and pineapple (var. Mauritius & Kew) were conducted.

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JAFFNA

Field Evaluation of Tissue Cultured Banana var. Ambon & Rathambala

This study funded by CARP was completed; tissue cultured plants demonstrate a healthy and vigorous growth and produced number of suckers in comparison with conventional plants; somaclonal variations were not detected in morphology or yield characters of tissue-cultured plants as compared to conventional suckers; tissue cultured banana plants did not exhibit any variation in the field, which was confirmed by DNA analysis (at PGRC) as well; the findings are presented in a research paper submitted to the International Banana Conference in Kenya to be held in April 2008.

Plant Regeneration Systems [as alternative methods of *in vitro* propagation]

Beli & Wood apple

An attempt on shoot formation from immature leaf tissues via organogenesis has given positive results; experiments are being continued to obtain developed roots.

Grapes

Two regeneration systems were tried; cell suspensions were successfully established from grape tissues and inducing of somatic embryogenesis is being experimented in the first trial; in the other, *in vitro* plants are produced from shoot-tip culture system and experiments are being continued on *in vitro* multiplication.

Dragon fruit

In vitro plant culturing was successful; micro propagation by organogenesis is being experimented.

ORNAMENTALS

Propagation

In vitro propagation systems were successfully established for *Dendrobium* orchids, ground orchids and African violet.

In vitro Mutagenesis

This is a study aimed towards producing novel types of above plants using Gamma irradiation and mutagenic chemicals; successful systems for soil transfer and hardening process were identified for the above plants.

OTHER CROPS

Ginger (var. Fiji)

In vitro cultures were successfully established; micro propagation studies are being continued; potted plants (16) were handed over to Root & Tuber Crops Division for field planting.

Low Cost Tissue Culture

A program on *low cost tissue culture* methods was started during this year with the aim of introducing and popularizing this technology among Sri Lankan farmers. Research experiments are being conducted to find low-cost alternatives for culture media components, culture environment and equipment.

PLANTING MATERIAL PRODUCTION UNDER CROP ZONE PROGRAM

Collection of Mother Plants

Banana (var. *Ambon* and *Rathambala*) suckers were collected from farmer fields; they were subjected to virus indexing by the Pathology division of HORDI and healthy plants were selected to initiate new cultures.

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Establishment of Orchards for Planting Material Production

Banana and pineapple orchards with tissue-cultured plants as foundation material were established to produce planting material at the following locations:

- Farms of the SPMDC.
- HORDI farm at Wagolla

Control of Sweet Potato Weevil:

Sweet potato weevil pheromone trap was more effective in reducing the weevil damage than application of insecticides or insecticides in combination with pheromone traps; *Argyreia populifolia*, *Ipomea aquatica*, *Ipomea triloba* and *Convolvulus arvensis* were identified as alternate hosts of sweet potato weevil.

Table 2.2.3: Distribution of tissue cultured plants during 2007

Crop	Variety	Number distributed	Location planted	Purpose
Banana	Ambon	50	Wagolla farm, Rambukkana	As foundation stocks to produce planting material
	Pulathisi	80	MI farm, SPMDC	
Pineapple	Mauritius	1500	ARS, Thelijjawila	Field trails
		100	Wagolla farm, Rambukkana	As foundation stocks to produce planting material

ENTOMOLOGY

Research: Pest Management

Non chemical Control

Bean:

A live barrier of maize, combined with thiamethoxam treated seeds, had a significant effect in lowering the incidence of bean-yellowing syndrome, which is a very important and economically important disease of bean in this country.

Rearing of Trichogamma:

Developed a mass rearing technique for *Sitotroga cerealella*, a host insect species that can be used to mass rear *Trichogramma* sp., an egg parasitoid of *lepidopteran* pests.

Fruit Fly:

An island wide survey showed that *Bactrocera kandiensis* and *B. dorsalis* were the most economically important fruit fly species in Sri Lanka; due to this survey, eight fruit fly parasitoid species were identified.

Control of Hoppers & Aphids:

Field evaluation of locally synthesized neem formulations (SL neem 19 and 39) effectively controlled the aphids and plant hoppers in Brinjal, cabbage and okra.

Control of Aphids:

A botanical named Sparrow 888, an organic insecticide that can be used in organic farming, was identified as effective against aphids

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Vermi Compost:

Vermi-compost was found to be ineffective in controlling the bean yellowing syndrome, pests causing leaf curl of tomato and leaf miners.

It was found that vermicompost can be harvested in three months time; it could produce a higher number of healthy worms at harvest by preparing a compost bed with worms on the top layer and cow dung as the source of nitrogen for worms.

Chemical Control

New Recommendations to Replace Hazardous Chemicals

In screening trials at the HORDI and in pilot scale testing for national recommendation of pesticides, following low mammalian toxic insecticides were identified as effective against some pests of vegetables:

- Spinosad for Brinjal shoot and fruit borer
- Thiamethoxam and acetamiprid for white flies.
- Auvant and Emamectin benzoate for cabbage leaf eating caterpillar complex.

Following low mammalian toxic insecticides were identified as effective for some vegetable pests and recommended for pilot scale testing under farmers' condition.

- Auvant and spinosad for bean pod borers
- Dinotefuran for white flies.

PATHOLOGY

Survey, Collection and Characterization of Banana *Fusarium* Wilt Pathogen in Sri Lanka

Fusarium wilt is one of the serious diseases in banana cultivation in Sri Lanka; identification of vegetative compatibility groups of *Fusarium* wilt pathogen was performed in order to identify and develop resistant varieties of banana.

Identification of Viruses Associated with Yellowing Syndrome in Cucurbitaceous Crops in Sri Lanka

Leaf-yellowing problem is a severe threat in cucurbitaceous crop cultivation in Sri Lanka; four viruses were identified in diseased cucurbit plants; studies are being continued to develop an integrated package for the management of this problem.

Disease Diagnosis of Crops and Advisory Service for Disease Management

Disease diagnosis of plants and advisory service for disease management provided by Plant Pathology Division were continued; about 900 plant samples including fruit crops, vegetables, tubers, condiments, spices, ornamentals, other field crops and grasses received from different sources were clinically tested for diagnosis of fungal, bacterial and viral diseases; causal agents of diseases of plant samples were identified and advice was given to farmers, private companies and agriculture extension officers for their management.

Identification of Plant Pathogens Associated with Imported Seed Potato (*Solanum tuberosum* L.)

Sri Lanka imports annually a large quantity of seed potato tubers from few countries. Laboratory tests were carried out on samples of imported seed potato lots to screen for pathogens and to find out whether the imported lots conform to local quarantine requirements; presence of pathogens in most of the samples were within permissible limit; however some seed potato lots were rejected

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and discarded owing to presence of pathogens beyond the limits.

Incidence of Anthracnose in Brinjal fruits

A rapid variety screening method (*in vitro*) was developed to identify germplasm of Brinjal resistant to anthracnose disease; the method includes measuring of inhibitory effects of fruit exudates on the germination and growth of spores of the causal organism.

Identification of Citrus Germplasm Free from Citrus Tristeza Virus and Greening Bacteria

Severe incidence of *Tristeza* virus is one of the causes for yield decline of citrus in Sri Lanka; to identify healthy plants, infected trees were screened by using ELISA and PCR; as a solution to the virus problem in the long run, healthy grafted plants were established in an insect proof net house to supply disease free bud wood for grafting in future.

Afla-toxin in Different Varieties of Maize

Presence of afla-toxin produced by fungi in maize seeds lowers the seed quality; production of Afla-toxins by fungi in seeds was quantified by ELISA test after harvesting different varieties; some of them had lower levels of afla-toxin produced by *Aspergillus nige,* in comparison to afla-toxin levels found in varieties of Sampath and Pacific.

Solid Carriers of Anti-fungal Bio Control Agents

Molasses and Yeast liquid medium was found as suitable for mass multiplication of *Trichoderma* spp; materials such as talc, peat, clay and calcium carbonate etc are being tested to find out their suitability as solid carriers.

Evaluation of new Formulation of "Captan" in Controlling Cucurbit Downy Mildew

New liquid formulation of Captan was tested along with Captan WP and Ridomil against bitter gourd downy mildew under natural infection conditions; the new formulation of Captan at the rate of 15-20ml/ 10l was found to be equally effective as Captan WP and Ridomil for management of cucurbit downy mildew.

Screening of new Liquid Formulation of Topsin and Fugione against Tomato Blight

Liquid formulation of Topsin and Fugione were tested against tomato blight diseases under field conditions; Topsin WP and liquid formulation of Topsin (10-15ml/ 10l) showed the highest bio-efficacy in tomato blight control; Fugione was found to be equally effective as Mancozeb.

CHEMISTRY: SOIL FERTILITY MANAGEMENT PROGRAMME

Organic Vegetable Production

Compost as the Nutrient Source

The effectiveness of different types of compost (gliricidia-based, tithonia-based, 1:1 mixture of gliricidia and tithonia compost and vermicompost) was tested on vegetable crops; the trial is being continued to determine the long-term performance of these materials and their effects on vegetable yield and soil quality.

Continuous Application of Compost

Over a period of 15 seasons, different vegetable crops were continuously grown in large plots treated with recommended NPK fertilizers, 40 t/ha of compost and recommended NPK+40 t/ha of compost respectively. Application of only compost gave

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higher yields than NPK fertilizers, but the integrated use of NPK fertilizers and compost gave the highest yield. The only soil quality changes observed up to now, due to application of compost, are gradual build up of available phosphorus and potassium levels. However, the levels still remain within acceptable limits. The better performance of the compost only treatment may be attributed not only to the nutrients supplied but also to the many beneficial effects on the soil and plant system caused by organic manure.

Phosphocompost

The performance of Eppawala Rock Phosphate (ERP) enriched compost was tested in comparison to ERP free compost. Even after 6 seasons of continuous application, there was no significant evidence of any benefit due to ERP enriched compost.

A Simple Method for Determination of Critical P level in the Soil

This experiment was conducted to develop a quick method to determine the critical level of P in the soil for vegetables under green house conditions; by application of this simplified method the critical P levels of crops can be determined more quickly; this method will be continued to be applied to determine the critical levels of P for different vegetable crops in different kind of soil.

Nutrient Status of Leafy Vegetables

A study was conducted to compare the nutrient contents in leafy vegetable crops grown with organic manure and conventional inorganic fertilizer; crops were analyzed to find out the nutrient contents; in general the macro nutrient content in the organic leafy vegetables were higher than that in conventionally fertilized vegetables; the trial is being continued.

Zinc Fertilizer Requirement of Vegetables Grown on Upland Soils of Nalanda Area

A previous study had shown that the upland soils of Nalanda area have a low available Zinc content; a field study was conducted on vegetable growing upland soils of Nalanda area to find out the requirement of Zinc fertilizer for vegetables, in particular for tomato, which is a high yielding vegetable and moderately sensitive to deficiency of Zinc; Zinc was added to the soil as a top dressing, 3 weeks after planting at rates of 0;5;10;15 and 20 kg Zn/ha; results indicated that there was no significant gain in yield due to application of Zinc fertilizer; as similar results had been realized with respect to crops of bean and luffa as well, it was concluded that there was no need to apply Zinc to upland soils in the Nalanda area for vegetable cultivation.

Analytical Service

About 515 soil samples were tested during the year, of which about 31% were from soil test based fertilizer recommendation programme and the balance 69% came from the DOA research programmes. In addition, 56 organic manure samples were analyzed for quality; the total revenue during the year from the analytical service was Rs. 79,990/=.

HOME GARDENING & FLORICULTURE

Following 3 main research and development programmes are being conducted under this division:

- Home garden development
- Thilina breeder seed production
- Floriculture development

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Home Garden Development Programme

The objective of this program is to develop sustainable home gardening under different social, ecological and cropping patterns for improving food security, nutritional awareness and family income in an economically viable and environmental friendly manner.

Maintenance of Model Home Gardens

Model Home Garden at HORDI

The model home garden at HORDI, which was established 10 years ago, is now being maintained as a component of Agro Technology Park, Gannoruwa; about 142973 persons visited this site to acquire knowledge on home gardening.

Model Home Garden at Rupavahini Cooperation

The model home garden at the premises of Rupavahini cooperation is being maintained as an exhibition site; the TV programme, "Rividina Arunella", is being telecast from this site live on every Sunday.

Model Home Garden at Horticultural Farm, Weerapana

A model home garden was established to address the aspects of social, environmental, and cropping pattern in the Wet Zone of the Southern Province; this home garden is being maintained at exhibition level from year 2006.

Establishment of new Model Home Gardens

Eight new model home gardens were established during the year 2007 to address varying social, environmental and cropping patterns at following locations:

Ranaviru model home garden, Bullers Road, Colombo; Ambatenna Horticultural Farm, Kandy; Research station, Setha-Eliya; President's Park in Weeraketiya; Agric. Ministry Colombo; Calren Free School in Weeraketiya; Minister's Residence in Delgoda; Agric. Technology Park, Bata Atha.

Dissemination of Knowledge on Home Gardening

Technology dissemination activities were conducted during the year 2007 with the participation of officers from ministries of Media, Education, Samurdi, Defense, Science and Technology and Provincial Ministries of Agriculture.

Training was conducted with the involvement of following organizations: Wari Pubuduwa, UNDP-Galle, State Mortgage Bank, Plan Sri Lanka, Investment Bank - Colombo, Agromart Foundation Galle and Matale, REAP – Southern Province and Totten – Hikkaduwa.

Under-utilized Crop Varieties Suitable for Home Gardening

Tested and maintained 48 accessions of under-utilized crop varieties, of chilli, okra, winged bean, leafy vegetables, leeks, egg plant, sweet-potato, yams and several fruit crops, which are ideally suitable for home gardening, under home gardening situation during the year 2007.

INFORMATION DISSEMINATION ACTIVITIES VIA ELECTRONIC MEDIA

SLRC "Rividina Arunalla" Live Programme

Rividina Arunalla, a half an hour live programme telecast on every Sunday, is specially designed to disseminate knowledge

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on home gardening; as a nationwide popular TV-programme, it promotes Home Gardening among the public and discusses technical aspects with a practical approach; the programme has been highly rated and has a higher response from the public and policy planners.

During 2007, 48 live programmes were conducted on important topics of home gardening and related aspects; the good response from viewers has indicated the impact of the programme on home gardening; due to its success,"Ran Aswanu Mangallaya", the island wide home gardening competition was launched by the SLRC, for which over 5000 home gardeners have been registered as competiters.

Radio Programmes with SLBC (National, Ruhuna and Kandurata Service) and Private FM Channels

Altogether 11 live programmes (*Gewaththa, Aswenna, Kawluwa, Sandamini. Ruhunubimai Govidathai*) were broadcast in different radio channels on home gardening during the year; important topics in relation to home gardening were discussed broadly in the programmes.

Community Participatory Training

Nineteen training workshops on designing and development of home gardens were conducted during *Yala* 2007 within the premises of HORDI in which 2577 participants from different government organizations and willing individuals were trained and technical bulletins on home gardening were provided.

Also, twenty training programmes were conducted at locations outside of HORDI on the request of number of public and non-government organizations; 2814 participants were trained in these programmes.

"Thilina" Tomato: Breeder Seed Production

During the year 2007, 1000g of breeder seeds of tomato variety "Thilina" was produced and 750g was handed was over to the Seeds and Planting Material Division; in order to encourage the farmers to produce good quality seeds by themselves, the remaining lots were distributed among the farmers in the major tomato growing areas of the country (5g seed packets) on request.

FLORICULTURE PROGRAMME

Improvement of Endemic and Indigenous Flora

Exploration and collection of potential wild flora was continued during the year 2007; more than 360 accessions were maintained in the unit and few new accessions were added to the collection during the year 2007.

Study on Identification of Plants for Cut Foliage

This study was conducted in collaboration with Department of National Botanical Gardens and the Economic Strategic Supporting Programme (ESSP) of Ministry of Regional Development and Sri Lanka – German Development Corporation.

Suitability of different cut foliage types varies with the location cultivated between different DS divisions; 15 foliage species were identified as suitable to cultivate in Kandy and Matale Districts; a draft project report was submitted to National Botanic Gardens for implementation in future.

Development of Value-added Floricultural Products

- **Display Arrangements**

Development of display arrangements such as tray gardens and indoor landscaping

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is being carried out in the floriculture green house at HORDI in an exhibition manner.

- **Techniques of Dried Flower Production**

Caryota, English Ivy, *Ficus pumai, Cordyline* "Green", *Cycus spp* and *Asplenium nidus* were identified as responding cut foliage for glycol preservation; Roses, *Plumeria, Crossandra, Euphobia*, and *Chrysanthemum* were identified as suitable garden flowers for dry flower arrangements.

Management of White-fly in Gerbera Hybrids

A research was conducted to find out suitable insecticides to manage white fly in *Gerbere hybrida;* two insecticides, Imidacloprid and Thiomethoxam, were recommended to control white fly in *Gerbere hybrida* under green house conditions.

Study on Germination of Gladiolus Seeds

Major objective of this study was to perfect the technique of seedling production of gladiolus for hybridization programmes. Parallel studies were conducted in Hakgala botanic garden and plant house of floriculture section of HORDI, Gannoruwa; germination percentage of gladiolus variety, "Hakgala orange" seeds is comparatively low as 25% in Hakgala and 32% in Gannoruwa. Survival rate was 90% in Hakgala and 40% in Gannoruwa; the study is being continued.

CENTRAL LIBRARY

The Central Library continued to provide its services during 2007; it received more than 200 foreign and local periodicals during the period on complimentary and exchange basis. The HORDI subscribed to New Scientist, National Geographic and Time journals during the year; 3000 £ was paid for the CABI country membership by HORDI.

During the year, over 1550 readers visited the library; about 657 books were lent to the members; also provided other regular services such as: reference, inter library loan scheme etc.

The Central Library played an active role through AGRINET: 600 content pages (SDCP) were distributed among DOA officers; about 100 content pages were sent through e-mail to the officers who have internet facilities; provided journal articles requested by DOA officers after obtaining them from HARTI, CRI, RRI, TRI, PGIA, IWMI, NARA and university libraries.

About 100 retrospective searches were done throughout the year on the request of DOA officers; such facilities were also provided through AGRIS, SCOPUS and Internet as well; SCOPUS and PERI were other means the Library resorted to obtain information to cater to the needs of the clients.

The DOA journal, "Tropical Agriculturist" Vol 154 (2002-2003) and the "Annual Symposium of the Department of Agriculture" (ASDA) Vol. 7 were distributed among the DOA officers, local and foreign institutions.

DEVELOPMENT & TECHNOLOGY TRANSFER ACTIVITIES

During this year HORDI scientists conducted following training programmes for agricultural extension officers, farmers, school children, undergraduates, persons from private organizations etc.

- Cultivation of root & tuber crops

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- Crop disease management and Crop clinics
- Oyster mushroom & Button mushroom cultivation; spawn production
- Pest management of horticultural crops
- Basics of tissue culture
- Enhance practical knowledge on beekeeping
- Integrated pest management (IPM) in vegetables

Technical information was provided via paper articles, letters, telephone, personal communication, hand outs and leaflets.

Several undergraduates of the state Universities completed their final year projects and few NDT students completed the 6 months Im-Plant Training under the supervision of HORDI scientists.

Maintained the Insect Zoo, Home Garden and the Crop Museum; a model mini tissue culture lab is being constructed at HORDI premises with AVC to popularize low-cost tissue culture technology; an exhibition stall was displayed at the Fruit Exhibition, 2007.

TV Programmes

- New method of cleft grafting of mango in *Govibimata arunalu* 23 October 2007
- Status of Rambutan in *Govibimata arunalu* May 2007 July 2007
- Propagation of bread-fruit in *Govibimata arunalu* May 2007

Radio programmes

- Root and tuber crops
- Pest control

PLAN FOR 2008

Vegetables

- Planting material production as foundation stocks
- Application of tissue culture for ornamental crops.
- Technology transfer activities
- Identification of CTV and bacterium in citrus germplasm
- VCG analysis of *Fusarium* wilt pathogen of banana
- Studies on pest Control methods suitable for organic farming system
- Breeder seed production of "Matale Green"
- Breeder seed production of "Sena" variety
- Breeder seed production of "Bush polon"
- Development of integrated disease management package for capsicum Anthracnose
- Studies for disease management and advisory service
- Distribution of basic planting material of root and tuber crops
- Advanced yield trial and national coordinated varietal trial on cassava
- Development/ Identification of parental lines- yard long bean
- Evaluation of imported varieties of yard long bean
- NCVT and VAT on leafy vegetables
- Maintenance of gene bank of leafy vegetables
- Seed production of leafy vegetables
- Varietal development of potato
- Exploration, conservation and evaluation for high yield and quality fruit of uguressa varieties and finding out of suitable propagation method

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- Critical P value of vegetable crops growing in Mid Country Wet Zone
- Development of cucumber F1 hybrid varieties
- Germplasm evaluation of bitter gourd
- Purification and multiplication of promising lines
- Germplasm evaluation of Brinjal
- Diallel crossing of promising bitter gourd accessions
- Observational yield trial of bitter gourd
- Varietal adaptability test of bitter gourd
- National coordinated varietal trial of bitter gourd
- Screening of Brinjal germplasm for bacterial wilt
- Diallel crossing of promising Brinjal accessions
- Purification of selected promising accession of Brinjal
- Variety adaptability test of Brinjal
- Major yield trial of Brinjal
- National coordinated varietal trial of Brinjal
- Screening of capsicum germplasm for bacterial wilt
- Germplasm evaluation of *Capsicum*
- Diallel crossing of promising *Capsicum* accession
- Purification of selected promising *Capsicum* accession
- Yield trial of *Capsicum*
- National coordinated varietal trial of *Capsicum*
- Variety adaptability test of *Capsicum*
- Tomato varietal development via conventional breeding
- Tomato varietal development via heterosis breeding
- Tomato varietal development via mutation breeding
- Evaluation of tomato inductions
- Genetic maintenance of parental materials of F1 hybrids
- Awareness programs on tomato in Matale district farmer fields
- Multiplication of pre-released tomato varieties
- Varietal development in pumpkin
- Development of new ornamental plants from indigenous and introduced species using breeding techniques
- *Luffa* germplasm evaluation and purification
- *Luffa* Hybridization
- Screening of hybrids
- Maintenance of bean F4, F5 populations
- Screening of pole bean varieties (NCVT, VAT)
- Study on bean yellowing
- Yield trials on bitter gourd (OYT,MYT,PYT)
- Yield trials on Brinjal (OYT,MYT,PYT)
- Plant density study on green house tomatoes
- Effect of plot size on yield of green house tomatoes
- Effect of plant density on yield of *Capsicum* under open field condition
- Varietal adaptability trial on vegetables
- Influence of weather conditions on Male and Female flower initiation of cucumber

Root & Tuber

- Evaluation of salt tolerant sweet potato clones
- Establishment, multiplication and evaluation of high dry matter sweet potato varieties.
- Advance yield trial of CIP sweet potato varieties
- Time of planting of Innala
- Maintenance of recommended sweet

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potato varieties and production of basic planting materials..

- Maintenance of Sweet potato, Innala, *Diascorea, Colocasia,* Turmeric and minor root crops germplasm.
- Establishment of Yaya demonstrations
- Facilitate training programme
- Biological control of nursery diseases
- Testing of imported planting materials for quarantine diseases
- Studies on disease management and advisory service
- Testing adaptability and yield potential of a new species of mushroom
- Varietal adaptability trial on cassava
- Multiplication of pre released ginger variety Fiji
- Ginger germplasm maintenance, collection and identification of true to type ginger varieties
- Evaluation of cultural/ biological control measure to reduce leaf yellowing disease and increase productivity
- Kiri ala germplasm maintenance
- Basic planting material production of recommended varieties of Kiri ala and *Diascorea*

Fruits

- Comparison studies on tissue cultured Ambon banana and conventional suckers for nutrient requirements
- Nutrient requirements for high density Ambon banana in effective soil groups in MCW 2
- Testing of different nutrient management packages developed at HORDI for Ambon banana under high density planting system
- Development of high yielding good quality Rambuttan varieties through induced mutation
- Development of high yielding good quality mango varieties through induced mutation
- Development of high yielding good quality and disease resistant banana varieties through induced mutation
- Development of high yielding good quality mangosteen varieties through induced mutation
- Selection of high yielding good quality and disease resistance banana germplasm
- Identification of parental varieties for hybridization for high yield and quality fruits of durian
- Exploration, conservation and evaluation of Jack fruit
- Interstock study on mango for dwarfing
- Improvement of Dragon fruit through hybridization
- Selection of banana variety Ambon
- Germplasm exploration, collection, characterization, conservation and evaluation of under utilized fruit species
- Studies on improvement of nursery management and vegetative propagation of underutilized fruit species (Beli, Mandarin, Uguressa, Veralu, Lovi, Masan, Velvet tamarind, Madan, Woodapple)
- Seed germination studies on underutilized fruit species (Beli, Mandarin, Uguressa, Veralu, Lovi, Masan, Velvet tamarind, Madan, Woodapple)
- Development of database on underutilized fruit species
- Study on incidences of pest and disease in underutilized fruit species under naturally grown and cultivated conditions
- Study on the effect of fertilizer on seedling growth of Beli
- Management of diseases in protected houses

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- Studies on evaluation of storage possibility of Velvet tamarind
- Production of elite planting material of Beli by vegetative propagation

Tissue Culture

- Establishment of *in vitro* nuclear stocks of banana and pineapple varieties
- Application of tissue culture for selected fruit crops
- Mode of *in vitro* plant regeneration from a cultured plant cells
- Development of a package for tissue culture at home level
- Demand driven training on "Basics of plant tissue culture"

Entomology

- Development of botanical pesticides
- Studies on pest control methods suitable for organic farming system
- Exploration and utilization of fruit fly natural enemies.
- Identification of commercially grown banana varieties for industrial purposes.
- Sustainable development of home gardening
- Studies on pest control methods suitable for organic farming system.
- Studies on protein base incorporated IPM system for melon fly control
- Area wide management of fruit flies-Crop Zone project

Pathology

- Management of *Fusarium* wilt of banana
- Resistant varieties for bacterial wilt and Anthracnose
- Resistant varieties of maize for Aflatoxin production
- Virus indexing of fruits and vegetables
- Evaluation of some fungicides for major diseases
- Screening for rice blast disease
- Sustainable development of home gardening
- Evaluation of fungicides for fruit and vegetable diseases
- Identification of resistant sources of capsicum, Brinjal and beans for anthracnose
- Development of formulations of fungal bio-control agents
- Management of nursery diseases of fruit crops
- Biological control of nursery diseases
- Testing of planting material for quarantine diseases
- Identification of resistant varieties of tomato for viral diseases (CMV, YLCV)
- Identification of resistant varieties of cucumber for viral diseases
- Identification of resistant varieties of capsicum for viral diseases
- Management of diseases in Avocado
- Management of Anthurium diseases

Chemistry

- Comparison studies on tissue cultured Ambon banana and conventional suckers for nutrient requirements
- Response of vegetables to added Zn
- Fe status in RBE and RBL soils in MCIZ
- Cu status in RBE and RBL soils in MCIZ
- Effect of different types of compost on vegetables
- Preparation of different types of vermicompost and laboratory testing
- Long term effects and compost application on vegetable yield and soil quality
- Preparation of liquid organic extracts and green house testing on crops
- Soil fertility assessment and improvement programme at Marassana vegetable growing land

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- Water quality monitoring of Mahaweli river water
- Evaluation of rain ship techniques for extraction of soil phosphorus
- Micro nutrient status of green manures
- Zinc status in soils of Nalanda area
- Formulation and evaluation of fertilizer mixture for poly-tunnel crops
- Investigation of heavy metal status in different cropping systems in Sri Lanka
- Assessment of soil fertility management problems and implement in intensive cropping systems

Floriculture

- Development of novel genotype from potential endemic and endogenous flora
- Production of marketable display arrangement of unexploited floricultural plants and value added novel products.
- Improving of locally available flower crop varieties via conventional and mutation breeding
- Collection, identification and evaluation of promising underutilized and unexploited home garden adaptable crops and crop varieties
- Exploration, collection, maintenance of ornamentally potential wild flora germplasm
- Genetic improvement of potential wild flora and other indigenous floricultural species
- Sustainable development of home gardening
- Development of production technology packages for newly rain fed Novel floricultural genotypes
- Breeder seed production of Thilina tomato
- Display arrangement of unexploited floricultural plants as value added novel products

Extension & Training

- Development of IPM packages for vegetables under farmer field conditions
- Development of IPM packages for vegetables under protected conditions

Mushroom

- Improvement of soil fertility and disease management through *Mychorhiza* and beneficial micro organisms
- Comparison of biological activities with organic farming site and non organic farming site
- Identification of suitable methods for opening of fully grown mushroom compost bags to enhance the mushroom productivity
- Selection of low cost substrate for commercial spawn production of Oyster mushroom

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2.2.1 PLANT VIRUS INDEXING CENTRE (PVIC) - HOMAGAMA

The Plant Virus Indexing Centre, Homagama functions under the administration of HORDI, Gannoruwa. The responsibilities of this center are identification of plant viruses, development of test kits for virus detection under laboratory and field conditions, virus indexing of samples from the field and plant quarantine service, carrying out studies on virus epidemiology and weed virus association, evaluation of possible control methods, development of virus free basic foundation stocks, investigation on virus coat protein mediated resistance, and detection of other pathogenic organisms (fungal, bacterial and nematodes).The centre has focussed its activities to help the farmers to maintain their crops free from plant diseases.

The PVIC has following 6 divisions:

- Serology/Virology unit.
- Virus epidemiology unit,
- Biotechnology unit,
- Tissue culture unit,
- Other pathogenic organism unit
- Technology transfer unit

BUDGET

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

Table 2.2.1.1: Annual budget – 2007 (Rs.)

Vote	Allocation	Expenditure
Recurrent	1,815,000.00	1,292,928.08
Capital	2,334,000.00	2,236,079.95
CARP 12/618/465360,000.00		193,652.48
CARP 12/672/503506,160.00		339,801.87
Crop Zoning Project	1,000,000.00	926,543.98
Simple virus control tech.	200,000.00	134,746.90
Total	6,215,160.00	5,123.753.26

PROGRESS

CONVENTIONAL PLANT VIROLOGY

Production of Polyclonal Antisera Locally for Routine Indexing Purposes

- **Banana Bunchy Top Virus (BBTV)**

Purified the virus and produced antiserum; studied the optimum conditions to detect BBTV by indirect ELISA technique; the best sample extraction buffer was PBST+0.13% Na_2So_3+2% ova albumin at 1:10(W/V) tissue dilution; antiserum dilution was 1:200 in PBS-TPO buffer incubated for 2 hours at 37^{0}C; the protein A conjugate was at 1:2000 in PBS-TPO buffer; after adding PNP substrate was incubated for 30- 60 minutes at 37^{0}C.

- **Banana Bract Mosaic Virus (BBrMv)**

Purified this virus by Hammond and Lawson (1988) method with slight modifications; 0.1M PBST buffer pH 7.4+ 0.13 % Na_2So_3+ 2% poly vinyl Pyrrolidone (PVP) + 0.2% of Ova albumin was identified as the best sample extraction buffer; best

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antiserum dilution was 1:500 in PBS-TPO buffer keeping the conjugate dilution at 1:2000 in PBS-TPO buffer; the best time to get readings was 1 + hours after the addition of substrate; this study indicates that the highest virus concentration of BBrMV is present at root tips followed by flower bract; the more suitable plant parts to check the presence of virus by ELISA were the bract and the leaf lamina of flag leaf or the 1st leaf.

- **Virus Detection and Identification of Dasheen Mosaic Virus**

There is no specific commercially available antiserum for the detection of Dasheen Mosaic Virus in "*Kiriala*". Therefore virus detection techniques were found to identify the above virus by direct ELISA using potato virus Y serum.

- **Identification of Virus Diseases in Strawberry**

Samples with virus like symptoms were collected from strawberry and indexed by double antibody sandwich enzyme linked immunosorbent assay (DAS-ELISA); percentages of virus infected in tested samples were 9% for tobacco streak virus (strawberry necrotic shock virus), 18% for strawberry mild yellow edge virus and 7% were mixed infections of the above two; strawberry latent ring spot virus was not detected in any of the samples.

- **Evaluation of MG3 Pineapple Cultivar Imported from Philippines**

At early stage characteristic external symptoms of the virus were not visible; indexing by ELISA was performed with antisera produced locally; there was no color reaction and the test result was found negative; in the PCR indexing, results were positive for PBV and PMWaV1 and negative for PMWaV2; the stock is being maintained under restricted conditions for further studies.

- **Routine Indexing of Viruses**

Tested banana samples, 56 from DOA, 53 from private sector and 205 PVIC for BBTV, BSV, BBrMV and CMV; conducted altogether 1256 tests on several crops, which include 40 on pineapple (for PWV), 35 on strawberry (for SMYEav, SLRSV and TSV), 42 on orchids (for CymRSV, CymMV and ORSV), 56 on beans (BCMV and PLRV), 30 on citrus (for Cit Green & CTV), 40 on cassava (for ICMV), 50 on papaya (for PRSV) and 40 on potato (for PLRV/PVY).

VIRUS EPIDEMIOLOGY

Detection of Viruses in Weeds in the Low Country Vegetables and Cassava

Collected weeds with disease like symptoms from crop lands and adjacent areas; subjected to sap transmission and ELISA tests; from the test results numerous weeds were identified as alternate hosts for viruses causing crop diseases; namely *Sphaeranthus indicus*, *Peuraria phaseoloides*, *Mimosa pudica* and *Sida rhombi folia* were identified as alternative hosts of the Bean Common Virus, *Centrosema pubescence*, *Nicandra physalia* and *Capsicum frutescens* for Cucumber Mosaic Virus, and *Acalypha ciliate*, *Acalupha indica*, *Mikania cordata*, *Balainvillea acmella*, *Ageratum conizoides* and *Jatropha curcas* for Indian Cassava Mosaic Virus; from sap transmission studies, weeds such as *Oxalis barrelieri* and *Aerva lantana* were identified in harboring viruses; further studies are being continued; also identified wild tobacco (for strawberry streak virus), Tamberia (for potato virus Y) and *Vinca rosea* , *Thibbatu* (for Brinjal little leaf mycoplasma disease) as alternate hosts.

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Control of Papaya Ring Spot Virus (PRSV) by Application of Herbal Spray and other Conventional Methods (mixed cropping, barriers, roughing and field sanitation)

This study was done on observational level at the PVIC and also in selected farmers' fields in the area; results have revealed that alternative application of neem oil or citronella oil (2ml oli+ 2 ml teepol+ 1L water) reduced the PRSV infection; investigations are being continued.

Study on the Transmissibility of Cassava Mosaic Virus by White Fly Vector *Aleurodicus sp.*

Bemisia abaci are being identified as the vector of Cassava Mosaic Virus (CaMV).According to the results of transmission and serological studies, it was identified as a potential vector for the above virus; studies are being continued.

Study the Population Dynamics of Aphid Vectors

Results of this study conducted from September 2005 to July 2007, have indicated that that aphid population was increased during the dry spell (in September) after a moderate rain fall in August and it was decreased with the on set of *Maha* rain. Population was low during the dry period (December to February); studies are being continued.

Cassava Mosaic Virus Eradication Programme in Western Province

Conducted a field investigation initially to assess the level of infection; in the survey 24 cassava fields (altogether 45 ac) were investigated; 2 fields (6 ac) were found to be infected with 10% of plants having symptoms of the disease.

Consequently training and awareness programmes were conducted, one for senior officers of the Dept. of Agriculture (Provincial) and Agrarian Services, 2 classes for Monitoring Officers and Agricultural Instructors and 4 classes for Agriculture Research and Production Assistants (ARPA).

Enhancement of Farmer Income through Virus Delaying Techniques in Selected Fruit and Vegetable Fields in the Wet Zone

Conducted a field investigation on ten farms (22 ac, including 3 poly tunnels) cultivated with low country vegetables, banana, pineapple , papaya and diascoria. It was observed that almost all of the vegetable fields were infected with Cucumber Mosaic Virus, 90% of banana fields infected with Banana Bract Mosaic Virus and 100% of the papaya and pineapple fields infected with Papaya Ring Spot Virus and Pineapple Wilt Virus transmitted by the mealy bug. The framers were advised to uproot the diseased crop plants and alternate hosts, control of pests, establish barrier crops, improve crop sanitation and use virus free planting materials.

In this regard 2 training classes were conducted for Monitoring Officers, Programme Assistants and Agricultural Instructors, 4 classes for staff of provincial Departments of Agrarian Services and Agriculture and 2 classes for farmers.

MOLECULAR VIROLOGY

Detection of Papaya Ring Spot Virus by RTPCR

To develop a PCR based detection method for Papaya Ring Spot Virus (PRSV), a collaborative study was conducted with the Faculty of Medicine, University of Colombo.

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It was not possible to produce DNA for papaya ring spot virus by using the RNA template from purified preparations of PRSV or by immuno capture method. However, with RNA extracted by using trizole reagent, it was possible for the production of complementary DNA for PRSV. However implication of CP gene of PRSV, by using MB 11 and MB 12 primer pair, failed to give positive results.

Identification of Different Strains of Banana Streak Virus in Sri Lanka

The high degree of genomic and serological heterogeneity among banana streak virus isolates has led to problems in developing reliable indexing methods for virus identification and disease control. Viral DNA isolated from different banana varieties infected with banana streak virus was subjected to Polymerase Chain Reaction with four specific primer pairs *viz,* Mys F1/R1, RD F1/R1, GF F1/R1, and Cav F1/R1 specific for BSV-Mys, BSV-RD, BSV-GF,and BSV Cav virus isolates respectively.Only BSV-Mys strain was detected in infected *Embul,Pulathisi* and *Kolikuttu* varieties. BSV-Mys, BSV-RD and BSV-GF strains were detected in infected *Seenikesel* variety. Only BSV-GF strain was detected in infected *Cavendish* variety. BSV –Cav strain was not detected from any of the varieties studied.

Identification of Strains of Banana Bunchy Top Virus using Polymerase Chain Reaction (PCR)

For the identification of different genomic variables in BBTV, several primers were used in polymerase chain reaction. Primer pair for component 1 (FPCR 4 and 30mer F3), degenerated primer pair (BBT1 and BBT2) and primers for characterizing strains as severe, moderate and mild forms (C-1CR,S-CR, SR-SR) were also used. It was found that in Sri Lanaka, component 1 of BBTV was not present. Degenerated primer pair amplified almost all BBTV infected samples. Two other severe strains of BBTV, S3 and My- S3 were also present. However, it was not possible to identify intermediate or mild forms of BBTV in this investigation.

Host Range Study of Pineapple Baciliform Virus (PBV) within the *Bromeliaceae* family.

Leaf extracts of 49 bromeliad plants including six genera (*Aechmea, Ananas, Billbergia, Cryptanthus, Guzmania, Neorgelia*) were subjected to PCR using the virus specified primers to detect the presence of PBV. Out of 24 spp. Tested, 19 spp. were found to harbor the PBV. *Dycki remotiflora, Cryptanthus bromeliads, Guzmania lingulata, Neorgelia carolinae* were found free of the virus tested.

Pineapple Mealy Bug Wilt

Conducted a study to detect optimum conditions required for pineapple mealy bug wilt associated RNA virus 1 (PMWaV -1) and mealy bug wilt associated RNA virus -2 (PMWaV-2) using RT-PCR in pineapple.

Detection of BSV in Tissue Cultured Banana Clones and Genomic Integration of BSV in Banana Varieties having 'B' Genome

This study was carried out using 10 banana varieties planted at the PVIC field. Extracted DNA was amplified using PCR and analyzed the product by gel electrophoresis. Analysis showed that of BSV sequence was present in *Ambul* (AAB), *Kolikuttu* (AAB), *Pulathisi* (AABB), *Ranel* (ABB), *Prasad*(ABB) and *Kandula* (AAAB) and was absent in Embon (AAA), *Bin kesel* (AAA) and *Anamalu* (AAA). Although *Seeni kesel* is having a 'B' genome (ABB) it is not possible to get positive results.

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TISSUE CULTURE UNIT

Propagation of Papaya through Tissue Culture

Lateral shoots of papaya were cultured in MS basal medium (+ MS + without hormones). Fungal and bacterial contamination was very high at initial stages; about 2-3 weeks after initiation all explants failed to survive due to contamination; studies are being continued.

Production Conditions of Tissue Cultured Banana

Field investigations suggested that suitable multiplication ratio for banana is 1:200; optimum sub culturing stages are: 5^{th} – 7^{th} sub cultures; the number of plants at final subculture of different varieties were: for *Dwarf Cavendish* -187, *Ambon* -400, *Binkesel* - 300, *Anamalu*-130, *Seenikesel*-336, *Pulathisi*-450, *Ranel*-60, *Alukesel* (local)-20 , *Kolikuttu* -60 and *Ambul*-210.

Growth and Fruiting Characteristics of Popular Banana Varieties Produced through Tissue Culture

Following characteristics were observed during the vegetative and reproductive stages of *Cavendish* dwarf, *Pulathisi, Embon, Embul, Seeni and Kolikuttu* varieties:

- All the varieties exhibited a reduced plant height.
- An acceptable bunch weight range from 15-20 kg for varieties.

The above characters will be further studied by planting at different locations.

Planting Material Production

- 4000 virus free tissue culture plants were produced under Crop Zone project and distributed among 125 farmers.

OTHER PATHOGENIC ORGANISMS

Other Pathogenic Organisms Identified from Diseased Samples Obtained from Farmer Fields and PVIC Field

- Jak fruit – die back- *Phomes lignos.*
- Banana -Panama disease- *Fusarium oxisporum,* Sigatoka- *Cercospora musae,* Cordana- *Cordana spp.,* Anthracnose- *Colletotricum spp.*
- Okra - Grey leaf Spot – *Cercospora abelmoschi,,* Black leaf spot – *Alternaria spp.,* Brown leaf spot – *Cercospora spp.*
- Capsicum – Leaf spot – *Septoria spp.*
- Tomato – Stem end rot – *Thielaviopsis spp.,* Fruit rot *(Anthracnose) Colletotrichum spp.,* Leaf spots - *Septoria lycopersici.*
- Beans -Pod rot - (Anthracnose) *Colletotrichum spp.,* Leaf spot - *Cercospora spp.,* Seedling soft rot- *Phythium spp.*
- Cow pea - Rust - *Uromyces phaseoli.*
- Brinjal - Downey Mildew–*Oidiopies spp.*
- Mango –Fruit rot-Anthracnose - *Colletotrichum spp.,*
- Rambutan- Leaf rot- Anthracnose - *Colletotrichum spp.,*
- Mushroom culture medium contamination – *Tricoederma spp.* (Saprophytic fungi).
- Pineapple - leaf/stem rot-Heart rot- *Phytopthora spp.,* Kankun- Leaf spot- Brown spot- *Sercospora spp.,*
- Diascoria- Leaf spot- Anthracnose- *Colletotrichum spp.,*
- Betel- Root/stem damage- Bacterial wilt- Gram (-) bacteria,
- Drascena-Leaf wet spot-Gram (-) bacteria.

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TECHNOLOGY TRANSFER DIVISION

Training Classes for Public and Private Sector Personnel

Conducted 20 training classes for personnel of Samurdhi, Army, Agriculture Research and Development Officers, Agricultural Instructors, Monitoring Officers and farmers on "Eradication of Cassava Mosaic Virus in the Wet Zone " and "Management of viral diseases using simple control techniques"

Demonstrations for Private and Public Sector Organizations

Conducted 5 demonstrations on modern techniques of viral disease detection, for private and public sector officers.

Work-shops

Conducted a work-shop for private and public sector officers and academics of universities, on "Importance of Disease Diagnosis in Rapid Propagation".

Field Days

Conducted a field day with the participation of farmers in the area, who have cultivated banana plants produced by tissue culture; Hon. Mithripala Sirisena, Minister of Agriculture Development and Agrarian Development also participated.

TRAINING

Mrs. B. M. V. S. Basnayake, Research officer was selected to follow Ph.D. programme on Molecular Pathology under the open scholarship sponsored by Chinese government in 2006. Presently she is reading for her Ph.D. in the University of Zhejiang, Republic of China.

Mr. Samitha Gunasinghe followed a short course on Molecular Biology from Gene Tech Sri Lanaka.

Collaborative Studies

Collaborative studies were initiated with Dr.(Mrs.) Sulochana Wijesundara from Biochemistry Division, Faculty of Medicine University of Colombo.

Further technical guidance were obtained from Dr. Jhon Thomas (Plant Pathologist) Queensland Department of Primary Industries and Professor Marion Bateson from Queensland University of Technology Australia.

Under graduate Research Projects

Center has offered four undergraduate projects to university of Wayamba, Ruhuna and University of Kelaniya Microbiology Department.

Industrial Training was offered for 04 under graduates.

Plant Virology Course and Demonstration on Modern Virus Detection Technologies

"Plant virology course" was conducted to undergraduates of Department of Microbiology, Department of Botany, University of Kelaniya. Demonstrations were undertaken to above students and undergraduate from University of Ruhuna.

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PLAN FOR 2008

Conventional Virology and Serology Division

- Production of antiserum for identification of coconut root wilt disease.
- Study the relationship between abnormality in potato tubers and virus infection.
- Develop rapid immune paper absorbent (RIPA) technique for detection of potato virus X, Y and Bunchy Top Virus.
- Identification and confirmation of virus diseases in *Xanthadisia.*
- Identification of virus diseases in different dragon fruit varieties in the cultivations and nurseries.
- Detail studies on symptomatology of mite damage and Papaya Ring Spot Virus (PRSV) infection by PVIC produced antiserum.
- Develop direct ELISA system to detect potato virus X by locally produced antiserum.
- Study the relationship between Banana Streak Virus (BSV) symptom and ELISA results for field grown tissue culture plants before and after fruiting.
- Identification on virus symptoms produced in MG 3 pineapple cultivar and relationship to ELISA results using PVIC produced antiserum.
- Monitor the disease incidence of Pineapple Yellow Spot Virus in imported pineapple through tissue culture.
- Routine virus indexing through serological methods

Epidemiology Division

- Identification of common viruses in weeds and other alternative hosts in low country vegetables and root and tuber crops in order to develop control methods.
- Test the efficiency of controlling papaya ring spot virus by treatments with neem or citronella oil to the crown apex.
- Eradication of Cassava Mosaic Virus infection in cassava cultivations in Western Province.
- Use of simple virus control methods in selected vegetable and fruit growing fields to enhance their economical yield.
- Study the population dynamics of aphids by different trapping methods.
- Study the suitability of different structures and pot cultures for disease free cultivations which could apply to urban agriculture.
- To promote agriculture under *"Api wawamu rata nagamu"* programme by establishing a disease free home garden model at PVIC fields.
- Eradication of Dasheen Mosaic Virus in recommended *"kiriala"* cultivars through heat therapy and maintain virus free cultivations.

Molecular Virology Division

- Development of RNA extraction method using fractionated silica.
- Study the spread ability of severe form of pineapple wilt associated virus -2 (PMWaV-2) using RT-PCR technology
- Find optimum conditions to detect Banana Streak Virus in banana using IC-PCR technique.
- Identification of Cucumber Mosaic Virus in banana using RT-PCR technique.
- Develop molecular based detection methodology for PVX and PVY using RT-PCR technology.
- In-house preparation of Taq Polymerase
- Routine virus indexing.
- Study the genomic integration of Banana Streak Virus in banana with 'B' genome.

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Tissue Culture Division

- Identification of banana varieties for tissue culture propagation without inducing Banana Streak Virus infection due to genomic integration.
- Eradication of virus diseases in recommended banana cultivars through meristem culture and heat therapy.
- Eradication of virus disease in MG 3 pineapple cultivar through meristem tip culture and heat therapy.
- Find optimum conditions to propagate 'Sieco' Papaya cultivar.
- Establishment of repository center at PVIC for banana with virus free DOA recommended cultivars.
- Production of 15,000 virus free Embon and other popular banana varieties.

Technology Transfer Division

- Publication of advisory leaflets based on research findings at the center.
- Conducting awareness classes to promote agriculture in government and private sector organizations.
- Making available facilities to conduct undergraduate research projects relevant to center's programme.
- Conducting demonstrations on modern virus detection techniques.
- Promoting healthy home garden cultivations in the area.
- Monitor the suitability of tissue culture propagated banana cultivars by PVIC in farmer fields.
- Publication of research findings in suitable journals.

Other Pathogenic Organisms Division

- Set new conditions to detect Citrus Greening Bacteria using locally produced antiserum.
- Study the host range of Brinjal Little Leaf mycoplasma disease.
- Literature survey on wilt of coconut palms due to mycoplasma.
- Routine disease diagnosis of fungi and bacteria by culture methods.

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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

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

Table 2.2.2.1: Annual Budget-2007 (Rs.)

Project	Allocation	Expenditure
Horana Lab (Furniture & office equipment)	4,118,000.00	4,116,193.77
Development of Horana (Lab equipments)	24,038,500.00	23,236,302.82
Capital	1,315,800.00	1,243,716.71
Recurrent	4,323,600.00	3,446,808.84
Crop Zoning Program 2007	1,974,700.00	1,317,349.40
SL-USA	892,376.41	380,105.19
Hybrid Vegetable	173,400.00	171,193.44
Organic farming	300,000.00	280,593.00
Horana Building Completion of new building	11,000,000.00	11,000,000.00
Total	48,136,376.41	45,192,263.17

PROGRESS

CROP IMPROVEMENT

Development of Hybrids of Guava

Developed and evaluated 34 hybrids; identified 7 of them as most promising for regional testing; they are currently being tested at 5 locations (RARDC: Aralaganwila, Makandura, Horana, Angunakolapelessa and Bandarawela) for their adaptability in different agro-ecological regions of the country.

Development of Hybrids of Papaya

Two inbred lines of papaya were developed to use as parental lines in F_1 hybrid production; they are uniform in growth characters, fruit flesh color and sex ratio of hermaphrodite to female flower 2:1 in 4th generation (G4); stability of the characters of the inbred lines will be tested in G5.

Selection of Promising Rambutan Varieties

Nine accessions selected from existing population in farmer fields were established at FCRDC, Horana; they are being evaluated for growth and fruit characters; most of them have a similar growth rate but differ in leaf characters; two accessions are excellent in fruit quality.

Selection of Banana Varieties from Local Germplasm

Selected 11 most promising accessions (*Embul* 1, *Kolikuttu* 2, *Seeni Kesel* 4 and *Suwandel* 4) out of 17 evaluated; they will be tested in different agro ecological regions.

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Variety Development of Passion fruit

This program was initiated in 2006 at FCRDC, Horana to develop high yielding, good quality passion fruit varieties through selection and hybridization; under this 9 yellow type accessions were collected, evaluated and 3 promising accessions were selected based on fruit size, fruit weight, juice content and juice quality; further, the cross compatibility of the accessions is being tested to identify compatible yellow varieties for cultivation and also for hybridization.

Conservation and Variety Improvement of Mango

Collected and established 10 exotic mango varieties (Carrie, Early gold, Irwin, Joe Welch, Kent, Mulgoa, NamDoc Mai, Pope summer, Sensation, Zill) and local varieties in cement pots since September 2004 for conservation and for breeding; recorded certain quantitative and qualitative inflorescence characteristics of five accessions that flowered in 2007; there was a wide variation in the percentage of hermaphrodite flowers among those accessions; it was observed that there was fruit set only in four accessions; Willard had the highest number of mature fruits. Also, 5 accessions of *Betty mango* were collected.

Selection of a Promising Variety of Durian

Collected 32 durian (*Durio zebethinus*) accessions from different areas of the country; they, along with 2 accessions from Thailand are being evaluated to select well adapted, high yielding varieties with good quality fruits; seven accessions attained the flowering stage after four years of planting; accession HOD-01 was observed bearing fruits.

Variety Development in Citrus spp.

The variety development program of citrus was initiated in 2002 with the objective of developing high yielding good quality citrus varieties (mandarin, orange and pumello) through selection, hybridization and mutation breeding.

At present 27 mandarin (*Citrus reticulata*), 11 *heen naran* (*Citrus crenatifolia*) and 09 Pumello (*Citrus grandis*) accessions are being evaluated; multiplied 3 promising mandarin accessions (HOCR 19, HOCR, 25 and HOCR 23,) which gave high yields (34, 10 and 6 kg/tree/ season respectively) with good quality fruits to test their adaptability in different ecological regions.

- Introduced 7 exotic citrus germplasms from Japan under Ehime-Sri Lanka Agricultural Exchange Program; they are being evaluated at the station.
- Commenced a mutation breeding program in 2007 with highly adaptable high yielding citrus spp viz. *Nasnaran* (*Citrus japonica*) to improve its fruit quality characters; about 600 bud woods irradiated by gamma rays are being evaluated for identifying desirable mutants.

Selection of Promising Avocado Varieties

Collected and established 22 avocado accessions at FCRDC; they are being evaluated for quality fruits; out of the accessions established in 2002, one local accession (HOAVO 1) and two recommended varieties (Tower II, Simmond) bore fruits after 46 months since field establishment.

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Selection of Promising Wax apple (*Syzygiyn* spp.) Varieties

Collected, established and evaluated 24 *Syzygiun* accessions to identify superior types; 20 of them bore fruits by 3rd year after establishment; 2 types produced seedless fruits with good flavor; evaluation is being continued.

Germplasm Collection, Conservation, Characterization and Evaluation of Under-utilized Fruit Crops

Under this program, which was initiated in late 2002, there were 303 accessions established in 14 field gene banks covering an extent of 3.73 ha by the end of 2007; in these gene banks there are accessions of *Beli* (24), citrus (47), *Lavalu* (5), *Lovi* (4), Jak (32), *Veralu* (17), *Uguressa* (22), *Goraka* (33), *Gaduguda* (13), Durian (35), *Sapota*(17) , *Anona* (14), Wax apple(26), Strawberry guava(7), Wild guava (7); characterization and evaluation are being continued to identify promising varieties for recommendation.

Development of Okra Hybrid Varieties.

Fifteen inbred lines were tasted for their combining ability by carrying out a half di-allel crossing program; selected 35 crosses from 105 combinations, for further evaluation.

Purity Maintenance of "*Varaniya*" Green Chilli Variety

A selection program is being carried out to identify a promising variety from 10 *Varaniya* type green chilli cultivars collected from farmer fields.

CROP MANAGEMENT

Pineapple as an Inter-crop under Durian

Initiated a study to find out the influence of plant density on fruit yield, quality and longevity of pineapple as an intercrop under durian in order to identify a suitable plant density for intercropping; preliminary results indicate that a high density planting (13333 plants) leads to a higher yield at the beginning; however, conclusion on yield, fruit size and longevity of crop could be made only after analyzing the yield data for another 1 – 2 years; the trial is being continued.

Productivity Enhancement through Management of Canopy and Nutrients

Among various factors, which affect productivity of guava, tree canopy management along with provision of nutrients and moisture contributes tremendously to raise productivity; wedge grafted plants(var. Pubudu) were trained using over the head trellis system with 9 different levels of N, P and K fertilizer combinations together with shoot pruning; during the 3rd year, canopy managed trees that received high N (600g/ plant), moderate K_2O (300g/ plant) and P_2O_5 (300g/ plant) produced the highest yield of 16.7t/ha with an increase of 33% over the present recommendation; also canopy management increased the individual fruit weight by 30% over the untrained trees.

Mangosteen Grafts on Double Root - stocks

The slow growth habit, which is an inherent characteristic of mangosteen, is one of the major constraints in expansion of the crop. The possibility of improving the rate of

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canopy development of grafts by provision of an additional root system is under investigation. At the age of 3 yrs after field planting, double root - stocked plants had grown into well developed tree structure with increased plant height, satisfactory branching and canopy development when compared to those qualities of grafts on single stock plant; at the beginning of 4th year, (38 months after planting) nearly 60% of grafts initiated flowers, as a consequence.

Evaluation of Different Species of *Anona* as Root - stocks

Seven members of *Annonaceous* family, viz. *A. reticulate, A. squamosa, A. purpurea, A. glabra* and *Rollinia* spp. were tested for the suitability as a root - stock for sour - sop. Among them A. *squamosa* showed the lowest success rate of 20% while the others had a satisfactory rates of 70% - 90% and 100% of graft survival at 3 months after field planting; grafts on *A. squmosa* exhibited leaf yellowing followed by retarded vegetative growth and eventual death in the field indicating its incompatibly with sour-sop; evaluation of growth and yield parameters is being continued.

Performance of Dragon-fruit at Horana

The second crop of dragon fruit was harvested from May to October 2007 with peak harvest taken in July and August: there was a high variation in the yield of vines from 1.5 kg to 21 kg.; weight of a harvested fruit ranged form 419-743 g and number of fruits per plant ranged from 2-48.

CROP PROTECTION

Post - harvest Diseases of Papaya and their Control

An experiment was conducted to study the fungi associated with the spoilage of papaya fruits and to evaluate several control measures; 10 pathogenic fungi were identified as causal agents for papaya fruit rot; out of the fungi isolated, the most common were *Phoma caricae, Colletorichum gloesporioides, Oidium caricae, Phytophthora palmivora, Botryodiploidia theobromae* and *Rhizopus stolonifer*; pathogenecity of fungi was confirmed and the symptoms of each pathogen infection were identified and recorded as black rot, anthracnose, powdery mildew, white rot, stem end rot and soft rot respectively.

The efficacy of cinnamon plant extract (10ppm) and selected fungicides on the control of above fruit rot diseases were evaluated in the field; Bavistin gave the lowest disease incidence (31.69%) while the cinnamon extract had a similar effect (38.19%); incidence of the disease treated with other fungicides varied (from 49.11 – 75.33%).

Application of copper fungicides produces scorching symptoms on the fruits. Since the Bavistin is a systemic fungicide it is not advisable to spray it on the fruits; the cinnamon extract does not have health hazards to human beings; it is environmental friendly; it can be successfully applied to reduce fruit spoilage of papaya.

A Serious Pest of Guava

The insect *Helopeltis antonii* was identified as a serious pest of guava; a highly positive correlation between its damage and the incidence of guava fruit canker disease has been observed. The insect was successfully controlled by spraying Imidacloprid (Admire) at the rate of 5 ml/10L water, three times at 3 weeks interval. It was found that guava fruit canker disease can be minimized by controlling *Helopeltis antonii*.

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New Insect Pests in Under-utilized Fruit crops

Two leaf feeding caterpillars which cause severe damage to *Uguressa* and *Gaduguda* were identified.

- In *Uguressa,* damage is caused by feeding on the immature leaves by larvae; the adult insect, which is a butterfly with orange and black colored wings, was identified as *Atella phalantha* Drury.
- In *Gaduguda,* damage is highly severe as thousands of caterpillars gather and feed on mature and immature leaves. The adult, which is identified as *Cyclosia panthana,* belongs to the Order *Lepidoptera* and Family *Zyganidae,* has black wings with whitish mottle.
- A stem borer was also identified as a serious pest in guava, but the species is yet to be identified.

Control of Nematodes in Guava

Guava fields at FCRDC were severely infested with nematodes belonging to the *Meloidogyne* sp. The effects due to cultivation of maize as a rotational crop as well as fallowing the land for some period were studied for nematode control. Both methods helped to decrease nematode multiplication, but a rapid decrease was observed in the land cultivated with maize.

Damage by Citrus Mite and Citrus Leaf-miner in Mandarin

Evaluated several mandarin accessions for their susceptibility to above damage; 13 of them had different degrees of susceptibility to the mite infestation and leaf miner attack; for mites, the accession HR/M/34 was the lowest (10.8%) while the accession HR/M/10 was the highest (37.4%) in susceptibility. Also the mite damage had a negative correlation with rainfall; for leaf miner, the variety Madhu was the lowest (6%), while the accession HR/M/26 was the highest (18.5%) in susceptibility.

Variety Response to Leaf-feeding Insects in Local Durian Accessions

Ten durian accessions established at FCRDC, Horana were evaluated against the damage of leaf feeding insects; they were found to have different degrees of tolerance to the leaf feeding insects; HoD 16 was the lowest, HoD 15 and 20 were moderate while HoD 10 was the highest in susceptibility.

SOIL NUTRIENT MANAGEMENT

Application of HERP in Banana

High grade Eppawala Rock phosphate (HERP), which contains a higher percentage of citric acid soluble P_2O_5 (6-7%) than Eppawala Rock Phosphate (ERP), is cheaper than TSP. Its agronomic effectiveness for banana was tested for 3 crop cycles. It was observed that HERP gave comparable yield to that of other P sources (ERP, TSP, IRP and different combinations of P sources).

Internal Browning of Banana

This disorder was observed in *Kolikuttu* and *Embul* banana; experiments are being conducted to study the effect of boron and calcium in this regard. Foliar spraying of above elements in different concentrations appears to be more effective than soil application in minimizing the condition; also the economical and practical ways of applying these nutrients are being studied.

Internal Hardness of Citrus

The condition of internal hardness of citrus, which results in cork formation of the pulp and low juice content, is suspected to be due to deficiency of boron; it is observed that only some varieties are susceptible to the problem. Fruit samples were analyzed for all

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nutrients and it was found that B content of affected fruits were lower (20 ppm) than to that of the normal fruits (74 ppm); experiments are being continued to find out the suitable method of application of B to minimize the problem.

Stem Bulging of Passion-fruit

Swelling and cracking of the stems of passion fruit results in weakening and the death of the vine beyond the affected area due to this disorder; deficiency of nutrients is suspected to be one of the reasons for the problem. Among the nutrients tested, boron and calcium appear to reduce the severity of the problem; replicated experiments are being carried out for further studies.

Productivity and Fruit Quality Improvement in Mangosteen

Fertilizer application is hardly practiced by the mangosteen farmer resulting in low yields; hence, the importance of application of fertilizer to increase the yield and quality of mangosteen crop was demonstrated by conducting long term experiments at farmers' fields in Horana, Kuruwita and Bollessagama in the Kalutara District; the best fertilizer level was found to be the DOA fertilizer recommendation, which gave a significant increase in yield from 5.9 – 12.7 t/ha over no fertilizer control treatment.

PRE & POST HARVEST TECHNOLOGY

Value Addition to Wax-apple (*Syzygium samarangense*) and *Lovi* (*Flacourtia incremis*) by Osmo-air Dehydration

Wax apple and *lovi* are two underutilized fruit crops, of which bulk of fruit yield is wasted due to lack of preservation techniques; studies were conducted to develop value-added products from wax apple and *lovi* fruits with high organoleptic and nutritional quality by osmo-air dehydration followed by air-drying.

Results indicated that immersing wax apple fruit pieces in 70° Brix sugar syrup at 1:1 ratio for 12 hours followed by air drying resulted in a better quality product in terms of physio-chemical and organoleptic value. *Lovi* fruit pieces, which were subjected to two successive immersions (two times X 12 hours) in 65° Brix sugar syrup at 1:1 ratio followed by air drying, had the best product quality. The final snack made of wax apple had 9.56 % moisture content and 78 % TSS, while *lovi* snack had 6.56 % moisture content and 85.2 % TSS.

FRUIT DEVELOPMENT ACTIVITIES

Production of Planting Materials

During 2007, the centre sold 18,452 budded or grafted plants and 1504 seedlings of *rambutan*, mango, *durian*, jak, avocado, star fruit, *sapodilla*, *garcenia*, lime, *mangosteen*, *jambu*, *lovi*, *annona*, guava, orange, *beli*, *weralu*, mandarin, passion fruit, strawberry guava, wood apple, etc. at a total value of Rs. 1.8M; additionally an income of Rs. 1.4 M was realized by selling farm produce.

Crop Zoning Program

Maintained the fruit villages initiated in 2005 in Western Province and the program was continued and extended to Ratnapura, Galle and Matara District under the "Crop Zoning Program"; during the year, 49 fruit villages were established comprising 11 *Mangosteen* (810 plants), 04 *Durian* (804 plants), 26 *Rambutan* (2819 plants) and 08 Guava (420 plants) having a total of 138 fruit villages by the end of 2007; they include 13 pineapple, 23 *Mangosteen*, 12 Avocado, 15

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Durian, 10 jak, 36 *Rambutan*, 9 mango, 6 *Gaduguda*, 5 passion fruit and 9 guava fruit villages.

Breeder Seed Production

Breeder seeds of Red *thampala* (500g) and *Yoda Nivithi* (200g) were produced for distribution.

Development and Maintenance of Established Home Garden

Different vegetable crops, herbs and fruit crops were grown in the garden throughout the year; pests and diseases were controlled by environmentally safe methods like cultural practices and application of Neem products etc; during the year 4675 persons (88 Farmers, 201 school teachers, 4218 students, 94 ARDOs and 10 NGO staff) visited the home garden.

Training Programs

The following training programs were conducted in 2007:

- 10 programs on organic manure production/ vermi composting and vermi wash for 248 trainees.
- 5 programs on fruit cultivation, pruning of fruit trees, post harvest technology and nursery development for 99 trainees.
- 18 programs on home garden, nursery management and dragon fruit cultivation for 314 extension officers, farmers and private sector personnel.

During the year, 4521 students with 197 teachers and 165 parents visited the home garden and nursery.

Farmer Advisory Programs

- 36 disease samples received from farmers and extension officers were examined and cultured; identified the diseases and recommendations were given for their control.
- 123 field problems submitted by farmers pertaining to pests and diseases, dragon fruit, durian and pineapple cultivation were attended during the year.

Mass Media

Officers from FCRDC participated in 04 radio programs on fruit cultivation, pests and diseases and home garden.

PLAN FOR 2008

Crop Improvement

- Development of high yielding, good quality passion fruit cultivars through selection and hybridization
- Variety development of avocado through selection from local germplasm for table and industrial purposes.
- Development of promising durian varieties for commercial cultivation
- Development of high yielding good quality banana varieties through collection, evaluation and selection of banana germplasm.
- Selection of rambutan varieties from existing seedling population at farmer fields
- Development of hybrids of Guava (*Psidium guajava.*).- Evaluation of promising hybrids at different agro-ecological regions. Continuation of the Project.
- Collection of mango germplasm in WZ and IZ and selection of good quality *Giraamba* and *Pettiamba* and other promising varieties for cultivation in LCWZ and IZ.
- Development of high yielding, good quality citrus varieties through selection, hybridization & mutation breeding

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- Development of hybrid of papaya using newly developed inbred lines. (continuation)
- Exploration, collection, conservation, characterization and evaluation, and development of plant propagation techniques for under-utilized fruit species (Continuation)
- Development of hybrid varieties of okra with desirable characters
- Purity maintenance of varaniya green chilli variety.
- Breeder seed production of red tampala and spinach variety – yoda (continuation)

Crop Management

- Development of a crop management package for grafted durian cultivation (continuation)
- Development of flower induction techniques through horticultural practices and chemical application for off season production of Rambutan.
- Effect of plant density and pruning height on growth and yield of rambutan
- Growth enhancement in mangosteen grafts and seedlings through provision of an additional root system and decapitation
- Effect of decapitation and defoliation on crop regulation in guava
- Development and maintenance of the established home garden- continuation
- Effect of cutting height of the parent Pseudo stem on yield and time of production of the following sucker in banana.
- Improvement of productivity in sour-sop through identification of a compatible root-stock and development of a suitable training and pruning system.

Plant Nutrition and Organic Fruit Production

- Micronutrient studies to overcome disorders in selected fruit crops.
  - Internal browning of banana.
  - Stem bulging of passion fruit.
  - Internal hardiness of citrus
  - Gamboge disorder of mangosteen.
- Study the effect of different sources and rates of potash fertilizer on marginal scorching and yield of Rambutan.
- Evaluation of vermi wash as a foliar liquid fertilizer for growth & yield of fruit crops (dragon fruit & passion fruit) & leafy vegetables.
- Effect of different organic material on vermi composting.
- Testing effect of different levels of Eppawala Rock Phosphate (ERP) incorporated fruit peel waste compost (FWC) on growth and yield of *Capsicum frutescens* L.

Plant Pathology

- Management of fruit rot diseases of guava through fungicides and herbal extracts in the field.
- Management of guava wilt disease through Trichoderma viridii.
- Development of integrated disease management package through chemical, biological, and using resistant root stocks to control *fusarium* root rot of passion fruit.
- Control of *phytophthora* root disease in durian.
- Studies on gall formation and scaly bark disease in sapota trees and budded plants in the nursery.
- Advisory services for farmers on disease diagnosis and control of popularly grown

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fruit crops, vegetables and other crops (flowers, bo-trees, root and tubers) in the Wet Zone.

Entomology

- Development of integrated insect pest management package for guava
- Assessment of damage, study the biology and evaluation of control methods for Neem Mosquito bug (*Helopeltis antonii*) in guava

Pre & Post-harvest

- Value addition to underutilized fruits
- Improvement of quality and shelf life of guava by applying pre and post harvest techniques and treatments

Socio Economics

- Upgrade maintenance of database on fruit crops (Extent & production imports & exports; retail, wholesale & farm gate prices)
- Cost of cultivation of passion fruit at research level (FCRDC/Horana)

Development Program

- Establishment of fruit crop zones (Durian, Rambutan, Mangosteen, Jak, Guava) in Western Province, Galle, Matara & Rathnapura Districts and fruit villages of Avocado, Gaduguda, Pineapple.

Planting Material Production

Tissue Culture

- Initiation of Tissue culture activities at FCRDC, Horana.
- Micro propagation of selected banana cultivars: *Ambon, Parakum (Sinikesel), Nadee* and sweet orange: variety *Bibile* Sweet.

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2.2.3 FOOD RESEARCH UNIT (FRU) - GANNORUWA

The Food Research Unit functions under the administration of Horticultural Crop Research and Development Institute (HORDI). The major responsibilities of this unit are to carry out research and development activities on post harvest technology, product development and quality evaluation of samples received from crop improvement programmes and disseminate relevant information and technology to farmers and other clients. The FRU is also involved in collaborative programmes with other crop research institutes of the DOA, the provincial agricultural system, other government and non-government organizations and the private sector on technology development and transfer. In addition, the Unit provides the necessary facilities and guidance for under-graduates and post-graduate students to conduct their research on diverse aspects of post harvest and processing technology.

BUDGET

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

Table 2.2.3.1: Annual Budget – 2007 (Rs.)

Vote	Allocation	Expenditure
Capital	698,700.00	589,079.00
Recurrent	1,074,000.00	1,049,475.00
Project 1	271,000.00	270,768.00
CARP/12/674/506		
Project 2	80,000.00	59,954.00
148-02-3-1-2502 (GAP)		
Project 3	443,000.00	297,254.00
285-02-2-4-2502(13)FRU		
Project 4	2,500,000.00	2,271,406.00
148-2-3-8-2502/HORDI/FRU		
Project 5	520,000.00	509,677.00
REAP B/H		
Project 6	1,100,000.00	220,672.00
148-2-3-7-2502		
Total	**6,686,700.00**	**5,268,285.00**

PROJECTS

Project 1:

Dehydration of Gotukola (CARP Research Grant)

Project2:

Development and popularization of traditional and novel rice based products, funded by Granary Area Programme (GAP).

Project 3:

Post harvest disease management in banana and mango, funded by ACIAR.

Project 4:

Post harvest technology and product development to improve marketing and utilization of fruits and vegetables under Crop Zoning Programme

Project 5:

Establishment of a bee honey processing plant in Matale and to develop standards, upgrade quality of bee honey and to introduce packaging of honey, funded by REAP.

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Project 6:

Reduction of post-harvest losses and improvement of quality of fresh fruit and vegetables.

PROGRESS

POST HARVEST TECHNOLOGY

- Analyzed the Asiatico-oxide levels in *Heen* and *Maha gotukola* have; *Heen gotukola* has more active substances, which improve the memory power than those in *Maha gotukola*; dehydrated products also showed the same level of efficacy; export promotion of the product has been attempted.
- Developed rice based products such as rice beverage, rice porridge and instant rice *pittu* with vegetable pack.
- Conducted trials to reduce incidence of post harvest diseases of mango and banana; such losses can be reduced by doubling the application of recommended level of potassium; soil application of double the recommended level of K reduced the post harvest diseases of mango and banana.

DEVELOPMENT ACTIVITIES

- Prepared a booklet on novel rice based products prepared by FRU which will be published soon.
- Provided a fruit pulper to Tharindu Products, Dangolla Kandy for fruit juice production.
- Provided a fruit pulper to Hasuna Products, Naula, Matale for tomato sauce production.
- Procured a multimedia projector, laptop computer with screen and UPS, which are being used for training; also purchased 800 plastic crates and distributed 400 of them among traders to be used in fruit and vegetables handling.
- Twenty labels were designed and given to V & J Industries to promote food processing.
- Established 2 societies of Bee Honey Producers in Matale, Nayakumbura to produce high quality bee honey under a common label; provided to the societies an equipment to concentrate bee honey.
- A refrigerator display cabinet was purchased to be handed over to Hadabima Stall.
- Conducted research and development work on osmotic ally dehydration of mango, papaya and pine apple fruits; relevant technology was transferred to SENADI Food Processing Company, 15/55, Gemunu Lane, Udumulla Road, Battaramulla.
- Transferred technology on tomato sauce and processing ready to serve fruit drink to Hasuna Food Processing Industry, Industrial Estate, Naula.
- Developed products of under utilized fruits and vegetables and presented the relevant details in the ASDA paper at the symposium in 2007.
- Developed a cassava (fried) product and handed over to Trinity Food (Pvt) Ltd, which produces it in large scale.
- A large number of food products available at *Hadabima* Stall are produced with technology transferred by the FRU; the FRU has granted permission to the producers to declare on their labels that the products are being manufactured with technical assistance from FRU.

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- The FRU assisted Tharindu Food Products to obtain the SLS recognition; also assisted V & J Industries to obtain HACCP.
- Assisted 6 undergraduates to complete their final year research projects.
- Conducted training on food processing at a number of *Vidatha* Training Centres.
- Organized a very successful exhibition on "*Palaturu Dekma*".
- Purchased a Spectrophotometer to improve the analytical capacity of the FRU.
- Under technology transfer activities, 240 no. of training classes have been conducted with the 2697 participants by FRU.

RECOGNITION

- The promising Agriculturist in Food Science of the year 2007 was awarded to Mr. S. Ekanayake, Research Officer, Food Research Unit at the Annual Symposium of the Department of Agriculture.

PLAN FOR 2008

- Evaluation of different agricultural commodities for quality parameters.
- Continuation of the work on manufacturing of rice based products and their popularization.
- Product development research on underutilized crops and their popularization.
- Continuation of the work on post harvest technology of fruit and vegetables in order to reduce post harvest losses.
- Perfection of food processing techniques on fruit and vegetables.
- Technology dissemination activities.

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2.2.4 NATURAL RESOURCES MANAGEMENT CENTRE - 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. Activities of this Centre include research on soil conservation and watershed management, land suitability evaluation, monitoring and forecasting of crop production, studies on agro-meteorological and climatic changes, crop productivity enhancement 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.

BUDGET

Table 2.2.4.1: Annual budget – 2007 (Rs.)

Vote	Allocation	Expenditure
Capital	732,000.00	571,083.00
Recurrent	1,324,500.00	1,074,546.47
Projects:		
CZP	400,000.00	284,151.36
REAP-1	1,250,000.00	1,158,998.58
REAP-2	100,000.00	99,469.13
WHP	250,000.00	47,323.48
ISCAP	2,500,000.00	2,254,734.61
CCP	300,000.00	107,955.50
AW-RN	42,500.00	22,500.00
Total	6,889,000.00	5,605,761.30

CZP - Crop Zoning Project
REAP - Regional Economic Advancement Project
WHP – Water Harvesting Project
ISCAP– Implementation of Soil Conservation Act Project
CCP – Climate Change Project
AW-RN – Api Wawamu Rata Nagamu Project

PROGRESS

RESEARCH

Development of Soil Management Information System for Better Land and Resource Management in Rice-Rice Rotation in the Dry Zone

A study was initiated at the Thuruwila village, Shrawasthipura, Anuradhapura to develop best management practices for rice-rice rotation for enhancing rice yield while sustaining use of land and other resources. The best management practices were developed based on soil limitations. The identified soil limitations included shallow plow layer, nutrient deficiencies and salinity. The components of best management practices thus included practice of deep plowing to deepen the plow layer, addition of deficient nutrients namely zinc and copper, application of straw and partially burnt rice husks to control saline conditions. Four farmer fields were selected in Maha 2007/2008. In each farmer field, above components were applied to an irrigation terrace having an extent of 0.1 ha. The remaining portion of the farmer field was considered as the control plot. Yield response will be measured at harvest in February 2008.

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Identification of Drought Prone Agro-Ecological Regions of Sri Lanka

The Disaster Management Act No. 13, 2005 of Government of Sri Lanka has identified 21 natural or man-made disasters in Sri Lanka. Among those drought has the highest frequency of occurrence. Drought or extreme negative rainfall anomalies are experienced in Sri Lanka at varying degrees under different meteorological situations. It is apparent that almost all locations of the island have a potential threat from incidence of drought. This study has evaluated susceptibility of each agro-ecological region to drought during main growing seasons, namely, *Yala* and *Maha* using a drought severity index, which is based on the monthly Moisture Availability Index (MAI). It is a function of both dependability of rainfall and the atmospheric demand for the water and hence, is capable of identifying the true picture of the water availability over the season. The results indicate that:

- The Wet Zone has hardly any chance of experiencing droughts during the *Maha* season, except WL2b and WL3 regions, which have a slight vulnerability to droughts.
- In the case of the Intermediate Zone, all Agro Ecological Regions (AERs) in the Up Country and Mid Country Intermediate Zone are generally free from drought hazards during the *Maha* season. Nevertheless, out of five AERs of the Low Country Intermediate Zone, except IL2 and IL1c, other three AERs are vulnerable to drought conditions during the *Maha* season.
- There is only a slim chance of occurring drought conditions in the entire Wet Zone during the *Yala* season.
- In the case of Intermediate Zone, the drought proneness is relatively higher compared to the wetter parts of the island.
- All AERs in the Low Country Intermediate Zone, except the IL1a region, are vulnerable to drought conditions of varying degree during the *Yala* season.
- Excluding the AERs that adjoin the high rainfall receiving AERs of the Wet Zone, all other AERs of the Mid Country Intermediate Zone are also prone to drought conditions during the *Yala* season.
- In contrast, almost all AERs of the Up Country Intermediate Zone are less likely to experience drought conditions during the *Yala* season.
- Naturally, all the AERs of the Dry Zone are highly vulnerable to drought conditions during the *Yala* season.
- In contrast to the *Yala* season, almost all AERs of the Dry Zone are less likely to experience drought conditions during the *Maha* season except those located in the extreme north-western and south-eastern regions.

TECHNOLOGY DISSEMINATION

Training on Soil and Water Conservation

Following trainings, seminars and workshops were conducted during the year:

- Six trainings of 5 day duration on soil conservation and watershed management, each of which included 2 days of theory and three days of fieldwork for 180 officers of the DOA.
- Three trainings of 2 day duration on soil conservation and watershed management for 150 officers.

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- 12 one-day trainings on soil conservation for 900 farmers.
- One-day workshop on "Water for agriculture in the Upper Intermediate Zone of Sri Lanka: Potential, present use and challenges" on the World Water day on 22nd March 2007; 45 officers of the DOA participated.
- One-day workshop on "Strengthening research-extension linkages related to environmental issues in agriculture" on the Environmental Day on 5th June 2007; 46 officers of the Central and Provincial Departments of Agriculture participated.

DEMONSTRATIONS ON SOIL AND WATER CONSERVATION

Soil Conservation Demonstration at Agriculture Park at Gannoruwa

This demonstration established in 2004, was maintained with the objective of disseminating currently available techniques in soil conservation and watershed management to the general public; the site was utilized to conduct on-site demonstrations for 20 groups of farmers and 4 groups of school students; additionally, services were provided regularly to educate visitors to the park on soil conservation techniques applicable on sloping lands.

Soil Conservation Demonstrations at other Locations

Three new demonstrations on soil conservation were established at the District Agriculture Training Centres at Ambepussa and Kuruwita, and In-service Training Centre, Bindunuwewa. Contour terraces, lock and spill drains, stone bunds and earth bunds were laid as conservation measures in these demonstrations. Various structures meant for conserving gullies were also laid. In addition, demonstrations established at Angunakolapelessa Research Farm, Kundasale Agriculture School and Seethaeliya Research Farm in 2006 were further improved and maintained.

Exhibitions on Soil and Water Conservation

Three exhibitions were conducted at following locations:

- In-Service Training Institute, Gannoruwa, Peradeniya for students.
- Matale for school students.
- Kurunegala for technical officers of the Department of Agriculture.

Radio Programs

- Seven radio programs were conducted on soil conservation and watershed management.

DEVELOPMENT

Soil Conservation in Farmers' Fields in Matale

A project was initiated in the Matale District to develop farm land adopting soil conservation measures with the provision of financial incentives. A total of 60 farmers in the villages of Selagama, Walmoruwa, Udurampelessa, Dambawa, Medabedda and Galwetiyaya were identified as project beneficiaries. It was funded by the Regional Economic Advancement Project of Matale District.

Conservation of Primary Water Sources in Matale District

A diminishing trend has been observed in the flow of perennial streams of water fed by numerous springs originating from the mountainous terrain in the central region. This has been attributed to irrational land use in the

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upstream areas of these streams. Since supplementary irrigation from these water sources is vitally important to sustain agriculture in the District, it is necessary to protect the water sources with the adoption of appropriate on and off farm conservation measures. Conservational activities in this regard were implemented in an extent of 100 ha comprising 7 micro catchments. A positive change has been realized in terms of volume of water flowing in the streams due to the measures of intervention adopted under the project.

TECHNICAL ASSISTANCE

The Centre provided the following technical assistance during the year.

- Under the Crop Zoning Project, the NRMC was given the responsibility of mapping of potential areas for establishment of crop zones with priority fruit crops identified by the DOA. In the year 2007, twenty national scale maps depicting potential areas for establishment of fruit crop zones were prepared using Geographical Information Systems. Since there is a need of developing detailed scale maps depicting land suitability for priority fruit crops, the Centre has already initiated a mapping process at Provincial and District level, thus entrepreneurs can easily identify the areas suitable for establishment of fruit crop zones; it is expected to complete the mapping exercise in the first half of the year 2008.
- Technical services were provided on soil conservation and land development to government and private sector organizations. The organizations included Government Seed Farm, Seetha Eliya; Forest Unit, Forest Department, Udawatta Kele; Petroleum Corporation, Sapugaskanda; Forest Garden at Kalutara, Ministry of Environment and Natural Resources; Ranawana temple, Kiribathkumbura; Keppetipola temple, Mawanella; St Sylvester College, Kandy and Private farm, Galgamuwa.
- Preparation of soil conservation and storm water drainage management plans for various land blocking-out and tree felling projects as a requirement in the process of granting environmental clearance by the Central Environmental Authority.

OTHER ACTIVITIES

Implementation of Soil Conservation Act

- Continued necessary work pertaining to obtaining of approval for the new amendments to the Act by liaising and providing necessary information to the concerned parties involved.
- The work on drafting of new regulation was completed. Accordingly a draft order and regulations were finalised and submitted to the Ministry for further action.
- A program to create awareness on Soil Conservation Act was undertaken. Accordingly, two district level one-day awareness workshops were held in Badulla and Kurunegala for 115 officers of the government departments that have a stake on soil conservation. In addition, 19 awareness sessions were conducted at Agrarian Development Centre level in selected Agrarian Development Centres in Rathnapura and Kegalla Districts; 438 field level officers from various government institutions and 182 farmers participated.

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Maintenance of Database

The database on agro-climate, land and water resources was maintained to provide information to various clients.

Maintenance of Agro-meteorological observation Network

The Agro Meteorological Observation Network consisting of 22 agro-meteorological observation stations scattered throughout the island was maintained. During the year 2007, routine maintenance activities in 10 stations were carried out. In addition, three new rain gauge stations were added to the rainfall observation network during the year 2007 raising the total number of rain gauging stations in the network to 92.

Representations in Technical Committees

During the year 2007, the staff of the NRMC served in the following committees as representatives of DOA:

- Environmental Monitoring Committees of National Environmental Authority for Upper Kothmale Hydropower Project and 3 housing projects
- Committees for granting Environmental Clearance for various projects such as land blocking out projects, hotel projects, mini hydropower projects, timber harvesting projects, housing projects.

PLAN FOR 2008

Research

- Categorization of lands in the dry zone on the potential for rain fed farming
- Identification of potential of AERs for tea production
- Application of soil fertility and land productivity mapping techniques in productivity enhancement in farming systems
- Soil erosion hazard mapping

Technology Dissemination

- Training on soil and water conservation, and natural resources management
- Demonstration of recommended soil conservation measures

Technical Assistance

- Preparation of soil conservation and storm water drainage management plans
- Technical guidance on soil and water conservation activities

Other

- Implementation of Soil Conservation Act
- Maintenance of database on agro climate, land and water resources
- Maintenance of agro meteorological observation network
- Representation in technical committees
- Writing a text book on Agro-ecological regions of Sri Lanka

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

The RARDC, Bandarawela, with its satellite Stations at Rahangala and Maduruketiya and experimental farms at Bibile and Muthukandiya, conducts need based research and development of appropriate technology to cater to the farmers in the Uva Region and Balangoda segment of the Sabaragamuva Province. Its mandate area includes agro ecological regions of IU_2, IM_2, IM_3, WM_3, IM_2, IL_2 and WM3.

The research and development activities during the year were focused on the following:

- Crop improvement.
- Establishment of field gene bank of floricultural crops cultivated in the area.
- Variety selection and development of fruit, vegetable and flower crops.
- Integrated pest and disease management.
- Development of organic vegetable cultivation and soil fertility management.
- Crop zoning programme on pear, oranges, and mandarin.
- Seed potato production by rooted stem cuttings (RSC) in farmer field.

BUDGET

The annual allocations and expenditure under different votes are given in the Table 2.2.5.1.

Table 2.2.5.1: Annual budget - 2007 (Rs.)

Vote	Allocation	Expenditure
Recurrent	3,568,750.00	3,576,713.74
Capital	1,640,000.00	1,482,116.40
Projects		
SL-USDA	677,064.00	578,958.00
Crop Zoning	3,606,410.63	3,606,404.63
Citrus virus indexing	196,442.12	145,899.77
Organic farming	600,000.00	435,379.50
Potato seed production	2,600,000.00	2,332,540.79
CARP	434,680.00	393,902.46
Total	13,323,346.75	12,551,915.29

PROGRESS

Research and development activities carried out during 2007 were focused on mandated vegetables which include beans, carrot, cabbage, bell pepper and tomato, sub-tropical and temperate fruits of sweet orange, mandarin, apple, pears, peaches, and strawberry and floricultural crops of roses, gerbera, chrysanthemum, anthurium, aster, Madonna lily and carnation.

CROP IMPROVEMENT

- Evaluated 53 local pole bean and 28 local and introduced bush bean germplasm for yield and other characteristics; 22 pole and 14 bush bean lines were selected for further evaluation.
- Conducted trials on adaptability of 4 selected pole bean lines in farmer fields; the cultivar PB 8-18 gave a comparatively higher yield of 17.55 t/ha with good quality pods.
- Evaluated 5 bush bean varieties, namely Flash, Sun 100, Yellow mellow, Yellow stone and Target with Contender as the check variety; Contender recorded the highest yield (8.2 mt/ha.) followed by Yellow stone (5.6 mt/ha.).

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- Tested adaptability of 2 carrot lines, IER-6 and IER-1, which produced seeds under local climatic conditions, in farmer fields; IER – 6, which showed a high resistance to *Alternaria* blight, performed better than the check variety New Kuroda.
- Collected accessions of Chrysanthemum (85) and Gerbera (7) and established them in the RARDC, Bandarawela under the flower crop germplasm exploration programme.
- Selected 13 new Gerbera lines with promising flower quality in the hybridization programme.

New Varieties

- Released 2 citrus lines improved at ARS, Rahangala and ARS, Moneragala as new varieties; they were named as Maduruketiya Dodam (MKD) and Rahangala Jamanaran.

AGRONOMY

- It was found that the optimum plant spacing for Gerbera and Madonna lily was 30 cm x 30 cm to produce a higher yield of flowers, in quality and quantity.

Fertilizer Recommendations

- The best combination of organic manure application for Chrysanthemum was found to be cattle manure 5 t/ha + poultry manure 5 t/ha or poultry manure 10 t/ha without cattle manure.
- Mixture of sub soil and cow dung in the ratio of 1:2 performed better and gave a comparatively higher yield in organic cultivation of tomato in poly tunnels.
- It was found that the size of the tuber could be changed by the level of Nitrogen in potato cultivation; this strategy to manipulate the tuber size can be useful in seed potato production.
- Bio-gold and Bio-phos, two organically acceptable fertilizer mixtures were evaluated with synthetic fertilizers; Bio phos produced equal results with Eppawala Rock Phosphate or Triple Super Phosphate.

PLANT PROTECTION

- Conducted 3 fungicide screening trials during the year; the new formulation of Pyraclostrobin EC 250 showed promising results on managing Late Blight (*Phytophthora infestans*) in potato and White Rust (*Puucinia horinana*) in Chrysanthemum.
- Mancozeb 75% DF, a safer formulation of available product Mancozeb 80% WP, performed equally well in comparison to the older formulation.
- Three fungal spp. (*Rhizoctonia solani, Fusarium oxysporium* and *Phytophthora* spp.) were identified as causal organisms of Gerbera root and rhizome rot.
- Incidence of Tomato Spotted Wilt Virus was found to be reduced slightly due to straw mulching; yet, the plant height, number of branches, the yield were recorded higher in white polythene mulched plots.

SERVICES

Breeder Seed Production

Produced DOA –SCS certified breeder seeds of bean varieties Keppetipola nil (20 kg.), Balangoda nil (30 kg.), Lanka butter (60 kg.), Sanjaya (15 kg.) and Wade (05 kg.).

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Planting Material Production and Distribution

Potato

- Produced 28000 RSC and 4000 mini tubers. These materials were distributed among 45 farmers to produce elite seeds.

Fruits

- Produced budded plants orange (954), mandarin (650), pear (1650) and 850 avocado (850); distributed orange (850), mandarin (650) and pear (685) plants among farmers under the Crop Zoning Programme.

TECHNOLOGY TRANSFER ACTIVITIES

- Officers of RARDC participated in 04 PTWG meetings held in Uva and Sabaragamuva Provinces.
- Conducted two field days on pear and orange cultivation at Bandarawela and Rahangala.
- Conducted 3 field days on potato during the year, one at the research field of the RARDC, Bandarawela on evaluation of commercial varieties; others on potato seed production were held in farmer fields at Gonamotawa and Obodaella.
- Conducted 2 training classes on seed potato production for 100 farmers.
- Provided plant protection advice to potato, fruit, flower and vegetable farmers in the region.
- Conducted training programmes for farmers (175), university students (45) and school children (1354).
- Presented 5 research papers at the floriculture workshop organized by Royal Botanic Garden.

New Construction

- Constructed 3 poly tunnels (1000 sq. ft. each) under the seed potato production project.
- Constructed 3 plant houses at Bandarawela, Rahangala and Maduruketiya Research Stations under the Crop Zoning Programme.

Mass Media

- Two news paper articles on seed potato production using RSC.
- Eight newspaper articles on plant protection aspects of vegetables, fruits, flower crops and protected agriculture.
- Eight newspaper articles on fruit cultivation.
- Two newspaper articles on low cost planting material production of tomato and cauliflower cultivation.
- One TV programme on mandarin cultivation.
- Five research papers were accepted for publication in Floriculture workshop organized by Royal Botanic Garden.
- Two research papers presented at the workshop of underutilized fruit crops in Tanzania were accepted for publication.

PLAN FOR 2008

VEGETABLES

- Germplasm evaluation of bean for yield and other characteristics.
- NCVT on pole and bush bean.
- Carrot variety improvement.
- Plant density studies on capsicum and chick pea.

Seed Production

- Breeder seed production of bean varieties Keppetipola nil, Balangoda nil, Lanka butter, Wade and Sanjaya.

Potato

- NCVT and commercial variety evaluation.
- On farm seed potato production using RSC.
- Intercropping studies with Maize.

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Floriculture

- Collection and maintenance of germplasm.
- High quality planting material production.
- Development of strategies for high quality flower production.

Plant Protection

- Fungicide and insecticide screening for disease and pests.
- Identification and management of diseases in flower crops.
- Management of bean yellowing syndrome.
- Disease and pest management in protected agriculture.
- Studies on potato tuber diseases.
- Studies on population dynamics and natural enemies of pests in up country vegetables.
- Effect of live barriers on the behavior of shoot and pod borer in egg plant.

Organic Vegetable Production

- Vegetable variety evaluation for organic farming.
- Selection of organically acceptable fertilizers and substrates for cultivation of crops in protected systems.
- Studies on organically acceptable pests and disease management systems for vegetables.

Soil Fertility Management

- Fertilizer management studies for potato seed production.

Horticulture (Fruits)

- Technology development to enhance the productivity and quality of pears.
- Identification of maturity index for citrus.
- Selection of avocado germplasm with high oil content
- Development of new processing technologies for underutilized fruits.
- Identification of suitable orchard management practices to increase yield potential of apple.
- Variety evaluation of sweet orange and mandarin.
- Stock scion studies on citrus and pear.
- Planting material production of fruit crops.

Tissue Culture & Biotechnology

- Somaclonal variation for gerbera through tissue culture.
- Micro propagation of superior varieties of Chrysanthemum.
- Assessment of somaclonal variation of Chrysanthemum.
- Micro-propagation of Gladiolus.
- Selection of tissue culture protocol for micro propagation of baby's breath.

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2.2.6 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 Stations (ARS) at Kalpitiya and Vanathavilluwa, the four Adaptive Research Units (ARU), at Tabbowa, Inginimitiya, Wariyapola and Walpita and the Horticultural Research Farm (HRF) at Walpita, come under the purview of the RARDC, Makandura. These stations / units strengthen the R & D network in handling location specific R & D programmes. While catering to the R & D needs based on national priorities in the RARDC network of the Department of Agriculture (DOA), research efforts are also directed at the specific needs of the Provincial Councils. The Centre has also established linkages with the other Institutes and Centres of the DOA and outside organizations such as the Faculty of Agriculture and Plantation Management, University of Wayamba, Makandura, Lanka Phosphate Ltd., etc. to carry out commodity and factor research and extension and communication.

The R & D activities of the Centre are focused mainly on developing and integrating technologies for coconut based cropping system to sustain crop productivity in the coconut lands. The technologies are developed for the mandated fruits, vegetables, root and tuber and condiment crops. The other areas of R & D focus are vegetable breeder seed production, fruit crop planting material production, farmer-field crop productivity demonstrations, on-farm trials, soil-test based fertilizer recommendation programme, Provincial Technical Working Group (PTWG) focused farmer-problem driven research, location specific research activities etc.

BUDGET

The budgetary allocation and expenditure under different votes are presented in the Table 2.2.6.1.

Table 2.2.6.1: Annual budget - 2007(Rs.)

Vote	Allocation	Expenditure
Capital	1,390,000	940,000
Recurrent*	3,670,000	3,570,000
Council of Agriculture Research Policy	1,210,000	1,090,000
Organic Farming for Export	1,150,000	1,770,000
Crop Zoning	3,850,000	2,710,000
Eppawala Rock Phosphate	440,000	370,000
Production of Compost & Promotion of Integrated Plant Nutrient System	2,000,000	1,990,000
TOTAL	13,710,000	12,440,000

* Permanent staff salaries are not included.

PROGRESS

RESEARCH HIGHLIGHTS

Anona

- Grafted plants of *seeni anona* initiated flowering 1 year after planting.

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Pomegranate

- Pomegranate fruit-lets could be stored about 25 days in the sealed poly bags under 5-6 ^{0}C temperature.
- Pomegranate wine was prepared with the ingredients of sugar, spices and yeast

Tamarind

- Grafted tamarind plants reached reproductive stage within one year after transplanting.

Mushroom

- An indoor cultivation method was introduced for cultivation of straw mushroom.

TUBER CROPS

Cassava:

- Yield of tubers and stems of cassava was increased by 32% and 45 % respectively due to application of respective management practices.

Sweet Potato:

- Yield was significantly increased due to application of fertilizer in the formulation of *N55:$P_2O_5$180:K_2O120.*

FLORICULTURE

Anthurium:

- Grew better due to application of slow release granular fertilizer (12:25:18) + compost or the control release fertilizer (16:18:12) + compost with the coconut husk chips media.
- Coconut husk chips : compost at the ratio of 4:2 could be used as an alternative to leaf mould for growing media.
- Raised bed with concaved bottom or pots (27 cm diameter, 22 cm height) are better for cut flower cultivation.

Idda:

- A mixture of 11g of N and 12g of K_2O per plant for one year could be applied for higher flower production.

FRUITS

Pineapple:

- DOA recommended dosage of Triple Supperphosphate (TSP) or 1/2 dosage of TSP + 1/2 dosage of Eppawala Rock phosphate fertilizer can be used as an effective P fertilizer to obtain higher yields.

SOIL SCIENCE

Vermi compost

- Among different earthworm spp. collected from different locations, *Esinia* performed a highest multiplication rate(6 times per month).
- Application of vermi compost and vermi wash resulted in early, uniform flowering, fruit quality improvement and emergence of lesser No. of suckers after harvesting of pine apple.
- Collected *Hirsutella thompsoni* strains were effective in controlling green house mites under Markandura conditions.

Poultry Manure

- Deep litter is a suitable source of organic manure for vegetable cultivation.
- Broiler litter compost is superior to *salvinia* compost and green manure compost for vegetables.
- Satisfactory yield level could be maintained in vegetable cultivation under organic farming systems.

Inorganic Fertilizer

- Triple superphosphate could be replaced with Eppawala single superphosphate as a source of Phosphorus for vegetables.

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PLANTING MATERIAL PRODUCTION

Table 2.2.6.2: Planting Material Production in 2007

Institute	Plants Sold	No. of plants
Horticulture Farm		
Walpita	Rambutan (Budded)	5539
	Mango (Budded)	4029
	Guava (Budded)	202
	Garcinia (Budded)	504
	Beli (Budded)	370
	Others	2898
	Rooted cutting plants	776
	Seedlings	6968
ARS -		
Kalpitiya	Pomegranate	1542
	Grapes	10
	Guava	345
	Papaya	132
RARDC		
Makandura	Idda (Rooted cuttings)	300
	Pichcha (Rooted cuttings)	200

SOIL TESTING

Twenty samples received from farmers in the region were analysed and issued site-specific fertilizer recommendations.

PEST AND DISEASE DIAGNOSIS

Diagnosed 20 samples and appropriate recommendations were given.

TECHNOLOGY DISSEMINATION

Table 2.2.6.3: Training Programmes Conducted

Topic of the Programme	No.of Programmes	No. of Participant
Mushroom Cultivation	08	212
Pineapple cultivation	11	687
Tissue culture	01	60
Mango cultivation	02	30
Dragon fruit cultivation	03	58
Compost production	54	2945
Home garden	22	1006
Banana	01	24
Pomegranate	01	23
Vermi compost	07	160

Field Days

Conducted field days for 40 farmers and 32 officers respectively.

Advisory Services

During this year advisory services have been provided for farmers and growers in the following fields : fruit 104, mushroom 59, compost 51, floriculture 09, vegetables 13, root and tuber crops 15, home gardening 08, crop protection 20 and others 40.

Seminars Conducted

- Importance of integrated plant nutrition system (IPNS) in Sri Lanka. Dr. J.D.H.Wijewardena, D.D.R. on 31-01-2007
- Importance of Microsoft publisher computer package. Mr.W.D.Athukorale, R.O. on 28.02.2007
- Home gardening, Mr. V.Krishnadasan, R.A. on 28.02.2007
- Productivity enhancement of rice cultivation, Mr.H.L.Dayananda, R.O. on 28.03.2007
- Pineapple planting material production through tissue culture, Mr. W.S.Priyantha , A.M.O. on 28.03.2007
- Organic farming for sustainable agriculture, Ms. D.M.P.S.Dissanayaka, P.A. on 28.03.2007
- Pest and disease management of organic farming system, Mr. L.C.Wijetilaka, R.O. on 25.04.2007

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- Diagnosis of plant virus diseases using ELISA, Ms. E.W.G.Sanjeewanie, P.A. on 28.05.2007
- Identification of banana varieties, Ms. M.A.D.K.Mannnannayake, A.I. on 28.05.2007
- Locally available growing media for the cultivation of Anthurium, Mr. M.A.Kularathna, R.O. on 27.06.2007
- Hybrid pineapples, Ms. H.P.I.D.Kanthi, R.A. on 27.06.2007
- Contribution of ARS, Kalpitiya for the seed and planting material production, Mr. D.M.Perera, A.I. on 27.06.2007
- Factors affecting spreading and development of infectious disease in crops, Ms.Disna Ranasinghe, P.A. on 01.08.2007
- Bee keeping in the home garden, Ms. C.M.Pradeepika, A.I. on 01.08.2007
- Marketing problems of agricultural products, Ms. N.P.S.Manike, E.A. on 29.08.2007
- Integrated plant nutrient system, Mr. H.A.C.A.Kumarasinghe, P.A. on 29.8.2007

DEVELOPMENT WORK

Following construction and development work was completed.

RARDC, Makandura

- Pump house
- Improvement of drivers' room
- Officers quarters – Repaired
- Construction of potting shed – Nearing completion
- Colour washed office rooms of HRF,Walpita ARU Wariyapola, ARU Inginimitiya and ARU, Tahbbowa, and ARS,Kalpitiya, and ARS, Wanathavilluwa .
- Plant house
- Labour rest room
- Compost production unit

PLAN FOR 2008

FRUITS

Pineapple

- Hybridization programme.
- National Coordinated Varietal Trial
- Fertilizer studies
- Production of different size of pineapple fruits.
- Development of *in vitro* multiplication techniques for seedless fruit crops

Banana

- Performance of tissue cultured plants
- Maintenance germplasm collection and characterization
- Selection program
- Organic fertilizer application
- IPNS studies
- *Sigatoka* leaf spot control
- Screening for stem weevil

Mango

- Germplasm collection and evaluation

Pomegranate

- Hybridization programme
- Chemical fertilizer studies
- Comparison of pruning systems

Dragon fruit

- Fertilizer studies
- Organic farming studies
- Plant density studies

Anona

- Mutation breeding

Grapes

- Varietal evaluation

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Guava

- Varietal evaluation

UNDER UTILIZED FRUIT CROPS

Garcinia

- Chemical fertilizer response studies

Tamarind

- Growth performance studies
- Chemical fertilizer response studies

VEGETABLE RESEARCH

Pumpkin

- Hybridization program
- Capsicum, Bitter gourd and Brinjal, NCVT trials

Tomato

- Pest and disease control using bio-pesticides and plant extracts
- Bitter gourd Varietal evaluation

Mukunuwenna

- Integrated nutrition management
- Heavy metal uptake studies

Vegetables

- Study the effect of Eppawala Single Super Phosphate
- Organic fertilizer studies
- Studies on compost mixtures
- Broiler litter and broiler litter compost for substitution of chemical fertilizer

Mushroom

- Low cost spawn production method.
- Evaluation of new bag filling method for oyster mushroom
- Testing of cultivation media for four types of mushrooms.

ROOT & TUBER CROPS

Sweet potato

- Chemical fertilizer studies

Cassava

- Plant management studies to improve crop and stem yield
- Maintenance of germplasem

Ginger

- Effect of vermi compost

FLORI CULTURE

Anthurium

- IPNS and Fertilizer studies for improvement of quality and yield
- Evaluation of growing media
- Tissue culture plant production
- Germplasm collection and breeding

Idda and Pichcha

- Fertilizer studies
- Germplasm evaluation

VERMI COMPOST

- Bio chemical changes of organic waste

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2.2.7 AGRICULTURAL RESEARCH STATION (ARS) - SITA ELIYA

Research and development activities of Agriculture Research Station, Sita Eliya are focused on needs of the farmers in the area, which are relevant to enhancement of productivity of potato, exotic vegetables, selected temperate fruit crops, floricultural crops and protected agriculture. The ARS is also responsible for producing basic planting material of potato, strawberry and gerbera for the national requirement. In addition, it provides training and technical advice to government farms, farmers and extension staff and students of different categories.

BUDGET

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

Table 2.2.7.1: Annual budget – 2007 (Rs.)

Vote	Allocation	Expenditure
Capital	1194000.00	573950.00
Recurrent	2107500.00	2089731.63
Crop Zone	400000.00	384570.32
NASP	1068948.00	1054834.37

PROGRESS

Following are the highlights of the studies carried out during the year:

TISSUE CULTURE

- Jasmonic acid at the rate of 2.5mg/l was found to be a promising growth regulator to increase the weight of potato micro tubers.
- Two hundred ppm of GA_3 sprayed 4 times beginning from 2 months after planting at 2 weeks interval increased the runner production of strawberry variety Chandler by 20 folds in protected houses; the technique can be applied to foundation stock of any age.

PLANT BREEDING

- Three locally developed high yielding, late blight resistant potato lines namely 99-02, 99-05 and 99-06 were selected for DUS Testing.
- Two locally developed potato lines namely 01-8-10 and 01-5-4 suitable for chips and French Fries were identified for VAT.
- Sixty one locally developed lines were evaluated for yield, late blight resistance and other desirable traits.

AGRONOMY

- Rooted stem cuttings (RSC) production of potato can be increased from 3 to 6 under UCWZ conditions by,
- Removing axillary tubers of the mother plant 2 weeks after establishment.
- Removing the apical shoot after 10 days of establishment.
- Growth and yield performance of abnormal tubers produced in different new production systems being developed were found to be similar to that of normal seed tubers.
- Use of 8cm diameter plastic pots is suitable for repeated harvesting technique to produce mini tubers efficiently.
- In aeroponic and hydroponic systems,

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mini tubers can be harvested at 10-14 days after tuber initiation and they should be cured at 95% RH for 3-5 days at 20-23°C.

- Twenty six commercially imported potato varieties were evaluated and 7 varieties namely: Bellerosa, Cicero, Magarita, Inova, Febula, Laura and Biogold were identified as promising in both UCWZ and UCIZ.
- Two potato lines viz. FLS-7 and LBR -15 were evaluated under VAT and found to be promising.

PLANT PATHOLOGY

- Compost tea could be used as a non chemical treatment to manage late blight of potato.
- Agrobact @ 4.5g/l and F-500 @ 2ml/l were effective in the management of late blight.
- In a study carried out in the Up Country Wet Zone, out of 06 commercial potato varieties Voyeger and Quincy were highly tolerant to late blight.
- The fungicide Champ 57.6% at the rate of 1000 ppm was found to be effective in controlling Black Rot in Cabbage.
- Cultivation of Shiitake mushroom is possible under UCWZ condition.
- Compost based on tea refuse is not suitable for button mushroom production.
- Forking of carrot is found to be severe in soils infested with *Fusarium spp.*

ENTOMOLOGY

- Screening of new insecticides for controlling of sucking pest complex; aphids, thrips and white flies of potato was carried out; Imidacloprid 70% WG @ 50g/ha, Thiacloprid 240OD @ 100ml/ha, Ethiprole 100SC @ 100ml/ha, Thiacyclam 50%SP @ 1000g/ha and Dinotifuran 20WP @ 353g/ha were found to be effective in controlling sucking pest complex of potato.
- Screening of new insecticides for control of sucking pest complex aphids, thrips and white flies of beans was conducted; Imidocloprid 70% WG @ 60g/ha, Thiacloprid 240OD @ 75-100ml/ha, Ethiprole 100SC @ 375-500ml/ha, Thiacyclam 50%SP @ 100g/ha and Dinotifuran 20WP @ 375g/ha were found to be effective in controlling sucking pest complex of beans.
- Chinese cabbage was found to be the most preferred host plant of *Liriomyza huidobrensis* for feeding & oviposition and mass rearing of *Diglyphus isaea.*

SOIL SCIENCE

- Seed yield of pre-basic seeds can be increased by application of 50% of N fertilizer as a basal and 50% at 2 weeks after planting.
- Application of foliar fertilizers, i.e. Maxicrop, Calmax, Maxical, Robon, "Dilan farm product", Bio-gold and Supermax have no significant effect on the growth and yield of potato in the research field.
- Application of Biophos (*Bacillus megatherium*) to Eppawala rock phosphate (ERP) gave better growth than the application of TSP in terms of leaf weight, root weight and root length of cabbage.
- Application of Biogold (*Azotobactor chrococcum* and *Pseudomonas fluorescens*) gave higher leaf weight and canopy diameter in cabbage.

DEVELOPMENT ACTIVITIES

Out come of the development activities carried out during the year is indicated below:

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Tissue Culture

- Produced 5831 disease free potato in-vitro plants (5231 of Granola, 500 of Desiree and 100 of Raja) and issued them to the net house in Government Seed Potato Farm for further multiplication; 2684 plants from variety Granola, 480 plants from variety Raja and 362 plants from different varieties were issued for informal seed production and experimental purposes; 500 plants of variety Desiree were issued to Hayley's, a private company, for seed production.

- Produced 1350 disease free *in-vitro* strawberry plants of variety Chandler for further multiplication in a poly-tunnel; 50 *in-vitro* plants were issued to a private grower for multiplication purpose; 5000 rooted planting material derived from tissue culture plants were distributed among farmers.

- Issued 530 *in-vitro* raised Gerbera plants to the growers in Nuwara Eliya area.

Agronomy

- Produced 400,000 RSCs and mini-tubers were produced for further multiplication by informal seed producers.
- Successfully commissioned a commercial scale production of mini-tubers using aeroponic techniques.

Plant Pathology

Diagnostic and Advisory Services

- About 322 farmers requested for advice for pathological problems.

  Out of them, 42.85% were on vegetables, 27%, were on potato, 28.42% on floriculture and 1.73% on fruits.
- Tested 200 potato plants and leaf samples for Potato Virus X, Y, S, M and PLRV.
- Tested 1000 for the Bacterial Wilt
- Produced 137 kg of Button mushroom spawns and 8 kg of Oyster mushroom spawns for demonstration.

Soil Science:

- Soil samples were tested for fertilizer recommendations as indicated below:

Farmers	-	181
Farmer fields	-	15
Research	-	10
Total	-	206

Entomology

- Tested 1000 samples for the Potato Cyst Nematode in Government Seed Potato Farms.

Special Activities

- Established a model farm under SriLanKoRDAA.
- Established a demonstration on soil conservation in collaboration with NRMC.

Training:

Following training activities were conducted at the ARS during the year:

- B.Sc. specialization projects by the undergraduates:
- Impact of nitrogen fertilizer on mini tuber production on potato in aeroponic system
- Impact of time of harvesting and pre-conditioning treatments on the quality of stored potato mini tubers.
- A staff member of Eastern University underwent training on nematode taxonomy
- Two days training for AII and farmers from Trincomalee District on potato production organized by the JICA, Trincomalee.
- Two days training on mushroom production organized by Industrial Development Board of Ceylon.

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- Two training programs for 200 farmers on strengthening the informal seed production.

Publications

- A research paper was presented at 19th Annual Congress of PGIA, University of Peradeniya and published in Tropical Agricultural Research, Vol. 19
- Country report on "Tissue culture activities and germplasm conservation" was presented at Tissue Culture and Crop Preservation Unit, NBPGR, India.
- Country report on potato seed system in Sri Lanka was presented at the international workshop on potato in India.

Paper Articles

- Black rot of cabbage
- Identification and control of anthracnose in curry chilli
- Potato diseases
- Use of tissue culture technique in seed potato production
- Five radio programs on pest and diseases of upcountry vegetables and potato
- ASDA poster on "A hydroponic system: To boost potato (*Solanum tuberosum*) mini tuber production".

Presentations

- "Opportunities and trends in Agriculture" A presentation made at the workshop for Communication facilitators in Hatton organized by Ministry of Estate Infra Structure Development.
- A seminar was conducted for the celebration of National Science Day at Good Shepherd Convent, Nuwara Eliya on "New trends in Biotechnology on Agricultural Development" .

Visits

School students:
410
Students of Agriculture Schools:
241
Undergraduate students:
62
Officers (Mahaweli and provincial DOA): 25

Seminars

- Climate change and its effect on potato production in Up Country Wet Zone: Mr. H.M. Pushpika.
- Statistical analysis in plant breeding: Ms.P. Malathy.
- Better soil fertility and nutrient management through soil testing: Mr. Upali Yapa.
- Mutant germplasm characterization using molecular markers: Ms. R.N.I. Perera.
- Field diagnosis of common diseases of potato and vegetables: Mr. A.G.C. Babu
- Potential of using Hyacinth bean for pod borer control in common bean: Ms. J.A. Samanthi.

Special Seminars

- Impact of climate changes on agriculture: Dr.B.V.R. Punyawardhana.
- An assessment of herpeto-fauna diversity in up country of Sri Lanka: Mr. Nayana Pradeep.

PLAN FOR 2008

Pathology

- Effect of inoculum potential on development of *Xanthomonas campestris pv. campestris (Xcc)* and its management by bio-control measures.
- Identification of biotic/abiotic factors influencing forking of carrot

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- Development of bacterial wilt management strategies in seed potato farms
- Screening of new fungicides against *Mycospherella* leaf spots of cabbage
- Development of non chemical strategies for the management of late blight of potato
- Screening of new potato varieties against late blight
- Screening of new potato breeding lines against major diseases
- Screening of fungicides against white rust of chrysanthemum
- Development of management strategies against Anthracnose in Madona Lily
- Studies on diseases associated with Gerbera cultivation under protected environment
- A survey on major diseases of cut flower crops; Roses, Carnation, Gerbera, Madona Lily, Statice, Altromaria etc.

Biotechnology

- Development of Anthracnose resistance strawberry varieties using mutagens

Entomology

- Monitoring, evaluation and control of potato cyst nematodes (PCN) in Government seed farms in Nuwara Eliya
- Mass rearing of *Diglyphus isaea*
- Screening of new and safer pesticide against aphids, thrips, white flies and leaf miner of potato and beans in farmers field condition.
- Screening of new pesticide against leaf eating caterpillar of cabbage.

Plant Breeding

- Development of high yielding, late blight resistant desirable potato varieties.
- Development of high yielding, disease resistant, heat toleranct potato varieties.

Fruits/Crop Zone

- Production of 2000 pear plants under Crop Zone Programme

Vegetables

- Breeder seed production of ball radish
- Evaluation of up country vegetables
- Seed production of selected up country vegetables; lettuce, Pack-choy, broccoli, garden pea and cauliflower.

Tissue Culture

Development Activities:

- Production of disease free potato *in-vitro* plants to cater the demand of Seed Potato Production Programme.
- Production of disease free potato *in-vitro* plants of the varieties to be released by the station.
- Production of disease free strawberry *in-vitro* plants for planting material production under polytunnel.
- Production of quality planting materials of gerbera and *Gypsophila* spp through micro propagation.

Research:

- Experiments to increase the rate of multiplication of strawberry variety Chandler.
- Evaluation of different propagules derived from tissue culture for runner production and fruit production of strawberry variety Chandler.
- Induced mutation of potato shoot tip cultures for bacterial wilt resistance.
- Gerbera callus and cell suspension cultures for desirable variations.
- Effect of age of in-vitro plants and the media composition on maturity and the performance of mother plants in net house

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Agronomy

- Effect of plant density on seed yield of potato
- Evaluation of commercial potato varieties
- Variety adaptability trial of potato
- Performance of different mixtures of spent tea and half burnt paddy husk on pre-basic seed yield of potato
- Performance of used and unused mixture of spent tea and half burnt paddy husk on pre-basic seed yield of potato

Soil Science

- Study of quantity and time of N fertilizer application on seed yield of potato
- Studies on compost production techniques suitable for UCWZ under the national project on Organic Fertilizer Production.

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2.2.8 AGRICULTURAL RESEARCH STATION (ARS) - TELIJJAWILA

Agriculture Research Station (ARS), Telijjawila, functioning under the administration of HORDI, Gannoruwa, is responsible for conducting appropriate research activities to address the field problems of farmers in Galle and Matara Districts. Its major activities include areas of crop improvement, agronomy and plant protection. In addition the ARS implements activities related to special programmes such as Crop Zoning, *Api wawamu- Rata Nagamu* etc. The priority area of the ARS is horticultural crop development; hence, most of the activities implemented at present are focused on increasing the productivity and production of those crops.

BUDGET

The allocations and expenditure incurred in year 2007 are in Table 2.2.8.1.

Table 2.2.8.1:Annual budget - 2007 (Rs.)

Vote	Allocation	Expenditure
Recurrent	1653,000.00	1635840.37
Capital Projects	588,000.00	531,608.66
Crop Zoning	900,000.00	898,175.06

PROGRESS

CROP ZONING

Rambutan

- Maintained the plantation of 400 budded plants(*Malwana* variety) established in year 2006 at Ransagoda of Matara District; in filled the vacant spots left by dead plants in the plantation with 21 new plants; plantation is in healthy condition.
- Also the 2 nurseries established at the same village in October 2006 is functioning well; men were trained on budding techniques to produce budded plants by themselves; success rate of budding by them was observed to be about 17 %; unsuccessful plants were budded again in December 2007; it is anticipated to produce about 1000 budded plants by June 2008.

Pineapple

- The Crop Zone at Godagama, Palatuwa is being maintained; due to the success of the initial cultivation more people are motivated to grow pineapple in the same village; already an additional 1 ac has been cultivated with pineapple as an intercrop under coconut.
- Nursery men in Godagama produced 3000 suckers in December 2007 with new techniques transferred to them by the ARS and generated an income of about Rs. 21,000/=; nurseries are further being developed to produce suckers on commercial scale.
- Though affected by floods, the nurseries at Mulatiyana are anticipated to produce about 1000 suckers by the end of the year.
- In the nursery at the ARS, Telijjawila about 20,000 plants are being raised.
- Three net houses were established to raise pineapple nurseries.
- Rapid propagation techniques have been introduced by using following material:
- Harvested stems
- Developing suckers

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Banana

- Banana crop zone established with 40 farmers is well maintained; the extent has been further expanded by farmers themselves; conducted training programmes and demonstrations to train them on production of food wrappers and other products with banana leaves; at present the farmers produce wrappers for the hotels at Akuressa.
- Production of 5000 conventional suckers of recommended banana varieties is in progress at the research station.

Infra-structure

- Partially completed fencing around the land owing to practical problems encountered; necessary arrangements have been made to formally acquire the land for the Department of Agriculture.
- Established an access concrete foot path to the field.
- Partially completed a building of 15' x 20' in size as an extension to the existing office building.
- Developed an extent of 11 ac by clearing shrubs.

PROGRESS

AGRONOMY

Pineapple

- **Propagation Techniques**:

In-vivo multiplication technique for in-vitro propagated pineapple plantlets has been developed; by this technique the number of plantlets produced can be tripled.

- **Multiplication Technique for Suckers:**

A conventional sucker ready for field planting can be further multiplied to 4 – 6 suckers in 3 months by segmenting it transversely.

Papaya

- **New Propagation Technique**:

A vegetative propagation technique has been developed for papaya. The plants propagated by this technique attain flowering at 50 days after field planting and their dwarf nature is suitable for urban agriculture and home gardens.

Banana

- **Further Multiplication of Suckers:**

Pseudo stems of suckers weighing about 800 – 1800 g were cut away from the base and the corms were split into strips of 300 – 500 gm in weight; then they were maintained in a nursery for three months till they reach the level of transplanting; multiplication rate by this technique was 53%.

- **Non Chemical Methods to Control Banana Corm Weevil *(Cosmopolytus sordedus)***

Following techniques were used to control the banana corm weevil:

- Immersing the corm in clean water for 48 hours.
- Dipping the corm of the sucker in boiling water for 30 seconds.

Above techniques were effective in controlling all stages of the life cycle of corm weevil.

- **Diversified Banana Products.**
  - **Bio Plates from Leaves**:

All the torn leaves and leftovers in wrapper production can easily be molded into plates, which are strong enough to serve a meal.

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- **Products with Leaf Sheaths and Petioles:**

Petioles and leaf sheaths can be used to make banana bunch covers, baskets, mats, wall hangers, and degradable pots to raise plants.

Sweet Potato

Promising Sweet potato Varieties for Problem Soils:

Tested 13 sweet potato varieties for salinity tolerance; and five varieties (396 – 4, 188022 – 1, 440224, 1807017 – 1, 1990062) were identified as promising for acid sulphate affected soil in the Nilwala River basin; further studies are in progress.

Rice

- Under variety evaluation, following 9 rice lines were selected as resistant to blast:

In *Yala* 2007 - Ld 6-M-18, 06-968, 03-1071 and *Suwanda Samba*

In *Maha* 2006/2007- Ld 3-6-12-2, Ld 4-6-19, Ld 2-1-14, Bw 361 and Bg 304

Vegetables

- Identified bitter gourd variety H16 as a cultivar with qualities of high yielding ability and moderate tolerance to fruit fly.
- Identified Brinjal cultivar EGH 16418, as a high yielding variety, despite high incidence of shoot and pod borer.
- Identified the cultivar, Batticaloa selection as a promising okra variety for further investigations.

Mushroom

Identification of Different Substrates for Mushroom

- Banana pseudo stem based compost mixture (in which saw dust was amended with banana pseudo stem in 1 : 1 ratio) can be raised as a better substrate than frequently used saw-dust media for oyster mushroom cultivation. Therefore, banana pseudo stem can be used as a good substrate for oyster mushroom cultivation.
- In comparison to the DOA recommended sawdust based compost mixture, higher oyster mushroom yields were recorded in compost mixtures in which a rice straw and sawdust combination (1 : 1 ratio) was used.

Development Activities

Compost production programme was started to fulfill the requirement of compost.

- *Glyricidia* was established in 1 ac as a green manure crop.
- Marginal pepper cultivation was pruned and fertilized.
- About 1000 areca nut seedlings have been raised to establish in the field with the onset of rain.

Demonstrations

Conducted demonstrations on the following:

- *Kiriala,* pineapple and banana multiplication techniques for different farmer groups, school children and extension staff in the Southern region.
- Ten demonstrations of mushroom cultivation.
- About 25 sessions on production of banana based products.
- Weevil controlling techniques for growers and extension officials.
- Five programmes on compost production.

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Other Activities

Services

- Issued 350 banana suckers to farmers on request.
- Established a marketing network for farmers, who have adopted technology developed or recommended by the ARS, Telijjawila in planting material production, to sell " *Kiriala -Isuru*" plants; about 28,000 propagules have been sold and about Rs. 196,000/= earned by the farmers.
- Sold 80 packets of mushroom seeds.
- Distributed technical handouts on banana, pineapple, papaya, *kiriala,* cassava and mushroom to the people, who visited the station and 5 exhibitions held, and also through mail.
- A booklet on " Practical problems in banana cultivation" was written for the *walawa* farmers and handed over to a " Walawa Nadee Farmers' Organization"

Answers to Farmers

Recommendations and advice were given to all the farmers who brought infected samples for identification. Instructions were given to more than 500 people though mail and over the phone.

Visitors

About 2060 persons including farmers, school children, students from different Agriculture Schools, NGOs, officers of the public sector and extension officers visited the ARS during the year.

Radio Programmes

Conducted 10 programmes on fruits, home gardening, mushroom production and banana based products.

TV Programmes

Participated in 3TV programmes on banana based products.

Newspaper Articles :

Published 12 articles on technical matters in Newspapers.

Exhibitions

Participated in 5 exhibitions and 2 "*Janatha Sathkara Sewaya*" sessions.

Awards

S.S. Weerasinghe was awarded the gold medal and cash award for the " Best Researcher Year 2007" by the Department of Agriculture.

International Training

1. Research Officer Mrs. Janki Kariyawasam attended the Bio Pesticide conference in Tamil Nadu, India.
2. A five month training for Mr. S.D. Yapa, Research Assistant on Vegetable Seed Production Programme in Japan.

Other Training

Two students from schools of agriculture were trained and five school children were provided with information for their project activities.

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PLAN FOR 2008

- Continuation of the agronomic research programmes on pineapple, papaya, banana, mango, mushroom , vegetable, rambutan, kiriala, and other fruit crops.
- Plant pathological studies on mushroom, vegetable and rice.
- Planting material production of Banana, pineapple, rambutan and kiriala.
- Maintenance of the modal home garden.
- Development of the farm land and occupying completely with crops.
- Completion of the expansion of the existing office building.
- Completion of the establishment of protecting fence.
- Repairing of the mushroom shed.
- Development of a mini laboratory to implement disease diagnostic activities and mushroom seed production programme.

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2.2.9 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". This station was handed over to the DOA in 1984. It functioned under the administrative control FCRDI until year 2000, when the station was affiliated to the HORDI, Gannoruwa.

The station focused on research and development activities to improve the productivity of vegetables, fruits, and root and tuber crops. Recently the ARS was given the responsibility of implementing important activities under the rice research and development programme and later on they were extended to produce hybrid seed paddy as well. Nearly an extent of 5 ha is being cultivated under the hybrid seed production programme alone.

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

BUDGET

The allocation received and the expenditure incurred under different votes and projects during year 2007 are given in the Table 2.2.9.1.

Table 2.2.9.1: Annual budget - 2007 (Rs.)

Vote	Allocation	Expenditure
Capital	548,000.00	421,757.66
Recurrent	903,000.00	885,259.30
SL-USA Project	215,000.00	187,269.96
Hybrid Rice Project	215,000.00	187,269.96
Crop Zone Project	700,000.00	479,688.83
Seed Production Programme	8,500,000.00	8,005,200.30

PROGRESS

A number of infra structure development activities of the station were completed in year 2007; they include a newly constructed auditorium, which is being gainfully utilized by officers and the farmers to have dialogues on technical matters related to crop production.

SEED PRODUCTION PROGRAMME

Chilli: Breeder Seed Production

The main objective of this programme was to produce breeder seeds of recommended variety "Wasana".

Capsicum: Breeder Seed Production

Lanka Yellow Wax, a cross between capsicum varieties of CA 8 and Hungarian Yellow Wax, was recommended and the programme of breeder seed production of the new variety is being carried out.

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Rice:

Rice varieties, AT 676 (3month) and Ld 3 -12 - 50 (3 1/2 month) were tested, which yielded 5.16 mt/ ha and 4.46 mt/ ha respectively.

Rice Variety Adaptability Trails were conducted in farmer fields; several promising rice varieties under 3 and 3 1/2 months age classes were tested in the farmers' fields at 7 locations to select suitable rice varieties for the region.

Finger Millet:

The finger millet variety evaluation programme, conducted among SAARC countries, was carried out by the ARS during the Yala season of 2007; under this programme, which was a collaborative work coordinated by the PGRC, a total number of 12 varieties including 5 from India, 3 from Nepal and 4 Local varieties were evaluated; the variety BR 202 from India, which gave a grain yield of 3.4 t/ ha., was the most promising.

Hybrid Seed Paddy Production

During Yala 2007, a quantity of 960 kg of good quality seeds of the hybrid variety BG 407 was produced and distributed as it was done in the two previous seasons.

Certified Seed Production of Papaya (Rathna)

Produced and distributed 4.9 Kg of certified seed of papaya variety Rathna.

PLANTING MATERIAL PRODUCTION

Cassava:

Produced and distributed stem cuttings of cassava (about 2000 meters).

Banana:

Produced and distributed suckers of following varieties as indicated below: *Seenikesel* 2751; *Ambulkesel* 486; *Kolikuttu* 36; Ash plantain 660; *Kandula* 239; others 03

Papaw:

Conducted the programme on evaluation of hybrids during the *Maha* 2006 and *Yala* 2007 seasons in which 8 varieties were tested; in the end, two varieties were selected as highly promising and suitable for Mahaweli System C.

Pineapple:

Conducted the NCVT in which 4 hybrid varieties were tested along with *Kew* and *Mauritius* varieties.

Brinjal:

Conducted the evaluation programme on yield potential and fruit quality of different varieties under different agro ecological conditions; among varieties tested, the accession 8890 F of *lena-iri* type gave the highest yield.

SL-USA Fruit Crop Conservation Project

The objectives of this project, initiated in 2002 were collection, conservation and characterization of 6 under utilized fruit crops, namely *Anona*, wood apple, *Mora*, *Nelli*, tamarind and *Madang;* up to now 75 accessions of them were collected and 50 plants have been established in field gene bank for conservation.

TECHNOLOGY DISSEMINATION

The ARS conducted several training programmes and workshops on different topics

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during year. They included: production of mushroom (3 programmes for 55 participants), fruit cultivation (02 programmes for 48 participants) and vegetable cultivation (2 programs for 37 participants).

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

The ARS conducted a field day with the intention of disseminating of new information and technology generated through research to the farmers of the area; the Hon Maithreepala Sirisena, the Hon. Minister of Agriculture Development and Agrarian Services was the chief guest in this occasion.

Training

- Mr. M. M. B. Nishantha Priyajanaka, Agriculture Instructor underwent training In Japan on Vegetable seed production at Tsukuba International centre JICA (March 8 – August 18)
- Mr. H. M. Pradeep Chandana Agriculture Instructor underwent training on Hybrid Rice Technology for developing countries in China. (May 25 – September 20)

PLAN FOR 2008

- Hybrid rice seed production of Bg 407 H
- Basic and standard seed production of Papaya.
- National coordinated variety trails of selected vegetables.
- National coordinated rice variety trails.
- Implementing the work plan of the Underutilized fruit crop project.
- Production of seed and planting materials such as root and tuber crops, fruits, and vegetables.
- Organizing extension and training programme for school children and farmers

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2.3 RICE RESEARCH & DEVELOPMENT INSTITUTE (RRDI)- BATALAGODA

Rice played a significant role in the Sri Lankan economy as the staple food of all Sri Lankans. Rice contributed 2.9 % to the GDP. The contribution from rice to total agricultural GDP was 21.6% in 2006. National average paddy yield increased to 4.30 t/ha in maha 2006/2007 and 4.54 t/ha in Yala 2007 with an annual national average yield of 4.39 t/ha. However, the cultivated extent decreased by 11.1% in 2006/2007 maha compared to 2005/2006 maha and by 8.7% in 2007 Yala compared to 2006 Yala. The area cultivated in 2006/2007 maha and 2007 yala were 525,338 ha and 291,375 ha respectively. The total paddy production in the country was 1.97 million tons in 2006/2007 maha and 1.16 million tons in 2007 yala. The market value of local paddy production in 2007 at the rate of 17.5 rupees per kg of paddy was over rupees 54.8 billion.

During 2006, 12000 tons of high quality rice was imported at a cost of rupees 550 million. On the other hand 1.2 million tons of wheat was imported for a value of 198.6 million US dollars in 2006. This suggests that we need to produce more rice to supplement at least 50% of the wheat consumption as planed in Mahinda Chinthanaya and to save foreign exchange.

The rice market situation changed during later part of 2007. Rice prices in the local market increased to a record high level of over 70 rupees per kilogram. Increased demand for corn in the world market with the increased emphasis on renewable energy sources in developed countries resulted in increased world market prices of corn. Rice was therefore substituted for corn as animal feed in Sri Lanka. Further, the increased world market price of wheat resulted in the increase of prices of wheat significantly during latter part of 2007. These changes led a significant increase in the consumption of rice and rice based products. Rice flour industry expanded to compensate wheat flour. The per capita consumption of rice which was about 104 kg per head is estimated to increase to 116 kg per head. These developments created a scarcity of rice in the market resulting significant increases in local market prices.

The trend of increasing rice prices is not unique to Sri Lanka. The increased demand for rice in the world market has increased rice prices to a record high level and appear to continue. Therefore, there is an urgent need to produce more rice locally to feed Sri Lankans and also to fulfill the need for animal feed and export to niche markets. Thus increasing national rice production in the island will continue to be an essential need to reach the new targets of self-sufficiency and to maintain food security in Sri Lanka. While achieving self-sufficiency, improving the quality of rice to local and international market standards is also an essential dimension.

Abiotic stresses such as water stress, salinity, alkalinity and other soil toxicities affected rice yields especially during *yala* season. Due to lapses in pre-plant management of the field, use of weedicides for rice

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cultivation continued to be at a higher level while use of pesticides however decreased. Rice grain sterility, partly due to increased air temperature and humidity was reported from many parts of the island. Rice cultivation is therefore faced with biotic and abiotic stresses. Rice Research & Development program of RRDI and satellite stations therefore continued with the aim of finding short and long term remedies to above problems while increasing grain yield potential and quality of rice. The research program was also focused in finding solutions to challenges such as lack of good quality water and inadequacy of water at important growth stages, high temperature stress, environmental pollution due to heavy use of weedicides, degradation of the soil environment and increased inorganic fertilizer use, break down of genetic resistance to pest and diseases and organic rice farming.

RRDI continued to work in close collaboration with International Rice Research Institute (IRRI), Philippines. IRRI continued to play a major roll in supplying germplasm through INGER program. RRDI continued its programs on hybrid rice with the support from FAO. JAICA supported in the dissemination of biological test based nutrient management system for rice at farmer level.

The government of Sri Lanka paid special attention in strengthening the infrastructure of research, training and development activities of RRDI. Hon Minister of Agriculture Development and Agrarian services, Mr. Mitripala Sririsena, Hon Minister of Agriculture, Mr. Hemakumara Nanayakkara, Hon. Minister of Coconut Development Mr. Salinda Dissanayake, Hon Minister of Agriculture, North Western Province, Mr R.D.Wimaladasa and other distinguished invitees visited RRDI and laid the foundation stones for the new research and training and the hostel complex.

BUDGET

RRDI was fortunate to receive its recurrent budgetary requirement during 2007. The budget allocation from local and external fund and expenditure are given in Table 2.3.1.

Table 2.3.1: Annual budget – 2007 (Rs.)

Vote	Allocation	Expenditure
Capital	8,316,800.00	4,733,202.00
Recurrent	18,547,000.00	18,353,557.86
Foreign funded projects		
SLUSA (1)	254,200.00	131,085.00
SLUSA (2)	453,000.00	244,754.06
SLUSA (3)	762,041.00	422,114.38
Weed Science – IRRI	270,000.00	269,768.00
Projects (Local)		
CARP Hybrid rice	1,770,480.00	1740,894.00
Crop wild Relatives (1)	250,000.00	240,517.69
Crop Wild Relatives (2)	260,000.00	248,906.50
Organic Farming (1)	1,150,000.00	961,519.96
NSF	136,989.35	136,989.35
JAICA	717,380.66	717,380.66
Granary Area Program	120,000.00	90,411.78
Krushi Navodaya	5,200,000.00	2,545,800.00

PROGRESS

VARIETY IMPROVEMENT

Increasing rice production in the island could be achieved by increasing the area under cultivation and productivity of rice lands.

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Developing high yielding new rice varieties with desired quality could increase productivity. RRDI scientists continued its effort to increase the genetic potential of rice varieties through conventional breeding, heterosis breeding and using tissue and anther culture techniques. The task of increasing realizable yield potential over that of present highest yielding variety is becoming extremely difficult as varieties are fast approaching a yield ceiling. Despite these challenges, substantial gains could still be achieved through conventional techniques.

Abiotic stresses such as water stress, high temperature stress, salinity and soil toxicities are considered very important in rice cultivation in Sri Lanka. Cooking and eating quality of rice for both local and international market standards should be further improved. Rice varieties having high micro nutrient content and rices varieties for the preparation of rice based products are needed. Therefore, new promising rice lines are being developed continuously at RRDI to incorporate these important transferable traits along with the high yielding ability.

Conventional Breeding Programme: 4 - 4 1/2 Month Age Class

Four to four and half months maturity rice varieties were cultivated in 75542 ha in 2007, which is 9.2% of the total annual rice crop extent in Sri Lanka. This age group is predominantly cultivated in Kegalle, Kandy, Matale, Badulla districts, Mahaweli systems and Northern Province especially in Maha season where water is not a limiting factor. Longer maturity duration of this age class permit exposure of rice to different climatic and other environmental hazards, especially during early growth stages. There is still room to increase genetic potential for yield of this age class compared to 3 – 3 1/2 month age class. Therefore, 4-4 1/2 m rice breeding program was focused to develop high yielding, pest and disease resistance rice varieties with desired grain quality which are adaptable to diverse eco systems.

Four to four and half month rice variety improvement program consists of several segregating populations and progenies belonging to different filial generations and homogeneous lines advanced until 2006. In 2007, these materials were advanced and evaluated while making new cross combinations for the future. Twenty four new crosses were made and 34 F_1 generations were advanced in 2007. Twenty four early segregating bulk populations belonging to different filial generations (F_2, F_3, F_4) advanced from previous season were evaluated for specific objective of the original cross made and for desirable phenotypic acceptability. Four hundred and eighty two progenies of F_5 generation onwards were further advanced and evaluated for maturity duration, pest and disease reaction. Eighteen elite lines were evaluated for yield and grain quality using Bg 379-2 as the standard variety. Two elite lines with white pericarped, intermediate bold type grains; Bg 06-1258 and Bg 06-997 and one line with small round grains; Bg 06-1350 were selected for further evaluation.

Bg 3026, a white intermediate bold type line resistant to BPH, BLB and blast but moderately susceptible to GM was nominated to large scale variety adaptability testing (LSVAT). The white pericarp elite line Bg 2893, which is moderately resistance to rice blast, rice gall midge and brown plant hopper and with high adaptability over the divers environments were further evaluated under the LSVAT program in farmers fields before

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submitting to the Varietal Release Committee for National release in 2008.

Conventional Breeding Program - 3 1/2 Months Age Class

About 0.58 m ha or 71% of the rice land is cultivated to 3 1/2 month duration rice varieties. This age group varieties in Sri Lanka has reached very high yield potential compared to 4-4 1/2 month varieties. Further this category of varieties fits with the short growing season in most part of rice ecosystems in Sri Lanka. Variety improvement program of this maturity group continued to identify high yielding better quality rice lines with durable resistance for Brown Plant Hopper (BPH), Rice Gall Midge (RGM), Bacterial Leaf Blight (BLB) and Blast (BL). The sources of resistance for above biotic factors are as follows.

Table 2.3.2: Sources of resistance for biotic factors

Biotic factor	Sources of Resistance
BPH	IR 65432-136-2-2
IR	54742-6-20-3-9
IR	54751-2-34-10-6-2
RGM	Ob 2552
BLB	IRBB 60
Blast	Bg 357, Bg 352, Bg 358

In the 3 1/2 month variety improvement program, fifty crosses were made in 2007. Based on hybrid vigor and maturity age, eight combinations were selected for further advancement. Twenty seven segregating populations from F2 to F4 developed in previous season were evaluated in the field using modified bulk method and all populations were selected for further advancement. During the year, 865 progenies from F5 generation onward were also established and evaluated and 130 progenies were selected for further advancement. Eight advance generation lines were tested in preliminary yield trials (PYT) and eight lines were tested in major yield trials (MYT). Based on results from MYT, no entry showed a significantly higher yield than the standard check.

Conventional Breeding Program - 3 Months Age Class

About 0.15 m.ha. or 19% of the rice lands is covered with 3 month rice varieties. This category of varieties is more suited for ecosystems with limited water availability in Sri Lanka. Variety improvement program of this maturity group continued to identify high yielding better quality rice lines with durable resistance for BPH, RGM, BLB and Blast.

Segregating populations from previous seasons were maintained up to 10 filial generations using modified bulk method. Fifty two new crosses were made during 2007 to incorporate BPH, BLB, Blast and RGM resistance, improve the grain quality and reduce maturity durations (Table 2) and 95 F1 populations were established. Eighty three filial generations from F2 to F4 were evaluated in the field. About 1928 progenies from F5 onwards were established and evaluated. Twenty four advanced lines were included in the PYT while 18 lines were evaluated in MYT. A selected white pericarp line from MYT Bg 06-985, resistance to blast, BLB, RGM and BPH was nominated to NCRVT.

Under the project of thrips resistance varietal development, back cross breeding method was adapted using Bg 360 and Bg 300 as recurrent parents. Two promising lines (Bg 360 BC_5) 04-0121 and (Bg 360 BC_4) 04-0036 were identified and tested their adaptability in farmer fields during, Maha 2007/2008 at Galgamuwa.

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The program to develop near isogenic lines continued. Forty two near isogenic lines of Bg 357 were established.

Table 2.3.3: Sources of Resistance to BPH, BLB, RGM and Sources of Other Quality Characteristics

Character	Source
Bacterial Leaf Blight	
	IRBB 56
	IRBB 60 -(Xa4, Xa5, Xa13, Xa21)
	IRBB 59
	IR 66700-4-2-9-3-5-3-5
	IR 66700-3-3-3-4-3-3
Brown Plant Hopper	
	IR 54751-2-34-10-6-2 *O.officinalis*
	IR 65482-4-136-2-2
O.australiansis	(BPH 10)
	IR 54751-2-41-10-5-1 *O.officinalis*
	IR 54742-6-20-3-9-3 *O. officinalis*
	IR 65482-4-136-2-2-2 *O.australiansis*
Rice Gall Midge	
	MR 1523
	Ob 2552
	CR 95-JR721-3
	CR94-13
Short maturity duration	
	Tulsi
	Vandana
	Hetada wee
Grain quality	KDML 105
	IR 841
	Jesmin rice
	Pusa basmati I
	Pusa sugand II
	Pusa sugand III

Conventional Breeding Programme 2 1/2 Months Age Class

The ultra short age variety, Bg 250 which was released in 2005 was planted to 389 ha which is 0.05% of the total rice area in the country. This variety which matures in 80 days fits well into ecosystems where 3 months varieties cannot be grown due to water shortage. Breeding program to develop 2 1/2 months age new rice lines was initiated during 2005 yala and continued with the objectives of selecting lines which matures in less than 80 days and with acceptable yield. In 2007, eleven crosses were made and 7 bulk populations of F_2 (Hetada/Bg 250 and 03/1451/ Bg 250) and F_3 (Tulsi/Bg 250, MR 1523/Bg 250, IR 28/ Bg 250, PSBRC 4/ Bg 250 and Hetada/ Bg 250) generations were advanced.

Incorporation of Thrips Resistance to Ultra Short Age Rice

Because of the ultra short age nature, any biotic stress especially at seedling stage would significantly affect ultimate yield. Therefore, a program to breed ultra short age rice with durable resistance to rice thrips was started in 2006/07 Maha. Two thrips résistance lines selected from USDA thrips resistance breeding program were used as parents to incorporate thrips resistance to Bg 250. These two lines were developed through back crosses between Dahanala and Bg 360.

Improvement of Traditional Varieties through Mutation

Traditional varieties "Suduru samba" (red pericarp) and "Suwanda samba are tall and prone to lodging. Therefore these were irradiated in 2002 Yala using gamma rays to develop lodging resistance varieties. After vigorous selections for quality and phenotypic acceptability, 12 lines were tested in

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observational yield trials and five elite lines, SSR 8, SSR 17, SSR 23, SSR 26 and SW 27 were selected as they are superior to parents in both yield and lodging resistance. (Table 2.3.4)

Table 2.3.4: Yield of selected lines and varieties/cultivars

Variety/cultivar /line	Yield (t/ha)
Suduru samba	1.08
Bg 357	6.38
SSR 8	5.80
SSR 17	2.8
SSR 23	4.38
SSR 26	4.08
SW 27	3.14

Wide Hybridization Studies using Wild Rice (*O.nivara*)

Owing to incompatibility between two species incorporation of this trait into *O.sativa* was not possible through conventional breeding techniques the past. Therefore a wide hybridization program was initiated in 2002 to incorporate BPH resistant gene from *O.nivara* to *O.sativa* var Bg 379-2. Twelve progenies of F_{10} generation which are resistance to BPH were established in the field in 2007.

Further a separate program was initiated in year 2006 to incorporate BPH resistant gene from *O.nivara* to *O.sativa* var. Bg 380. Crosses were successful and F_2 plants were screened for BPH resistance. Resistant plants were obtained through screening.

Morphological Characterization of Wild Rice Species Collected within Sri Lanka

Sri Lanka is rich in its biodiversity in relation to wild rice. Thirty two new accessions were collected and incorporate to the existing collection of 18 wild rice accessions. (Table 2.3.5)

Table 2.3.5: List of wild rice species and accession s collected from different locations

Species name	No. of accessions collected
O.nivara	20
O.rufipogon	11
O.eichingeri	07
O.rhizomatis	08
O.granulata	04
Total	50

Out of these accessions forty accessions were morphologically characterized according to the IRRI descriptor. Financial assistance was received from Crop Wild Relatives Conservation Project.

Maintenance of Rice Germplasm

Rice germplasm collection at RRDI, which is over 1500 accessions, includes traditional cultivars, introductions and improved lines, were maintained under medium storage condition inside cooling cabinet (10°C) and short term condition (room temperature) inside storage room. Three hundred rice accessions were characterized and catalogued in 2007 while there are about 400 accessions catalogued in previous years. Over 750 accessions were rejuvenated. Apart from the conservation of these lines for the utilization in breeding program, the germplasm collection at RRDI is also a source of seed material for specific growers and others in need.

Hybrid Rice Research and Development Program

Hybrid rice breeding program continued as planned. Ten new hybrid combinations of different age classes were identified. One samba line of 100 day maturity duration, Bg 3R, selected from restorer development

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program was submitted to NCRVT program for testing under different agro-ecological zones.

During 2007, we identified 10 locally made CMS lines. During 2007, out of 150 test crosses made, 10 promising test crosses were selected for further evaluation. About 3500 kgs of Bg 407H was produced at ARS, Giradurukotte as seed paddy. About ten kg of seeds of parents of Bg 407H (A, B and R lines) were produced.

In the restorer development program, three way crosses were used to enhance the restorability and identified 5 new restorers.

In 2006 /2007 maha season, about 150ha of Bg 407H was cultivated in Ampara, Baticaloa, Giradurukotte, system C, Polonnaruwe and Anuradhapura. Four training programs to popularize hybrid rice technology were conducted for officers and farmers in Ampara, Polonnaruwe, Anuradhapura, Hambantota and Mahaweli system C and H areas. Ten minikits weighing 2 kgs each of Bg 407H were also distributed among farmers.

FAO funded a technical cooperation program (TCP) on strengthening national capacity for hybrid rice development and use for food security and poverty alleviation program was initiated. Further a CARP contract project on sustaining food security in Sri Lanka through development of hybrid rice was also initiated.

Tissue Culture

Four somaclonal variants of Suweda samba are at G_2 field evaluation stage. Field performances of these lines for their grain shape, plant height and other agronomic traits of these lines are superior to Suwenda samba.

Development of Salinity Tolerant Lines through Anther Culture Technique

Ten anther cultured lines, obtained from the cross between Bg 300 and Nonabokra in 2004 are being tested for yielding ability and salinity tolerance in the field.

Under the program of development of gamatoclonal variance and production of homogeneous lines, 64 anther derived lines from pokkali were developed. Ten dwarf lines with medium level salt tolerance are at yield evaluation stage.

Further calli developed from embryos from seeds of these ten lines were raised in tissue culture media containing different concentrations of NaCl. By this method we expect that the successful plant regenerated would poses salt tolerant characters.

In 2003, Bg 750, Bg 300, Bg 304, Bg 94-1, Bw400 and Bg 450 were crossed with saline tolerant At 401, At 354, Pokkali and Nonabokra. Seeds of these progenies were advanced up to F_5 generation. In 2005/2006 maha, about 80 high high yielding progenies were selected. These lines of different age groups were again tested for salinity tolerance at 6-8 d S m^{-1} EC level. Four lines in 4 month age class, 18 in 3 1/2 month age class and 3 in 3 month age class were identified as saline tolerant high yielding, pest and disease resistant lines. These lines are being further tested in saline fields with the participation of farmers at Putthalam and Polonnaruwe.

Wide Hybridization and Embryo Rescue

Wild rice possesses resistant genes for important pests and diseases. In this back cross breeding program, BPH and blast resistant

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genes were transferred from *Oryza eichingeri* to cultivated rice (BC_3 F_3 Pachchaperumal x O. eichingeri // Bg 357, Pokurusamba, Bg 300, Bg 379-2, Bg 360). Green house testing proved that these new lines possess resistant genes to blast and BPH. These lines of different segregating populations are now available for the normal breeding program.

WEED MANAGEMENT

Effect of Seed Establishment Method on Weed Population and Yield of Rice

Three seed establishment methods, 24 h of soaking followed by 48 h incubation and broadcasting of pre-germinated seeds on drained puddle soil (standard method), 48 h soaking followed by 24 h incubation and broadcasting of pre-germinated seeds on 3-5 cm flooded soil (water seeding) and 24 h soaking followed by 48 h incubation and broadcasting of pre-germinated seeds in rows using a plastic drum seeder in drained puddle soil were tested. The lowest weed population and weed weight was observed in water seeded plots. *Monochoria vaginalis* was dominant in water seeded plots and grain yield was significantly higher in row seeded treatment than that of water seeded and standard treatments. Row seeding with effective weed management found to be the best seed establishment method to obtain higher yield as compared to water seeding and standard broadcast seeding methods. In water logged situations, water-seeding found to be the best method.

Effect of Water Seeding Establishment Method on Germination, Growth and Weed Control of Rice

Three methods of seed soaking, sowing of one day soaked and three day incubated seeds, sowing of 2 days soaked & one day incubated seeds, sowing of dry seeds directly without soaking were tested under water seeded conditions. Two days soaked one day incubated seeds recorded highest germination and performed well under water seeded condition. Weed controlling ability was better under the water seeded condition compared to standard method.

Effect of Different Tillage Practices on Weeds and Yield of Wet Seeded Rice

Three different tillage practices, without tillage but sprayed Glyphosate herbicide at the rate of 3L/ha, Minimum tillage; one ploughing followed by one harrowing and conventional tillage, two ploughing followed by one harrowing were compared under lowland conditions. No tillage but with the application of Glyphosate herbicide at the rate of 3L/ha could be used as an alternative method of establishment of rice when ever practicing conventional tillage is difficult. No tillage reduced the cost of cultivation by omitting tillage operations but application of herbicide was necessary.

Phytotoxicity Effect of *Lantana camara* on Germination and Growth of Low Land Rice and Weeds

Lantana camara (Gandapana) has identified as the invasive plant having allelopathic activity. We reconfirmed the allelopathy potential of *Lantana camara* on germination and growth of broad leaf weeds. *Lantana camara* incorporated plots reduced the incidence of *Eclipta alba* and *Murdarnia nudiflora* by 40 and 60% respectively. There was no detrimental effect of *Lantana camara* on rice seed germination and growth.

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Diversity of Weed Flora in Wet Seeded Rice in Sri Lanka

Major weed species and the density of weeds in different rice growing environment in dry, wet and intermediate zones under irrigated and rainfed condition was surveyed in over 500 farmer field. One hundred and twenty eight weed species were identified. Nearly 28 weed species can be considered as economically important. The composition of weed flora is changing from annual weeds to perennial weeds in rainfed rice environments in three different rice environments.

E.crusgalli and *I. rugosum* were the pre dominant weed species previously. But *L. chinensis* and *I.globasa P. congugatum C. dactylon* are becoming dominant weeds due to incorrect cultural and management practices and changes in environment.

Weedy Rice and Wild Rice

Changes in crop establishment method from transplants to direct seeding and shortage of water have resulted in dramatic succession of weed flora from one of "easy to control" to one that is "difficult to control" weeds. One such weed that falls in to "difficult to control" category is weedy rice (*Oryza sativa*), known locally as "Uru wee","Wal goyam","Eratta wee".

Recently many farmers from major rice production areas such as Ampara, Vauunia, Kurunegala, Mathara and Puttalama complained that it is difficult to cultivate rice due to weedy rice problem. Yield loss due to weedy rice range on 50-100%.

About 30 years ago, this problem was negligible but today it is becoming a serious problem in areas due to poor cultural management practices, shortage of water, increase of direct seeding and lack of knowledge about these plant. This problem was first reported in Sri Lanka in 1997 in Ampara district. Today it was spreading irrespective of agro ecological zones at an alarming rate, threatening food security in the country.

This weedy rice with undesirable traits can inflict crop losses not only by reducing the yield but also the quality of commercial rice. Hence, urgent measures have to be taken to educate extension officers and farmers on the potential damage of weedy rice and adapted possible integrated management practices. There for awareness programs for farmers and field staff were conducted. Distribution of weedy rice, taxonomical, morphological, agronomical and ecological information were collecting to develop an integrated control measures.

Different forms of Weedy rice were identified in Puttalam, Ampara and Matara districts. Oryza nivara, Oryza rufipogen and Oryza rhizomatis are predominant wild species found in these rice fields. Once weedy rice is infested it is easily spread because of its high competitive ability. Mature grains drop prior to harvest and increase the soil seed bank. Weedy rice is difficult to control with herbicide and manual means because they are identical to the cultivated varieties. It can cause major damage to the quantity and quality of the rice harvest. Variations of plant characteristics identified among wild and weedy rice forms were; annual and perennial, different age classes; 3 1/2 to 5 months, red or white pericarp, with or without red, yellow, purple or brown colored awn, awn length vary from 0.5cm to 12 cm, different grain sizes and varying spikelet fertility from 20 to 100%. Integrated control method such as; use clean seed paddy and clean machinery, cultural and pre-plant chemical methods can be selected to minimize the threat to rice cultivation in above areas.

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National Coordinated Herbicide Screening Trial for Wet Seeded Rice

Integrated weed management (IWM) is the rational use of direct and indirect control methods to provide cost effective weed control. Chemical weed control is a common practice and effective control method in IWM. 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. Eight candidate herbicides were tested under lowland conditions and following five herbicides were selected for pilot scale testing in farmer's fields.

- Flucetosulfuron %WG – grass, broad leaf and sedge killer
- Orthosulfamuron + Propernil (IR prop 48) - grass, broad leaf and sedge killer
- Azimsulfuron 50DF - grass, broad leaf and sedge killer
- Fenoxapop – p – ethyl + isoxadifenethyl – grass killer
- Triasulfuron - broad leaf and sedge killer

Rate of Application of Pretilachlor + Pyribenzoxim 320 EC

Pretilachlor + pyribenzoxim is a recommended post emergence herbicide in lowland rice cultivation. Weed control efficacy and crop selectivity of the co-formulation of pretilachlor + pyribenzoxim (300g ai/ha + 20 g ai/ha EC) at three rates 1L/ha, 1.25 L/ha and 1.5 L/ha were studied. These treatments were compared with commonly used herbicide Bispyribac sodium 100SC 30g ai/ha; and the combination of herbicide Propanil 36% EC followed by MCPA 40% SL, un-weeded and hand weeded controls. Pretilachlor + pyribenzoxim effectively controlled grasses, broad leaves and sedges when applied at the rates of 1.25 l/ha and 1.5l/ha at 10 days after sowing. Therefore, overall results indicated an outstanding biological efficacy of pretilachlor + pyribenzoxim at the rate of 1.25 - 1.5 l/ha.

Weed Control Efficacy of Tank Mixtures of Bispyribac Sodium + Fenoxiprop-p-ethyl

Bispyribac Sodium 10EC is a commonly use herbicide in lowland rice fields. However, controlling efficacy of *Leptochloa chenensis* and *Ischne globosa* were very poor. Therefore, we evaluated the weed control efficacy of the new formulation of Bispyribac sodium (Nominee T-32 SC and 100 g/l SC) and formulated tank mixtures, Bispyribac sodium.+ Fenoxaprop–p- ethyl –Whip super 7.5 EC at the rate of 300 ml + 300 ml /ha on *Leptochloa chinensis* and *Isachane globosa*. Both Nominee T-32 SC and 100 g/l SC when tank mixed with Whip super 7.5 EC were found to be more effective in controlling grasses, broad leaves and sedges than lower concentrations. These tank mixtures did not have any phototoxic symptoms and controlled *Leptochloa chenensis* and *Ischne globosa* effectively.

DISEASE MANAGEMENT

Screening for Bacterial Leaf Blight

Bacterial leaf blight (BLB) caused by *Xanthomonas campestries* pv. *oryzae* is the only economically important bacterial rice disease in Sri Lanka. Since there is no effective method of control of BLB using chemicals, any rice variety to be recommended for cultivation should be resistant to BLB. We evaluated 177 lines comprising all advanced generation lines and NCRVT entries during

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2007. Among these lines, 90 lines, which is 51% of the total screened were categorized into resistant or moderately resistant group.

Screening for Blast

Rice blast caused by *Magnaporthe grisea* is the most damaging fungal disease for rice in Sri Lanka. Breeding for blast resistance continued to be a major breeding objective from the inception of rice breeding in Sri Lanka. In 2007, 3620 lines comprising all advanced generation progenies, yield trials, CRVT and VAT entries from all rice breeding stations were screened against rice blast disease under upland nursery conditions. Two thousand five hundred sixteen lines, which is 70% of the total screened, were categorized into resistant and moderately resistant category, which is acceptable for commercial cultivation.

Fungicide Screening against Sheath Blight and Blast

Sheath blight caused by *Rhizoctonia solani* is also a major fungal disease in Sri Lanka. There are no genetically resistant donors found for this disease. Therefore, developing varieties resistant to sheath blight is still not possible. However, this disease could be managed by adhering to proper agronomic and cultural methods while applying suitable fungicides when required. It was reconfirmed that the new fungicides, Difenoconazole + Propiconazole, (Armure 300 EC) was as effective as the currently recommended Hexaconazole 5% EC (Eraser) for sheath blight. Armure 300EC was recommended for pilot scale testing.

PEST MANAGEMENT

Screening for Brown Plant Hopper

Brown plant hopper (BPH) (*Nilapavata lugens*) is a serious pest all rice growing environments. We screened 4431 lines from advanced generations, yield trials, CRVT, VAT and INGER. Two thousand six hundred and nine lines which is 58% of the total screened, were resistant or moderately resistant to BPH.

Screening for Gall Midge

Gall Midge (*Orseolia oryzae*) is considered as a major pest for rice in Sri Lanka. Further it was reported that different bio-types are present in different rice growing eco systems. In 2007, we screened 2540 lines from advanced progenies, yield trials and CRVT and VAT. Two thousand two hundred and ninety nine lines which is 90% of the total screened were categorized into resistant and moderately resistant category.

Insecticide Screening

Rice paddy bug (*Leptocorisa oratorius*) is a serious pest at flowering stage. There was no genetic resistant to this pest at present, thus cultural and chemical control methods must be adopted. Priliminary investigations revealed that Dinotefuran at the rate of 360 g/ha is effective against paddy bug.

A common insecticide against rice Thrips, BPH and RGM were evaluated. Preliminary investigations revealed that Thiocyclam Hydrogen Oxalate (Evisect 4 G) at the rate of 25 kg per ha was effective against Thrips, BPH and RGM.

SOIL FERTILITY MANAGEMENT

Fertility of Rice Soils in Polonnaruwa

Reasons for low soil fertility in Polonnaruwe are being investigating and the work at Parackrama samudraya irrigation scheme was completed. Detail soil survey has revealed that the available K, P, Zn and Cu are at deficient level and heavy accumulation of

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Ca and Mg was observed, particularly in poorly drained soils. Soil organic matter content varies and soil salinity buildup was observed in certain areas. All these information are digitized and thematic maps for soil pH, EC, available nutrients, soil depth, textural, drainage and land classes were prepared. These maps are available and mitigation options were implemented with the extension officials and farmer participation at Yaya No 2, Ambangaga pilot sites. In case of problems associated with poor drainage, we are working with the irrigation department.

A socio economic and soil fertility survey conducted at Parakrama samudraya scheme in Polonnaruwa revealed that major problem in yala is limited availability of water and in maha, it was excess water. Poor weed management, labour shortages, low soil fertility, irregular application of fertilizer and poor marketing structure were identified as constraints related to low productivity in farmer fields.

Effect of Some Micro-nutrient Based Stimulant on Grain Yield of Rice

Both micronutrient based yield stimulants, ultra Zinc and 1% $ZnSO_4$ foliar spray when applied with NPK fertilizer increased grain yield over NPK alone but the increase was not different between two Zn treatments. Therefore, low cost 1% ZnSO4 could be used with NPK fertilizer to achieve higher yields.

Impact of S on Hybrid Rice

Nutrient requirement for hybrid rice is higher than inbred lines. We studied the S requirement for hybrid rice variety Bg 407H in Batalagoda soil series in Low Country Intermediate Zone. Application of S at the rate of 10kg/ha as ammonium sulphate increased the grain yield of Bg407H by 0.5 t/ha which is 10% yield increase over the no S treatment. Additional income with S application as Ammonium Sulphate is Rs.10000.00 while net profit will be Rs. 8943.00/ha (Paddy price - Rs 20.00/kg, 1.0kg of $(NH_4)_2SO_4$ - Rs.48.00/ kg). In addition, 9.0 kg of N is also supplied with the $(NH_4)_2SO_4$ applied. Experiment has to be repeated in other soil series for island wide S recommendation for rice

Biological Soil Fertility Test Kit

The biological soil kit developed by RRDI in 2006 for the easy identification of nutrient deficiencies in soil was demonstrated among farmers. One hundred and seventy one farmers in Kurunegala district and 126 in polonnaruwe district were given these test kits and farmers identified nutrient deficiencies in their fields using this kit. Over 80% farmers successfully used this test kit and identified nutrient problems in their fields.

Rice Varieties for Low Fertility Environments

To fulfill the demand for rice in Sri Lanka there is a need to introduce high yielding rice varieties which are responsive to added fertilizer. Contrary to this, there is an increasing concern for organic rice as well. We studied the performance of some twenty traditional, old and new improved rice varieties in the no added fertilizer rice field at RRDI where fertilizer was not applied for over 26 years. Suduheenati and H_4 were superior to others varieties tested and yielded over 3 t/ha. These varieties could be grown in low fertility environments as well as with minimum level of fertilizer N. Further, these lines could be used in breeding programs to develop varieties for low fertility environments.

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N use efficiency of ultra short age variety, Bg 250 was evaluated against Bg 300 and Bg 304. Agronomic NUE of Bg 250 was superior to Bg 300 and Bg 304.

AGRONOMY

Variety Screening for Moisture Stress

With the increasing demand for water by other sectors such as domestic needs and electricity generation, the availability of water for rice farming would be very low in the near future. Moisture stress will become the most important yield limiting factor for rice in the dry and intermediate zone. Along with water stress, inland salinity, which is increasing at an alarming rate will be much severe. Therefore, there is a need to develop varieties and cultivation technologies to suit such environments.

We screened ninety five rice accessions from both local and introduced through INGER program under moisture limited conditions to select lines for water limited environments. Moisture stress delayed days to flowering by 3 to 7 days. Only 3 lines including Bg250 flowered in 58-60 days and 33 lines flowered in less than 70 days. There was a significant variation in phenotypic characters when exposed to different levels of moisture stress. Based on the yield and other phenotypic response traits under moisture stress conditions, 8 lines were selected as very good performers.

Impact of Soil Moisture on Rice

We studied the differences in grain yield of different varieties when grown under both standing water and saturated conditions. Experiments reconfirmed that there is no difference in grain yield between plants grown in standing water and saturated conditions suggesting that there is room for conserving irrigation water through better water management practices.

Mapping of Drought Prone Paddy Areas

We mapped the drought prone areas for rice in the Kurunegala district using monthly climatic water balance data. Accordingly, the water availability pattern during standard cultivation seasons were estimated and based on these maps, suitable varieties of different maturity groups could be selected for cultivation in different climatic zones during yala and maha seasons.

Impact of Subsurface Salinity

Subsurface salinity is becoming a serious problem in yala seasons especially in dry zone irrigated locations. We studied different forms and concentrations of Na^+, Nacl and Na_2SO_4 placed at different depths of soil on yield and other attributes of different varieties of rice. All varieties were susceptible to both surface and sub soil salinity but the degree of susceptibility vary with variety. Depending on the severity of soil stress, there was a difference in yellowing of leaves in all tested varieties. Yield reduction of Bg 300 when grown in soils with 4 ds/m level of salinity reduced grain yield by 43% while the same salinity level but placed at sub surface of soil reduced yield only by 34%. The reduction in yield of saline resistant At 354 was 15% and 6% when same concentration of NaCl was place in whole soil and sub soil respectively.

The effect of $NaSO_4$ was much lower than that of NaCl suggesting that Cl^- is much damaging to rice than Na^+. The reason for this reduction in growth and yield with increased salinity was the reduction in leaf area and individual leaf C assimilation. Previous studies also suggested that yellowing in certain rice

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fields especially during yala is due to sub surface salinity. Therefore it can be concluded that for places such as Polonnaruwa where subsurface salinity is a problem, At 354 or a salinity tolerant line should be cultivated.

Seedling Broadcasting

RRDI introduced seedling broadcasting as a cost effective alternative to transplanting. This method also reduces seed cost which is a major component especially in hybrid rice. Seedling broadcasting is getting popularized among farmers as it requires less labor, less water while producing healthy seedling. We continued to improve this technique as a method of establishment of rice in major rice growing areas. It is recommended to cover these seedling trays with woven cadjan leaves for 3 days during germination. However farmers use transparent polythine, which result in poor quality seedlings. We observed that white polysack or news papers are equally good as cadjan leaves to cover seedling trays during germination.

Synchronization of Flowering of Parents in Hybrid

Difficulty in synchronization of flowering of parents in hybrid seed production is a recurrent problem. Non synchronization reduces hybrid rice seed yield. We observed that spraying 1% muriate of potash four times at two days interval at the panicle initiation stage enhanced flowering by 1-2 days. This would help to easy the problem of flowering synchronization of hybrid parental lines.

Organic Rice Farming

Before green revolution, majority of rice lands in Sri Lanka were under organic farming with traditional rice varieties. With the green revolution, traditional rice varieties were replaced by fertilizer responsive new improved rice varieties. These improved varieties increased the national rice production, but with added cost on inorganic fertilizer, chemicals for the control of weeds, pests and diseases. Increasing concerns on human health & environment, there is a current need for chemical free rice production method. Yield potential of different rice varieties under organic farming conditions were studied, with the incorporation of 10 – 15 t of green manure, 4 t of rice straw and 350 kg Eppawala rock phosphate per ha and with foliar application of green leaf extract and neem extract for controlling of pests. Average rice yield between 4 -5 t/ha was received from improved lines such as Bg 360, Bg 300, At 306 and Bg 358. Yield of traditional rice varieties such as Herathbanda, Gonabaru, Suduheenati and Kahatwee was around 3.5 t per hectare.

National Coordinated Rice Variety Testing Program

During 2007, NCRVT program continued with 3 and 3 1/2 month maturity classes. Four new rice lines of 3 month and 7 new lines of 3 1/2 months were tested with standard check varieties in 13 different location under complete researcher management conditions. At 605 from 3 month maturity group, Bg 3171, At 632 and Ld 3-12-36 from 3 1/2 month maturity group and Ld 3-3-25 from 4 – 4 1/2 month maturity group were selected for testing in the Variety Adaptability Program (VAT).

Variety Adaptability Program

Variety adaptability program was conducted over 60 locations for all three age classes in the dry, intermediate and wet zones. Ten new elite lines of different age classes were tested for adaptability. Three lines of 3

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month age class, 5 lines of 31/2 month age class and two lines of 4 month age class were tested with standard check varieties in both maha and yala seasons. A three month white, intermediate bold rice line, At 584, two 3 1/2 month white short round rice lines, At 582 and Ld 1-5-15, red intermediate bold rice line, At 570 and 4 – 4 1/2 month white intermediate bold line Bg 3026 were nominated to LSVAT program.

Large Scale VAT Program

In 2006 yala and 2006/2007 maha, one 3 1/2 month white intermediate bold line, Ld 99-12-38 and one 3 1/2 month red samba line, Ld 99-17-04, selected from VAT were tested over 50 locations in the LSVAT program in 1/2 acre plots in farmer fields to study the socio economic acceptability of these lines. Ld 99-12-38, a intermediate bold white grain, 3 1/2 month line showed high acceptability by farmers. Ld 99-17-04, which is a red pericarped samba line, is also superior to Ld 356.

During 2007 yala At 584, a three month intermediate bold white pericarped line was tested in 22 locations in the dry, intermediate and wet zones. This line was rejected as the cooking quality is poor.

GRAIN QUALITY

Different Drying Methods on Rice Grain Quality

A significant qualitative and quantitative losses occur in paddy during sun drying. We studied the quality of shade, sun and mechanically dried paddy samples at 3 months after harvest. Brown rice % increased with sun drying followed by mechanical drying. Head grain % was higher with shade and mechanical drying than sun drying. Whiteness was highest with sun drying followed by mechanically and shade drying. Rigidity was high with sun and mechanical drying and cracking % was highest with sun drying.

Evaluation of grain quality characteristics such as head grain %, amylose content, rigidity and whiteness of elite breeding lines continued.

Suitability of Different Rice Varieties for Different Rice Based Food Products

Identification of appropriate varieties for rice based food products is very important. Various type of rice based products such as hoppers, string hoppers, pittu, milk rice, and kokis were prepared using different rice varieties. Accordingly Bg 300 followed by Bg 352 was good for preparing milk rice. For Pittu, Bg 94-1 followed by Bg 358; hoppers, Bg 403 followed by Bg 300; string hoppers - Bg 358 followed Bg 94-1; Kokis – Bg 94-1 followed by Bg 300. Bg 360, which is known as keeri samba is not suitable for any rice based product except pittu, though it has the best cooked and eating quality.

Sensory quality characteristics of rice varieties grown on organic basis such as Neang menton, Kalu karal, Gonabaru, Bg 305, Bg 358, Arab arab, Bala murunga, At 306, Dik wee, Kahata samba, Bg 94-1, Bg 300, Raththel, Suwedel, Kaki mahaththaya, Bg 450, Bg 360, Godawee and Porakoda samba were evaluated using a sensory panel. There was no significant difference of eating quality among varieties.

Krushi Navodaya Program

National budget for 2007 allocated of Rs 137 million to improve the infrastructure facilities at RRDI with the aim of improving the rice research and development activities. A modern laboratory complex to improve the

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quality of research output and a training center with residential facilities for 50 trainees was initiated. A detail site characterization and development of architectural plans were completed by the Buildings Department. Construction of the training center was started towards the end of 2007. A long felt need of a seed drying and storage facility for RRDI was partially completed under this program.

SEED PRODUCTION

Breeder seed production of recommended varieties for all maturity classes, 2 1/2 month, 3 month, 3 1/2 month, 4-4 1/2 month and the 5-6 month photoperiod sensitive foundation seeds for the long age "Mawee" program continued as planned. In addition seeds of some new recommended rice varieties were produced and distributed among farmers for seed paddy purpose (Table 2.3.6).

Table 2.3.6: Breeder seed produced (kg) during 2006/2007 *Maha* and 2007 *Yala*

Variety/ maturity in days	Breeder seed (kg) *Maha* 2006/07	*Yala* 2007
150 - 180 days (photoperiod sensitive)		
Bg 3-5	100	not cultivated
Bg 407	80	(photoperiod sensitive)
Bg 745	120	
Bg 38	60	
120 d - 135 days		
Bg 379-2	120	160
Bg 450	120	120
Bg 403	100	140
Bg 406	-	100
Bg 454	80	120
105 days		
Bg 94-1	200	260
Bg 352	160	220
Bg 357	100	220
Bg 358	220	220
Bg 359	160	280
Bg 360	200	220
90 days		
Bg 300	220	300
Bg 304	120	240
Bg 305	80	220
80 Days		
Bg 250	40	60

About 25,000 kgs of seed paddy of new improved varieties were supplied to farmers in 2006/7 maha and 2007 yala. About 4000 kgs of foundation seeds of long age "Mawee" varieties, Bg 745, Bg 3-5, Bg 38 and Bg 407 were also produced and distributed for *maha 2006/7*. About 3,800 kgs of seed paddy of 17 rice varieties were distributed as "mini kits" among farmers for the self seed production program.

TECHNOLOGY DISSEMINATION

Dissemination of proven technologies to relevant stake holders is considered an equally important activity for the development of rice sector in Sri Lanka. During this year over 45 full day training programs for over 2250 visitors and trainees were conducted. As a routine program, RRDI annually conducted its one week field exhibition on research and development activities of RRDI. More than 4,000 visited the exhibition. Visitors comprised of field officers from DOA and other government institutes and departments, university students, private entrepreneurs, teachers, school students and farmers. Comprehensive training programs were also conducted according to their background and educational needs. Further, long term training

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programs of 3 to 6 month duration were conducted for university and technical college students for the fulfillment of their degrees or diplomas.

RICE RESEARCH STATION, AMBALANTOTA

The objectives of Rice Research Station, Ambalantota are the development of improved red pericarped rice varieties and salinity tolerant varieties. Moreover development of high yielding short age varieties and improved grain quality, Basmathi type and red and white samba type varieties are emphasized. The station also has other responsibilities such as producing breeder seeds of recommended "At " varieties, conducting Co-ordinated trials and finding solution to field problems of rice farmers in the region.

Varietal Improvement

About 94 crosses were made with the objective of developing varieties with high yielding and resistant to major pest and diseases with good grain quality.

About 96 bulk populations were evaluated and 78 were selected for further evaluation. From F5 generation onwards about 1932 advanced progenies were established and 330 were selected for further evaluation as progenies and in yield trials. About 44 lines were selected for preliminary yield trials (PYT) and 26 lines were selected from preliminary yield trials to evaluate in major yield trials (MYT).

Seven promising lines selected from MYT named as At 06-486, At 06-395, At 05-1382, At 05-1366, At 06-361, At 06-650, and At 06-363 were nominated for Coordinated Rice Varietal Testing (CRVT) programme. Two newly developed lines, At 605, At 582 and At 632 were selected from CRVT for futher evaluation in Varietal Adaptability programme. At 584 and At 570 were selected from VAT programme to further evaluate in Large Scale Varietal Adaptability Trial programme (LSVAT)

Two promising lines, At 584 and At 605 were nominated for Distinctnes Uniformity Stability and Test (DUST).

Co-ordinated Rice Varietal Trials of 3 and 3 1/2 month age classes were conducted and supplied the data. Varietal Adaptability Trials were conducted at 10 locations in Matara and Hambantota districts.

Introduced Germplasm Evaluation

International Network for Genetic Evaluation of Rice programme (INGER) was conducted at three locations with five scientis. Several useful germplasm were identified and seeds of those varieties were supplied to rice breeders to use in their breeding programmes.

Breeder Seed Production

Required quantities of breeder seeds, At 303, At 306, At 307, At 353, At 354, At 362, and At 402 were produced for the national seed paddy programme.

Technology Dissemination

Few students from technical colleges underwent four month training and four undergraduate students conducted their final year research studies at the station. About 750 visitors including school children visited the station for training and information collection on rice cultivation. Research Officers in the station participated as resource persons to few training programmes and crop clinics in the region.

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Foreign Training and Meetings

ROIC/Principal Scientist of the Station participated to the Technical Advisory Committee meeting of INGER programme (INGER TAC meeting) in Thailand and for an IPR training programme conducted by Michigan State University in USA.

RICE RESEARCH STATION, SAMMANTURAI

Main objective of research programs at Rice Research Station, Sammanturai was to identify knowledge gaps encountered with the rice cultivation in the Eastern Province, especially in the Ampara and Baticaloa districts and to propose suitable remedial options, selection of varieties suitable for the Eastern region and to act as a primary center for dissemination of rice technology to the region. The NCRVT, VAT and LSVAT were conducted both in research station and farmer fields. Large scale Hybrid Rice adaptability studies were conducted in farmer fields.

Six farmer and 3 officer training programs on eradication of wild rice and improvement of soil fertility were conducted. Six wild rice lines were identified from coastal region of Ampara district.

International Conferences Attended

- Bandara, K.M.C. 2007. Organic Trade fair and field tour in India.
- Wickramasinghe,W.M.A.D.B. 2008. Agriculture Institute of Canada (AIC) Annual conference all International participatory meeting. 27th October - 7th November, Albatar, Canada.
- Abeysekara, A.S.K, 21st Asian pacific weed science conference. October 2007, Colombo Sri Lanka.
- Dissanayake, D.M.N., International Conference on Intellectual Property Rights and Technology transfer, Michigan State University, USA.

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

The Center (RARDC) with its two sub stations, Rice Research Stations (RRS) at Bentota and Labuduwa, continued its activities to develop rice varieties and to disseminate technology to rice farmers in the districts of Kalutara, Galle, Colombo, Gampaha and part of Ratnapura in the Low Country Wet Zone (LCWZ). The main objective of the research and development programme of the RARDC, Bombuwela is to develop high yielding rice varieties, particularly with red pericarp, tolerant to iron toxicity. The ARS, Labuduwa emphasizes to develop mainly red pericarped *samba* type rice varieties, which have a higher demand in the southern region of LCWZ. The ARS, Bentota emphasizes to develop rice varieties for the flood prone and saline areas. The research and development programme of the Center included station and field research, varietal evaluation and on farm farmer participatory research as well. Other activities included organic seed production, development of a package for organic rice farming and multiplication of seeds of recommended rice varieties important for the region.

BUDGET

The annual budget during 2007 and expenditure under capital and recurrent votes and projects are given below.

Table 2.3.1.1: Annual budget – 2007 (Rs.)

Vote	Allocation	Expenditure
Capital	3,684,750.00	2,922398.00
Recurrent	9,283,000.00	8,303,184.67
Projects 'Krushi Navodaya'	5,125,000.00	1,168,346.00
Organic rice seed production	600000.00	620,688.77
Integrated organic seed production	1,100,000.00	351,457.88
Total	15,008,000.00	100,922,19.44

PROGRESS

VARIETY IMPROVEMENT

New Varieties

A new improved rice variety named Bw 364 of 3 1/2 month age class, which is recommended for Low Country Wet Zone was released; it is more adaptable to the low potential iron toxic rice lands in the region than other varieties; its potential yield is about 7-8 t/ha. Under good management, it is possible to obtain 4-6 t/ha, even in the low potential rice soils. Its resistance to major diseases prevalent in region such as neck and leaf blast is another advantage of this variety. It was observed to have resistance against bacterial leaf blight in the field. Also, it is resistant to major pests such as gall midge and brown plant hopper. The sturdy culm with intermediate plant height and late, slow leaf senescence of the plant at maturity gives more strength until harvest time enablig it to avoid lodging. Cooking qualities and consumer demand for the variety are observed to be acceptable.

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Testing of Varieties under NCRVT

The programme for improvement of varieties through conventional breeding was continued. The objective of this breeding programme is to develop rice varieties with a higher yield potential under adverse soil conditions. In this regard, priority was given to develop semi dwarf 3 - 3 1/2 month short age varieties resistant to pest and diseases, tolerant to iron toxicity and lodging.

- Following lines were tested under this program:

Bw 03-1063 (Red, intermediate bold type – 3 month age group)

Bw 03-1040 (White, intermediate bold type - 3 1/2 month age group)

Bw 04-992 White, *samba* variety - 3 1/2 month age group)

- From the NCRVT conducted during *Maha* 2006/2007 it has been observed that Bw 04-992 and Bw 03-1063 have a better adaptability in the LCWZ
- Bw 04-2015 was nominated for the NCRVT. This variety displayed resistance to major pests and diseases including neck blast; also, it is tolerant to iron toxicity.

Rice Varieties for Organic Farming

Purification, selection, characterization and multiplication of traditional rice varieties were continued; 3 varieties were selected for organic agriculture.

Promising Traditional Varieties for Organic Farming

The following cultivars were identified for organic farming:

Molligoda, Murungakayan, Beath heenati, Sudu heenati, Herath Banda, Kahata wee, Sulai and Madathawalu

Nutritional Properties Beneficial for Health

Preliminary investigation on nutritional properties beneficial for human health, which are widely believed to be present in traditional varieties, has revealed that '*Rath-al*' is highly rich in iron and '*Kahatawee*' is rich in protein; further evaluation of antioxidant properties are being carried out in collaboration with the ITI, Colombo.

Screening for Iron Toxicity

A study was conducted to identify the varieties, both local and introduced, that are tolerant to iron toxicity; 85 entries were tested of which 28 were found to be tolerant lines.

Breeder Seed Production

Breeder seeds were produced conforming to the standards given by the Seed Certification Service of the DOA as indicated in the table below.

Table 2.3.1.2: Breeder Seeds Produced in 2007

Variety	Quantity (Kg)
Bw 351	250
Bw 361	800
Bw 363	370
Bw 272-6B	220
Bw 364	600

AGRONOMY

Direct Sowing of Hybrid Rice

Since hybrid seeds are more expensive, transplanting of hybrid rice may be economically more advantageous if the aspect of seed cost is only considered. However,

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transplanting is not practiced at present due to high labour cost. The RRDI, Batalgoda had tested the possibility of direct sowing of hybrid rice. Direct sowing of highbrid rice was tested using low seed densities in the RARDC, Bombuwala in a similar manner. The experiment was conducted for the second season to test the possibility of direct sowing of hybrid rice using a seed density of 30kg/ha; it was observed that above density seemed to perform well under the conditions prevailing in the Wet Zone as it gave a significantly higher yield of 4.5t/ha as compared to that of the transplanted crop, which yielded only 3.5t/ha.

Agronomy Package for Organic Rice

Development of an agronomy package for rice cultivation under organic conditions was studied. Rice was cultivated organically, without utilizing any synthetic inputs, using green manure and compost material. It was observed that when rice was grown organically using different combinations of green manure and compost weighing up to 20 t/ha, a yield similar to that of a field applied with inorganic fertilizer could be obtained; the yields were 2.06 and 1.79t/ha from organic and inorganic fields, respectively.

Most of the green manure that can be applied in organic agriculture as cited in literature is not found in the LCWZ. Therefore such green manure has to be either grown in the LCWZ or transported from where they are readily available. This leads to the problem of sustainability in organic rice culture in the LCWZ. Therefore, investigations were conducted to identify green manure crops that can be used in the LCWZ. As many as five such green manure crops have been identified for organic agriculture in the LCWZ due to some of their inherent advantages. They are: 'Arunadevi' (*Wedilia trilobata*); 'Gatakola' (*Boreria* sp); 'Vinasavel' (*Mikania cordata*); Puraria sp; wild cassava (Cassava sp). The message based on the investigation is in the extension phase.

Seed Paddy Production under Organic Farming

A programme to produce seed paddy from the organically maintained research plots was carried out and a total of 26 bushels were produced from the promising varieties of *Herath Banda*, *Beheth Heenati*, Bw 272-6b, Bw 364 and Bg 250 for supplying to the interested farmers in the Region.

Commercial Seed Paddy Production

A project funded by Ministry of Agriculture Development, on the production of quality seed paddy, was carried out during maha 2006/2007. The main objective was to overcome the seed shortage and to supply an adequate quantity of seed paddy of recommended varieties required for the LCWZ.

An extent of 2.5 ac of under-utilized paddy land was rehabilitated and brought under cultivation with six recommended varieties, viz: BW 267-3, BW 272-6B, BW 361, BW 363, BW 364, which have good demand in the region. The variety Bg 250 from the RRDI, Batalagoda was also included in the programme as it was a short duration maturity variety (85days). This variety is suitable for the cropping system of the LCWZ, where farmers more often are compelled to plant rather late due to many field constraints such as flash floods.

A total quantity of 208.9 bushels of

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quality seed paddy was produced and distributed to farmers as indicated below.

Table 2.3.1.3: Quantities of Seed Paddy Produced in 2007

Variety	Quantity (bu)
Bw 267-3	30.9
Bw 361	21.4
Bw 363	21.8
Bw 272-6B	57.5
Bw364	51.0
Bg 250	26.3
Total	208.9

Activities under the seed paddy production programme had to be restricted due to limitation of funds; following quantities of seed paddy were produced and distributed among farmers during 2007 yala by the Farms Division.

Table 2.3.1.4: Quantities of seed paddy produced in yala 2007

Variety	Quantity (bu)
Bw 364	62
Bw 272-6b	75
Total	**137**

The total contribution to the seed requirement of the region by this Centre during 2007 was 346 bushels.

SOIL SCIENCE

The routine soil analysis work to support the on going soil testing programme was continued in spite of the fact the Centre did not have a soil scientist to handle the work. The Center has made an earnest request for a soil scientist; 335 soil samples were analyzed under the Organic Rice Project while a further 423 soil samples and 264 plant samples were analyzed under the Health Promoting Functional Properties of Rice Project with the assistance of the existing staff. In addition, arrangements were made to receive the guidance by a soil scientist from RRDI, Batalagoda to improve the ongoing programme of the Centre.

NCRVT and VAT PROGRAMME

The NCRVT programme was conducted on 3 and 3 1/2 month varieties and reports were submitted to the RRDI, Batalagoda; several promising lines identified from the NCRVT programme were evaluated in the Colombo, Gampaha and Kalutara Districts; in the trials the variety At 605 showed a high adaptability with a yield of 5.6-8.3t/ha

WEED CONTROL

Herbicide Screening:

Several new herbicides were screened in wet seeded rice fields; 4 new herbicides of Flucetosulfuron 10% WG (Orthosulfamuron 1.25% w/w + Propanil 60% w/w) 60 WG and Azimsulfuron 50% Df as single application herbicides to control all types of annual weeds and Fenoxaprop-p-ethyl + Isoxadifen-ethyl 6.9%EC as a grass killer were identified as effective herbicides for LCWZ; tests are being continued on a pilot scale programme prior to their recommendation.

Non Chemical Weed Management

Rice straw (4t/ha) mulch before broadcasting or row seeding could be used as an effective method to suppress emergence of weeds in rice grown under rain fed conditions.

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PEST CONTROL

Screening of Insecticides against Rice Thrips (*Stenchaetothrips biformis*)

The results of experiments conducted have suggested that Imidacloprid, Thyoclam and Ethiprole can be recommended for BPH as indicated below:

Imidacloprid 70 WG	60g Fp/ha
Imidacloprid 2 w OD	150 ml Fp/ha
Thyoclam 50 SP	1000g Fp/ha
Thyoclam 4G	25kg/ha
Ethiprole 100SC	500ml Fp/ha

- Thyoclam 50 SP @ 1000g Fp/ha can also be recommended for controlling the paddy bug.
- The above new formulations could replace the more toxic pesticides.
- During yala 2007 a major breakthrough was gained in identifying the sheath mite in rice in the LCWZ.

DISEASE CONTROL

Disease Incidence of Traditional Varieties

- Identified 40 breeding lines resistant to rice blast disease; they are being tested further for their performance on disease incidence.
- Identified 15 varieties from the 30th INGER Blast Nursery Programme; they are being evaluated to be included as blast resistant sources for future breeding.

RICE RESEARCH STATION, LABUDUWA

The Rice Research Station, Labuduwa is responsible for developing rice varieties for high potential rice lands in the Low Country Wet Zone.

PROGRESS

Breeding

Two 105 day varieties (Ld 99-17-4 a red *samba* and Ld 99-12-38 white long grain) have been developed; all required tests have been completed for nominating them to the Variety Release Committee.

NCRVT and VATT Programme

Two promising breeding lines Ld 3-12-50- and Ld 3-6-12 were nominated to NCVRT; three promising lines Ld -12-36 (red samba), Ld 1-5-15 (white samba) and Ld 3-3-25 (red long grain) were tested in the VATT and they were found to possess good grain qualities.

Breeder Seed Production

A total quantity of 164 bushels of Ld 356 was produced during the year.

AGRICULTURAL RESEARCH STATION, BENTOTA

Variety Improvement Programme

The Rice Research Station, Bentota is responsible for developing rice varieties for flood prone rice lands in the Low Country Wet Zone; 84 lines received from IRRI were evaluated for above conditions and 07 of them were selected as promising lines. The local selection Bg 96-741, which is highly adaptable to this environment, was used in the final test as the check variety before making a recommendation for large scale VATT.

AGRONOMIC STUDIES

- A fertilizer package was developed for the flood prone area as indicated below:

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Basal (just before planting)

Urea12.4; TSP 61.8; MOP 17.3 kg/ha

1st TD Urea 24.8 -MOP17.3 kg/ha

2nd TD Urea 24.8 - -

- Also, the following package was developed for weed control for the flood prone land:

Table 2.3.1.5: Package for weed control in flood prone land

Weed	Weedicide	Time of Application	Dose
Grass	3-4 DPA (propanil)	7-12 days after sowing	8-10 l/ha
Sedges+ broad leaves	MCPA (40%)	21-28 " "	2-2.5 "
Grasses+ Sedges+ Broad leaves	Lespro	5-7 " "	3 kg/ha
	Nominee	8-14 " "	300ml/ha

- In another experiment on the method of establishment, the drum seeder from Vietnam was tested and it was found to be not adaptable under local conditions due to its design and operational problems. The traditional method of establishment of broadcasting @ 100 kg/ha was found to be the most adaptable method for the flood prone area.

TECHNOLOGY TRANSFER

- About 400 students from government schools were given training upon their request; 8 students from the Open University and Sri Lanka schools of Agriculture completed their implant training. Three radio programmes on weed control, agronomic practices and new rice varieties were broadcast. The Centre participated in the "*Dayata Kirula*" exhibition at the BMICH.
- A comprehensive seminar program was conducted where 11 ROO, 01 AO, 06 PAA, 06 RAA, 09 AII made presentations on their current and previous programmes.
- One leaflet was printed by the Pathology Division on Sheath Blight for the benefit of farmers and extension officers of the country.
- One farmer field school was conducted by the RRS, Bentota for effective dissemination of new technologies developed by the Station.

PUBLICATIONS AND AWARDS

GDSN Chandrasena, Research Officer was selected for the Presidential award for her research publication "Evaluation of pigeon pea accession and selected lines for reaction to *Maruca*" in Crop Science, vol. 42. No.2 (615-618) 2002.

Responsibilities Held by Officers

- A.P. Bentota, Coordinator of the Plant Breeding Working Group
- J.B.D.S. Kahadawela, RO, link scientist at the District Agricultural Committee, Kalutara.
- S.C. Wanigasuriya, ROIC, ARS, Bentota. Director, National Aquaculture Development Authority of Sri Lanka

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PLAN FOR 2008

- The Research Programmes currently being implemented will be further continued in consultation with RRDI, Batalagoda.
- Work under the two Organic Projects will be continued for organic seed production and the development of an agronomic package suitable to the unique environmental conditions of the LCWZ.
- Production of commercial seed paddy will be carried out as a development activity. This programme is aimed at supplying to the farmers a limited quantity of seed paddy of varieties recommended for this region that are not included in the National Seed Production Programme. Funds are solicited from the *'Api Vavamu, Rata Nagamu'*
- Infra structure development activities will be further continued with the support of "*Krushi Navodaya*" Project.
- One field day and several farmers' fora will be held at the RARDC, Bombuwela during the course of the year to disseminate new technologies among relevant parties.
- The ongoing Seminar Programme will be further strengthened; documents will be prepared for circulation purposes. The Seminar Programme will be extended to cover the entire Western Province.

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

Seed Certification and Plant Protection Centre (SCPPC) is the core management institution for Seed Certification Service (SCS), Plant Protection Service (PPS), National Plant Quarantine Service (NPQS), Registrar of Pesticide (ROP), and Plant Genetic Resources Centre (PGRC). Therefore, SCPPC is responsible for providing important services to farmers such as quality control of 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 provides these services to ensure the sustainability of food production in Sri Lanka.

The preparation and implementation of the Seed Act and development of regulations of Plant Protection are responsibilities of SCPPC. In 2007, legal regulations of the Seed Act has been revised and submitted to the Legal Draftsman. The draft of Regulations of Plant Protection was prepared and discussions have been initiated in 2007. The regulations are being prepared for the development of the Pesticide Act of Sri Lanka.

BUDGET

Table 3.1.1: Annual budget – 2007 (Rs.)

Vote	Allocation	Expenditure
Capital	1,747,743.00	1,0659,37.00
Recurrent	3,729,100.00	3,1291,78.00

PROGRESS

Seed Act

The regulations under the Seed Act were drafted and submitted to the Legal Draftsman during the year. They were re-submitted to the Legal Draftsman after effecting appropriate amendments suggested.

Plant Protection Act

Necessary discussions and consultations were held with regard to drafting of regulations under the Act. The draft regulations are to be finalized after further consultations.

PLAN FOR 2008

- Implementation of 3 acts, namely Seed Act, Plant Protection Act and Pesticide Act
- Management of Plant Genetic Resources Conservation programme
- Act as a focal point for national and international Plant Protection conventions

The following sections of the report reviews the highlights of activities carried out by all units, which are managed by SCPPC.

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3.1.1 SEED CERTIFICATION SERVICE (SCS) - GANNORUWA

The major responsibilities of the SCS include certification of basic planting material, certification commercial seeds and planting material of rice, vegetables, other field crops and fruit plants, laboratory testing of germination, viability , purity and moisture of local and imported seeds, post control quality testing of imported and locally produced seeds, testing of seeds for distinctness, uniformity and stability (DUS), training of relevant personnel including growers, nursery men, seed men and officers, conducting of research on relevant aspects of seed technology with the ultimate objective of providing high quality seed and planting material to the farmer or the end user of such material.

BUDGET

The allocations received and expenditure incurred during the year under different votes and projects are given in Table 3.1.1.1.

Table 3.1.1.1: Annual budget - 2007 (Rs.)

Vote	Allocation	Expenditure
Recurrent	11,270,000	10,500,000
Capital	3,470,000	2,600,000
Projects SCCP	500,000	260,000
Projects SSD	6,300,000	2,200,000
Projects Organic Certification	1,000,000	700,000
Total	**22,540,000**	**16,260,000-**

PROGRESS

- Certified 4259 ha of rice, 307 ha of OFC, 147 ha of vegetables and 69 ha of potato for seed production.
- Certified the quality of 6701 mt of seed paddy, 106 mt of OFC seeds and 39.8 mt of vegetable seeds and 1122 mt of seed potatoes.
- Laboratory tested 8,648 local seed samples and 87 imported seed samples
- Registered and provided technical assistance to 226 horticulture nurseries for certified planting material production.
- Certified 153352 grafted fruit plants
- Evaluated 8 rice, 3 OFCs, and 12 vegetable varieties, under DUS testing programme.
- Tested 675 post control samples of rice, OFCs, vegetables and potatoes.

Certification of Seed Paddy

During 2007 the SCS registered a number of DOA farms, cooperative societies, Provincial Councils, Govi Jana Kendrayas, Mahaweli Authority, Irrigation Department, Farmer Organizations, private companies, NGOs and individual farmers for certified seed paddy production.

The total registered extent to produce certified seed paddy was 4,259 ha. of which the share of the private sector was 74%. Extents registered for certified seed paddy production under different sources and seed classes are given in Table 3.1.1.2. There was a 21% decrease in the extent registered for certified seed production of rice when compared to that of the year 2006. This can be attributed to reduction in participation of both private and public sector in certified seed production.

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Table 3.1.1.2: Extents under Seed Paddy Production in 2006 and 2007

Source	Seed class	2006		2007		
		Extent registered (ha)	Extent accepted (ha)	Extent registered (ha)	Extent accepted (ha)	Accepted %
Research stations	Breeder's	5.89	5.89	5.7	5.7	100
Govt. farms	Foundation	43	39.47	43	37	100
	Registered	591	561.3	434	401	99
	Certified I	84.7	72.87	103	87	100
Contract growers	Registered	21.2	18.6	8	5	100
	Certified I	614.7	553	470	396	89
	Certified II			17	9	57
Private growers	Registered	6.9	5.87			
	Certified I	3991	3192.3	3080	2442	88
	Certified II	38.4	34.2	98	68	74
Total		**5396.8**	**4483.5**	**4258.7**	**3450.7**	

During 2007, a total quantity of 6701 mt of seed paddy was produced of which the quality standards of 4624 mt of seed paddy were accepted based on the laboratory tests (Table 3.1.1.3). DOA farms with contract grower programme produced 2652 mt (40%), and Private growers 4042 mt (60%).

Table 3.1.1.3: Quantities of Seed Paddy Tested and % Accepted in 2006 and 2007

Source	2006		2007	
	Quantity tested (mt)	Accepted %	Quantity tested (mt)	Accepted %
Research stations				
Breeders seed				
Foundation seed	7.28	98	7.3	87
Govt. farms	2334.3	88	2213	78
Contract growers	1085.5	85	439	88
Private growers	7594.6	62	4042	62
Total	**11021.68**		**6701.3**	

Certification of Other Field Crops (OFC) Seeds

The total registered extent under OFC seed production was 307 ha of which contract growers accounted for 84 %. Maize, green gram, ground nut, sesame, cowpea, finger millet, black gram, soybean and pigeon pea were included in the OFC seed production programme. Extents registered for seed production under different sources and classes are given in Table 3.1.1.4. There was a 17% increase in the registered extent for OFC seed production when compared to that of 2006.

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Table 3.1.1.4: Extents under OFC Seed Production in 2006 and 2007

Source	Seed class	2006		2007		
		Extent registered (ha)	Extent accepted (ha)	Extent registered (ha)	Extent accepted (ha)	Accepted %
Research stations	Breeders	1.26	1.26	1.2	1.2	100
Govt. farms	Foundation	11	11	15	9	100
	Registered	27	25	24	22	98
	Certified I	13	8	6.5	5.6	88
Contract growers	Registered	26	21	30	26	94
	Certified I	181	157	213	194	98
	Certified II	16	14	96		
Private growers	Certified I	3.3	2.6	1	1	100
Total		**262.56**	**225.86**	**306.7**	**272.8**	

During the year 2007, the total quantity of OFC seed produced was 106 mt of which 98% 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 2006 and 2007

Source	2006		2007	
	Quantity tested (mt)	Accepted %	Quantity tested (mt)	Accepted %
Research stations	0.9	100	0.5	100
Govt. farms	27.5	90	26.2	82
Contract growers	77.5	97	78.5	90
Private growers	0.3		0.87	100
Total	**106.2**		**106.07**	

Certification of Vegetable Seeds

The extent registered for vegetable seed production was 147 ha of which private growers accounted for 74%. Registered land extents under different sources and seed classes are given in Table 3.1.1.6. Tomato, okra, chili, snake gourd, bean, Brinjal, bitter gourd, radish, luffa, capsicum, yard long bean, cucumber, pumpkin, amaranthus, vegetable cowpea, water melon, and winged bean were included in the vegetable seed production programme. There was a 24 % decrease in the extent registered for vegetable seed production compared to that of year 2006.

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Table 3.1.1.6: Summary of Vegetable Seed Production Extents (ha) by Class and Source in 2006 & 2007

Source	Seed class	2006		2007		
		Extent registered (ha)	Extent accepted (ha)	Extent registered (ha)	Extent accepted (ha)	Accepted %
Research stations	Breeders	1.73	1.52	0.78	0.58	100
Govt. farms	Basic	13.8	11.9	10	6	100
	Standard	31	27	13	12	100
Contract growers	Basic	3.2	3.2			
	Standard	39.3	29	14	6.5	100
Private growers	Standard	105	88	109	76	99
Total		**194.03**	**160.62**	**146.78**	**101.08**	

Table 3.1.1.7: Quantities of Vegetable Seed Produced in 2006 and 2007

Source	2006		2007	
	Quantity tested (mt)	Accepted %	Quantity tested (mt)	Accepted %
Research stations	0.35	100	0.14	99
Govt. farms	0.6	89	2	97
Contract growers	42.6	99	4.7	94
Private growers	34.3	85	33	78
Total	**77.85**		**39.84**	

During the year, the total quantity of vegetable seeds produced was 39.8 mt of which 31.6 mt were certified; quantities tested and percentages accepted from different sources are given in table 3.1.1.7.

Seed Potato Certification

Cultivated extents for different seed potato classes are given in the Table 3.1.1.8. The total extent under seed potato during year 2007 was 56.64 ha and a total of 1122 mt of seed potato of 5 popular potato varieties (Desiree, Granola, Raja, Provento, Bernadette) was certified; also, 103359 rooted stem cuttings and 101244 mini tubers were certified under special seed potato programme carried out in poly-tunnels.

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Table 3.1.1.8: Extents under Seed Potato Production in 2006 and 2007

Source	Seed class	2006		2007		
		Extent registered (ha)	Extent accepted (ha)	Extent registered (ha)	Extent accepted (ha)	Accepted %
Govt. farms	Pre-basic	0.15	0.1	0.25	0.24	
	Basic	13.62	12.62	14.38	14.38	
	Certified	43.34	20.52	8.96	7.46	
Private growers	Certified	49.2	44.58	45.34	34.56	
Total		**106.31**	**78.12**	**68.9**	**56.64**	

Seed Testing

A total number of 8735 seed samples were tested for quality certification by the DOA seed testing laboratories at Peradeniya, Mahailluppallama, Aluttarama and Batata.

Certification of Planting Material

A total number of 153352 fruit plants in government and private nurseries were certified and labeled (Table 3.1.1.9). This is a 46 % increase when compared to that of year 2006.

Table 3.1.1.9: Number of grafted fruit plants certified in 2006 and 2007

Species	No. of plants certified	
	2006	2007
Mango-grafted	45,058	52,135
Rambutan-grafted	33,473	33,049
Orange-grafted	26,482	68,168
Total	**105,013**	**153,352**

Registration of nurseries

The SCS registered 226 nurseries during year 2007.

Mother Plant Certification

A total number of 1199 mother plants of mango, rambutan and orange, were selected and registered during the year 2007.

Post Control Testing

Post control tests were conducted to evaluate 675 seed samples. These include DOA-certified seed samples and imported seeds of different crop varieties. The number of Post Control tests conducted under different crop categories is given in Table 3.1.1.10.

Table 3.1.1.10: Number of Post Control Samples Tested

Crop group	No. of lots tested
Rice	141
OFC	83
Vegetables	209
Potato	242
Total	**675**

Distinctness, Uniformity, and Stability (DUS) Testing

Eight rice varieties, (AT 584, AT 582, AT 570, BG 407H, BG 2780, LD 99-12-42, AT 605, BG 3026) were tested for DUS in post control field at Gannoruwa; and 12 vegetable varieties, 3 OFC varieties were also tested. DUS testing of 6 rice, 3 vegetables and 1 OFC varieties were completed during the year.

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Research and Development

Research studies were conducted in following areas:

1. To identify dormancy breaking methods for newly developed rice varieties.
2. To study the variation observed in rice variety Bg 379/2
3. To identify reasons for variation observed in seeds of sesame variety "Uma"
4. To study the variation observed in seeds of cowpea variety "Dhavala"

Training Programmes

The SCS continued to conduct training programmes to enhance the knowledge of farmers and officers on production of quality seeds and planting materials. Personnel from cooperative societies, private seed companies, farmer organizations, farmer companies, registered nurserymen, SCS- field officers and farming community participated in the training programmes. During the year about 226 officers and 630 farmers were trained in 20 training classes. In addition 2 workshops and 4 field days were conducted for potato seed certification.

SCS Information System

- The SCS designed a new relational database system during the year by linking 22 regional stations , 4 seed testing laboratories and 4 post control stations of the Seed Certification Service located through out the country, for easy data retrieval and analysis for the management of information.
- Potato and fruit plant certification data was included in the new database system during the year 2007.

Foreign Training

1. Study tour on organic seed certification in INDOCERT, Kerala, India, 7-14 December 2007 (4 Officers)
2. Vegetable seed production training in Japan under JAICA five months – (2 Officers)

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3.1.2 PLANT PROTECTION SERVICE (PPS) – GANNORUWA

The Plant Protection Service is entrusted with the responsibility of promoting pest, disease and weed control methods, which are environment friendly, economically viable and practically feasible in the cultivation of agricultural crops under farmer conditions. In order to accomplish the above objective, the PPS emphasizes on the implementation, monitoring and evaluation of field level integrated pest management (IPM) programs while upgrading the existing pest management techniques.

The PPS also plays an active role in the implementation of the Pesticide Act through evaluation of new pesticides on pilot scale and assessment of recommended pesticides for their consistency in efficacy.

Controlling of pest and disease outbreaks, seed fumigation, and controlling of noxious aquatic weeds and invasive plant species in agricultural habitats are mandatory functions assigned to the PPS.

Provision of advisory services on controlling of specific pests is also another responsibility of the PPS. These mandated activities of the PPS encompass a major section of the Plant Protection Ordinance No: 35 of 1999.

BUDGET

The annual budget for the year 2007 is given in the table below.

Table 3.1.2.1: Annual Budget - 2007(Rs.)

Vote	Allocation	Expenditure
Recurrent	1,266,310.00	1,203,674.38
Capital	827,600.00	692,774.16
Projects:		
FAO/IPVM	492,789.66	323,809.61
Granary Area Program	100,000.00	75,915.00
National Organic Standard & Certification Programme	1,200,000.00	1,047,753.15
Total	**3,886,699.66**	**3,343,926.30**

PROGRESS

Promotion of Integrated Pest Management (IPM)

Integrated Pest Management in Rice under Granary Area Program

The major objective of the program is to grant technical support for sustainable rice production in the major rice growing areas through adoption of low cost and environment friendly pest management strategies while minimizing the use of synthetic pesticides. Activities under the program included training of field level extension officers on integrated pest management, pest surveillance and forecasting supported with field days and periodic review of activities during the season. Following activities were completed during the year:

- Conducted a three-day In-service Training Programme (in Sinhala and Tamil medium) on rice IPM for newly recruited Agriculture Instructors assigned to Ampara District.

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- A ttraining programme on IPM practices applied in rice cultivation was conducted with the collaboration of the School of Agriculture and FMTC, Anuradhapura for Agriculture Instructors in the Anuradhapura District.

Integrated Pest Management in Vegetables

Following activities were completed during the year:

- A training programme on IPM practices for 35 Agricultural Instructors of the Seed Certification Service (SCS).
- A training programme on IPM practices for 30 Agricultural Instructors in the Kurunegala District.
- Another training programme for 40 trainees on vegetable IPM at DTC, Nalanda, in the Matale District.
- Conducted a survey on "Pesticide Usage in Big Onion" in the Matale District

Integrated Pest Management in Leafy Vegetables

- Introduction of IPM methods on leafy vegetable for new growers in the Colombo District cultivating 12 ac., in addition to already established extent of 40 ac in that area.
- Training of DOA extension staff in the Colombo, Gampaha and Kalutara Districts on IPM methods for leafy vegetables

Integrated Pest and Vector Management in Rice Eco-systems (IPVM)

Plant Protection Service is responsible for the implementation and management of the IPVM programme while Mahaweli Authority and Anti Malaria Campaign (AMC) of the Health Department are collaborating agencies.

- During 2007, 17 sites were selected from the Monaragala, Hambantota and Matale Districts under the provincial system and Zones of C, G and Udawalawa under the Mahaweli System. A training programme was conducted for field officers selected form the above areas to develop them as field trainers under this project.
- In addition, a field day was also conducted during the latter part of 2007 at Uda Walawa Special Project area for senior officers from stakeholder departments.
- During the year 2007, 6 officers from WHO and Maldives made a study tour to pilot IPVM sites.
- A number of awareness programmes were also conducted for school children and government officers of other departments.

National Organic Standards and Certification Programme

The major objective of this programme is to develop environmentally sound and economically feasible pest management strategies which are compatible with organic agriculture and to develop farmer skills and their decision making ability pertaining to good sanitary and phyto-sanitary practices.

Following activities were completed during the latter part of the year.

- Training of officers on ICM and certification procedure.
- Two officers from each district including Mahaweli special areas were selected for the above training.
- Field implementation of organic ICM practices at 3 selected sites in Matale District.

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- A field survey was conducted in Polonnaruwa District to identify present situation and farmer practices on incidences of various pests.
- Strengthening of laboratory facilities for pest and disease identification.

Pilot Scale Testing of Pesticides

Following new pesticides were evaluated under farmer field conditions for their bio-efficacy; these pesticides have the added advantages over recommended pesticides in that they are more target-specific and applied at relatively low rates.

- **Herbicides for weed control in rice:**
- Bispyribac sodium + Thiobencarb
  - for grass, sedges and broad leaves
- Penoxsulam 24% SC
  - for grass, sedges and broad leaves
- Ortho Sulfumuron 50% WG
  - for sedges and broad leaves
- Ethoxysulfuron + Idosulfuron methyl
  - for sedges & broad leaves
- Pyrazosulfuron ethyl 10% WP
  - for grasses, sedges and broad leaves
- Metsulfuron methyl 20% WG
  - for sedges and broad leaves
- **Fungicides**
- Mancozeb 75% DF
  - for leaf disease of tomato
- Champ DP
  - for the leaf disease of tomato
- Chlorothalonil SC
  - for Anthracnose of capsicum
- Carbendazim 50% SC
  - for Anthracnose of capsicum
- Pyraclostrobin EC
  - for Anthracnose of capsicum
- Kasurabcid SC
  - for rice blast
- **Insecticides**
- Thiocloprid
  - for Thrips and Aphids of potato
- Accipate
  - for leaf curl in chilli
- Imidacloprid 5 EC
  - do -
- Indoacarb ISEC
  - for cabbage caterpillar
- Spinosad
  - for Brinjal pod & shoot borer
- Proclaim 5 SG
  - for DMB in cabbage
- Imidacloprid 200 g/l
  - for rice Thirps
- Imidacloprid 700 g/Kg
  - do -
- Ehiprole 100g/isl
  - do -

Control of Invasive Species

- **Biological Control of Salvinia**

Plant Protection Service maintains a culture of the biological control agent *Cyrtobagous salviniae* and introduces the insect to salvinia infested water bodies throughout the island with successful results.

Followed by awareness programs for farmer organizations, the bio control agent *Cyrtobagous salviniae* was introduced to 38 tanks in Puttlam, Hambantota, Ampara, Kurunegala, Anuradhapura and Colombo; most of the farmer organizations have reported back that the insect has successfully controlled the weed within few months.

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Biological Control of Water Hyacinth

Plant Protection Service also maintains cultures of two bio control agents *Neochetina bruchi* and *Neochetina eichhorniae* for controlling water hyacinth; the PPS has already started releasing them to water bodies in July 2007.

These insects were also introduced to 16 tanks infested with water hyacinth in Hambantota, Anuradhapura, Kurunegala and Puttlam Districts.

Training on Aquatic Weed Management

Plant Protection Service extended the collaborative support to the Ministry of Fisheries & Aquatic Resources to conduct two training programmes to train 160 officers on control and management of aquatic weeds and use of biological control agents.

Training Programme on Implementation of Regulations of the Plant Protection Act. No: 35, 1999

With the objective of implementing the Plant Protection Act, a three-day training workshop was held for 60 officers selected from all administrative districts except North and East of the country, to make them aware of the legal aspects in implementing the Plant Protection Act No 35 of 1999. Ultimately those officers were appointed by DGA as authorized officers under the Plant Protection Act, and official identity cards were issued to them.

Seed Fumigation

- Following quantities of seed material in Govt. farms in Kantale, Kundasale, Pelwehera, Mahailuppallama, Polonnaruwa, Nikaweratiya and Vegetable Seed Centre, Gannoruwa were fumigated to protect stocks from stored pests.

Seed paddy	325 mt
Seeds of other field crops (maize, cowpea etc)	50 mt
Vegetable seeds	7 mt

- The main library of the Tea Research Institute at Thalawakele was fumigated to control severe insect damage.
- About 7 mt. of vegetable seeds belonging to a private sector company was fumigated.
- Following stocks of food items belonging to Government Food Stores of the District Secretary, Puttlam were also fumigated.

Sugar	04 mt
Rice	92 mt
Dhal	04 mt
Vegetable oil	03 mt

Termites and Rat Control

- Actions were taken to control termite infestations in several government complexes; they included several office buildings of the Department of Agriculture, Peradeniya, Gannoruwa and Maha Iluppallama.
- In response to a request made by the Ministry of Cultural Affairs and National Heritage, action was taken to control termite infestations in Sellawala Raja Maha Viharaya in Pallegama and Mahamewna Asapuwa in Ulpath Madawala. Also, heavy infestations of termites at the Cultural Triangle Complex in Sigiriya were successfully controlled.
- Rats in the rice and coconut fields have been reported to be a severe problem in several farming areas in the Puttlam District. A training programme on control of field rats was conducted for officers and farmers in Anamaduwa

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Other Activities

- Plant Protection Service played an active role in the Agricultural Exhibition held at the HORDI, Gannoruwa and FCRDI, Maha Iluppallama by providing exhibits, posters and establishing a stall.
- Actions were taken to treat number of bo-trees belonging to several historic temples on their request and historical "Na" tree at the Negombo Church.

PLAN FOR 2008

- Implementation of Plant Protection Act.
- Implementation of Integrated Pest Management Program (IPM) for paddy.
- Implementation of Integrated Pest Management Program (IPM) for vegetables.
- Implementation of Integrated Pest Management Program (IPM) for leafy vegetables.
- Adoption of chemical and biological methods to eradicate or control invasive alien weeds.
- Evaluation of new herbicide formulations for bio efficacy at pilot scale under farmer field conditions.
- Fumigation of seed stores in Government Farms.
- Development of IPM package to control leaf eating caterpillar in big onion.
- Adoption of IPM in organic villages.
- Pest Surveillance & program in paddy.
- Domestic pest control.

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3.1.3 NATIONAL PLANT QUARANTINE SERVICE (NPQS) - KATUNAYAKE

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 was given to both research and service oriented quarantine activities.

The major activities of the NPQS included phyto-sanitary certification, inspection and treatment of imported and exported plants and plant products and dissemination of knowledge on all aspects of plant quarantine via training and awareness programmes for interested groups. The NPQS collaborates frequently in its activities with the National Research Institutes, Universities and Institutes and Centers of DOA.

BUDGET

Allocations received and expenditure incurred under different votes during the year is given in Table 3.1.3.1.

Table 3.1.3.1: Annual Budget- 2007 (Rs.)

Vote	Allocation	Expenditure
Capital	1,089,054.00	781,445.87
Recurrent	4,405,700.00	4,050,810.00
Projects		
i. US Aid Project	1,375,000.00	175,494.04
ii. CARP	515,580.00	406,222.76

PROGRESS

Quarantine Operations

Table3.1.3.2: Activities carried out in 2007

Activity		Progress
01.	Number of Phyto-sanitary Certificates issued	01
02.	Registration of inspections	562
03.	Number of inspection reports sent to entry points	511
04.	Registration of interceptions	276
05.	Number of interception reports sent	272
06.	Registration of coir products for testing	49
07.	Reports for tested coir products	46
08.	Registration of submitted samples for testing	49
09.	Number of reports sent on submitted samples	40
10.	Number of questionable consignments destroyed	757
11.	Number of training programs conducted	10
12.	Monthly progress reports of NPQS sent to D (SCPPC)	12

Division of Entomology

Table 3.1.3.3: Activities carried out in 2007

	Activity	No. of samples
1.	Testing of export plants and plant products	10057
2.	Testing of import plants and plant products	348
3.	Testing of exported coir and coir products	47
4.	Survey of pests (Soil survey for plant parasitic nematodes)	834
5.	No. of soil samples tested for contamination	260
6.	Management of pests in plant nurseries (Advisory service)	05
7.	Pest reference collection	80
8.	Testing of special samples	197
9.	Testing of seed potato samples	56

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Division of Pathology

Table 3.1.3.4. Diseases detected in the intercepted plant materials in 2007

Type of the sample	No.of samples/ consignments/plants	Findings
Potato	32cgt.s – Holland, Germany, U.S.A, Netherlands	Common scab – *Streptomyces scabies* Silver scurf – *Helminthosporium solani* Dry rot – *Fusarium* sp. Soft rot – *Erwinia* sp. Black scurf (*Rhizoctonia solani*) Netted scab – *Streptomyces reticuliscabies* Rubbery rot-*Geotricum candidum* (Newly observed disease) *Alternaria* spp *Aspergillus* spp. *Colletotrichum* spp.
Onion	02 samples-India	-
Maize	176 samples- Australia, Thailand , India, South Africa	Fungi: *Aspergillus niger, Mucor* spp., *Penicillium* spp, *Fusarium* spp., *Colletotrichum* spp.
Ground Nut	22 samples- India	Fungi: *Aspergillus* sp., *Penicillium* spp, *Mucor* spp.
Hot pepper seeds	01 sample - India	
Bermuda grass seeds	01 sample - Australia	*Alternaria* spp.
Chilli seeds	01 sample –California	
Carrot seeds,	01 sample- South Africa,	-
Leeks seeds	01 sample - France	
Sunflower seeds	01 sample- Australia	
Snake gourd	01 sample – Thailand,	Fungi- *Aspergillus* spp
Orchid plants	03 samples-Thailand,	-
Straw berry plants	09 samples- Egypt	-
Rose plants	09 samples – India, Holland	*Colletotrichum* spp
Euphorbia	05 samples- Holland	Bacteria - *Colletotrichum* spp.
Gerbera plants	08 samples –India	-
Chrysanthemum sp.	03- samples –Holland	
Limonium plants	03 samples- Netherlands Israel	-
Dracena cuttings (RC& URC)	03 samples-Thaiwan	-
Dianthus plants & RC	11 -SamplesHolland,Spain	-
Impatiens RC	01 sample- Holland	-
Alstroemeria plants	02 Samples- Holland	-
Anthurium plants	03 Samples- India	Bacteria
Stevia rebaudiana	01 sample -	*Rhizoctonia* spp
Anigozanthus flavidus	02 samples - Australia	-

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Asparagus	02 samples – Netherland -	-
Lilium bulbs	03 Samples- Netherlands	-
Sea weed	01 sample - Malaysia	-
Dampiera linearis	01 sample	
Grevillea quercifolia	01 sample – Australia	
Candicans conostylis	01 sample -	–
Miscanthus	01 sample - Denmark	-
Phyllanthus	01 sample - India	-
Paulowinia tomentosa	01 sample - New Zealand	-
Gladiolous bulbs	04 samples - Holland	-
Dried Jasmine flowers	04 samples- China , Germany	*Mucor* spp., *Aspergillus* spp.
Cordy line	01 sample - Australia	-
Wahlenbergia	01 sample - Australia	*Mucor* spp., *Colletotrichum*spp *Rhizopus* spp.
Bamboo seedlings *Latiflorus lodhamii* Cyrtomium	02 samples – China	
Rumohar (Leather leaf fern)	02 samples- Holland	-
Dragon fruit	01 sample -Thailand	-
Rose petal	01 sample - Japan	*Mucor* spp., *Aspergillus* spp.
Lemon peel;	02 sample - Japan	*Aspergillus* spp.
Dried strawberry	02 sample – Germany	*Aspergillus* spp.
Saff flower petals	01 sample - Egypt	*Mucor* spp., *Aspergillus* spp.
Dried orange peel fruit cut	01 sample – Egypt, China, Polland, Germany, Thailand	*Mucor* spp., *Aspergillus* spp.
Comomile	Do	*Mucor* spp., *Aspergillus* spp.
Merigold	Do	*Mucor* spp., *Aspergillus* spp.
Pepermint	Do	*Mucor* spp., *Aspergillus* spp.
Saff flower	Do	*Mucor* spp., *Aspergillus* spp.
Cherry cuts	Do	*Mucor* spp., *Aspergillus* spp.
Corn flower	Do	*Mucor* spp., *Aspergillus* spp.
Dried passion fruit	01 sample- Germany	*Mucor* spp.

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Table 3.1.3.5: Samples checked for phyto-sanitary test reports with additional declaration

Material	No. of samples	Checked for	Country of Destination
Coir products	22	Fungi and bacteria	India, Australia, New Zealand, Egypt, France
Foliage	713	Harmful fungi, bacteria, pests and soil organisms	Korea, Japan, Ukraine, Switzerland
Foliage	157	*Synchetrium endobioticum*	Holland, Canada, South Africa
Foliage	91	*Clavibacter michiganensis*	
Foliage	04	*Phymatotrichopsis ominivora*	
Foliage	725	*Puccinia horiana*-Chrysanthemum stunt viroid	

** Number of other samples checked (samples submitted to the pathology division for testing) = 65

Division of Weed Science

- Collected, identified and mounted 115 weed species on herbarium sheets during the year 2007.

- Developed a reference collection of weed seeds during the year 2007; the total number of weed seed species collected during the year was 238.

- Tested samples from 13 imported consignments; 7 consignments were found to be contaminated with weed seeds; among the weed seeds found, were seeds of *Parthenium hysterophorus* , *Convolvulus arvensis* and *Euphorbia dentata,* which are highly important quarantine weeds .

Division of Treatment Technology

Following activities were carried out in the Division of Treatment Technology during the year 2007.

FUMIGATION

Commercial Fumigations

A total of 149 consignments of plants and plant products, to be exported by different companies and individuals were fumigated at NPQS (Table 3.1.3.6).

Table 3.1.3.6: Commercial Fumigations Conducted at NPQS, Katunayake during the year

Commodity type	No. of fumigations
Foliage plants	18
Cut flowers	02
Wood/wooden items	36
Coir products	65
Gerbera	08
Miscellaneous.	20
Total	149

Following imported items intercepted by the Plant Quarantine Unit at the Katunayake Air Port also were fumigated.

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Table 3.1.3.7: Intercepted and Fumigated Agricultural Commodities during the year

Commodity	Quantity	Country of origin
Fruits and vegetables	55 Kg	India
Assorted Flowers	75Kg	
Flower garlands	200 no.s	India
Flower pots made out of leaves of *Eichornia*	2 sets	Taiwan
Coir fiber mat	01(13Kg)	India
Dracaena cuttings	50 no.s	Thailand
Orchid flowers	160 no.s	Thailand

Supervision of Quarantine Treatments

A total of 39 commercial fumigations, carried out by private companies on export commodities such as wooden pallets, wooden boxes, wooden skids, wooden crates and cardboard boxes, were supervised for certification purposes.

Experiments:

Experiment on Eradication of Thrips in Draceana

An experiment was conducted to find out the possibility of using hot water treatment to kill thrips in dracaena plants and it was found thrips can be killed by dipping in hot water at 49°C for 6 minutes: this experiment has to be repeated to find out the effect of this treatment on the quality of the plants and also to confirm the results.

TECHNOLOGY TRANSFER

Training and Awareness Programmes Conducted in 2007

Date	Group
15/02/07	Students of Kelaniya University
21/02/07	Students of Institute of Information Technology
25/04/07	Students of the school of Agriculture-Kundasale
09/07/07	Students of the Aquinas College
09/07/07	Students of NDT (Agri) Advance Technological Institute at Naiwala
18/07/07	Students of Harischandra College-Negombo
08/08/07	Students of Ave Maria Convent, Negombo
23/08/07	Students of Sri Jayawardanapura University
19/09/07	Students of Aquinas College of Higher Education
10/10/07	Students of Wayamba University
11/10/07	Students of Christ King College, Ja Ela
10/10/07	Students of Peradeniya University
05/11/07	Students of NDT (Agri) Advance Technological Institute at Naiwala
05/11/07	Students of Wayamba University

PLAN FOR 2008

- Testing of export samples.
- Testing of intercepted samples.
- Entry port inspection of seed potato consignments.

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- Testing of seed potato samples.
- Studying plant parasitic nematode status in export foliage nurseries.
- Control of plant parasitic nematodes of export foliage nurseries using environment friendly methods.
- Development of gamma radiation treatments to eradicate local fruit fly species in export potential fruits (mango, papaya, rambutan).
- Establishment of a reference collection of insects, diseases and weed seeds.
- Study on identification of thrips in ornamental plants.
- Study the repellent effect of botanicals for scale insects.
- Control of mealy bugs of export foliage plants using wormy wash and wormy compost.
- Identification of pathogens in samples submitted to NPQS.
- Literature survey for molecular detection of quarantine diseases.
- Preparation of permanent slides for fungi, maintenance of pure cultures of plant pathogens, improving laboratory manuals to identify plant pathogens and preparation of database for fungal disease identification.
- Adopting ELISA procedure for identification of viruses/bacteria.
- Identification of quarantine important diseases in export coir products and aquatic plant nurseries.
- Study on present status and management strategies for Anthurium leaf blight.
- Maintenance of live aquatic plant collection.
- Conducting studies related to quarantine important weeds.
- Conducting commercial fumigations and fumigation supervisions.
- Development of treatment standards.
- Post entry quarantine work.
- Pest risk analysis.
- Conducting training and awareness programmes.
- Preparation of leaflets, posters and research publications.

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3.1.4 OFFICE OF THE REGISTRAR OF PESTICIDES (ROP) - PERADENIYA

The Control of Pesticides Act No. 33 of 1980 provides relevant provisions for regulation of all activities in the country related to pesticides, commencing from their import to marketing of crops treated with them. For this purpose, the pesticides are duly registered after comprehensive evaluation of data on their safety, efficacy and environmental issues. Screening of labels and advertising materials, monitoring of product quality, issuing of import approval and disposal of obsolete pesticides are integral activities in the post registration process. The Registrar of Pesticides (RoP) approves all imports on consignment basis, only if they conform to international standards such as those issued by the FAO.

There are about 127 agro-pesticides currently being used as different formulations and under different trade names. There are five staff grade officers centrally implementing the programme with over 300 field level agricultural extension personnel designated as authorized officers carrying out various field regulatory functions including dealer certification and training, inspection of factories, re-packing plants and sales outlets, investigating field complaints and taking legal action where deemed necessary.

During the year, 1449 dealers were trained for certification, while 73 Agricultural Instructors trained as trainers on pesticides to conduct field programmes. In awareness creation, 300 students were trained and the quarterly newsletter (*Surekemu*) was continued to be published during the year 2007 as well.

The work of the analytical chemistry laboratory was complementary for the compliance of programmes, which were mainly focusing on pesticide formulations and crop residue analysis. In an effort to monitor residue levels in the environment and to assess human exposure potential, more than 150 samples were tested for residues of specific pesticides.

Through registration and other fees, a sum of more than 1.6 million rupees was remitted to the consolidated fund. New products numbering 102 were registered during the year, 4 of them being new molecules. In order to strengthen the residue analytical work of the National Organic Standards and Certification Project, key analytical instruments such as GCs, GCMS and some other analytical instruments of over Rs.20 m. were purchased and installed during the year.

BUDGET

The annual allocation and expenditure under different votes are given in following table.

Table 3.1.4.1: Annual Budget - 2007 (Rs.)

Vote	Allocation	Expenditure	Income
Capital	428,909.00	422,707.46	-
Recurrent	1,632,500.00	1,491,248.07	-
Special project	14,900,000.00	3,238,714.00 (Commitments 113,00000.00)	
National Organic standards Certification			
Registration & Re-Registration fees		-	814,000.00
Dealer Certification Fees	-	-	808,385.00
Total	**16,961,409.00**	**5,152,669.53**	**162,2385.00**

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PROGRESS

Registration of Pesticides

This is a two step process, where initially relevant information and documents of the agrochemical for which the registration is requested, are submitted for evaluation. Upon assessment of the data submitted, if it is acceptable, registration is granted with approved label and containers. After receiving the stipulated fee, a registration number is allotted. Then the Certificate of Registration is issued. During the year, 156 applications were received of which 102 registrations were completed and the total revenue collected was Rs. 1,532,000.00.

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, information and safety issues. During the year, 145 applications were processed under this category. Total revenue realized under this category was Rs. 725,000.00.

Registration of New Molecules

Safer and environmental friendly pesticides are identified and promoted during the pre-evaluation of products for local trials, a process which facilitates phasing-out of hazardous products available in the market. A rapid assessment method of registration dossiers with respect to efficacy and safety was introduced for pesticide products intended to be used in-house and/or experimental purposes. New pesticide molecules or specific pesticide products effective for certain pests under green house condition or in floriculture industry were ascertained for this purpose. More than 30 formulations were evaluated during the year and of which following 4 were registered:

- Pyrazosulfuron-ethyl - agro
- Bupirimate - Minor use
- Fenhexamid - Minor use
- Iprodione - Minor use

Thorough and comprehensive assessment of registration dossiers for efficacy, quality and safety aspects of pesticides for general use was carried out and it was further streamlined with respect to data requirements due to improved guidelines; 13 pesticide products, including commodity active ingredients and household pesticides, were registered during the year.

Approvals for Import

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, 995 Quality Certificates were assessed and import approvals were issued.

Screening of Labels and Advertising Materials

The procedure for approval of labels ensures dissemination of proper information to the end user. To facilitate this process, screening of submitted information in label templates of all categories of agricultural pesticides was carried out to improve the quality of label contents. More than 500 labels and more than 130 advertising materials were screened during the year.

Field Enforcement

The office of the ROP continued to coordinate with the Provincial, Inter Provincial and Mahaweli Authority field enforcement staff to implement the ongoing programme of Pesticide Dealer Certification Scheme; 24 one day training classes were conducted for pesticide dealers for certification of their sales

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outlets under the law. A Pesticide Dealer Certificate is valid for one year unless it is cancelled for valid reasons. A fee is levied as required for issuing a certificate; the total revenue realized under this category was Rs. 796,950.00.

Training Classes

Conducted 32 classes for 1121 dealers, 7 for 245 officers and 11 for 3000 students, during the year; and certificates for 1024 trainees and 1449 dealers were issued.

Laboratory Analysis

Pesticides Residues in Treated Crops

The collaborative programme with the Ministry of Health, Govt. Analyst, City Analysts and the Office of the ROP launched in 2004 was continued in order to monitor the pesticide residues in vegetables; based on 2004 test results chemicals were identified. Crops selected for testing were Brinjal, green chilli, bean, cabbage and snake gourd and the pesticides were carbofuran, chlorpyrifos, profenofos and diazinon.The testing procedure adopted was chromatography (TLC). More than 150 vegetable samples were analyzed.

Pesticide Formulation Analysis

Quality of a pesticide is a major factor determining the efficacy and the impact on the environment and human health. All the registered pesticides should conform to the physico-chemical standards set out by the authorities such as the FAO and WHO. Formulation analysis was done on 181 improved pesticides during the year. The monitoring programme of quality standards for all imported pesticides is also conducted by this office. If the product in a consignment is found to be conforming to the standards the clearance will be given for marketing. In 2007, 760 formulations (in batch wise) were cleared for marketing. The formulations below the stipulated quality requirements were re-shipped to the supplier.

SPECIAL ACTIVITIES

National Organic Standards and Certification Project

For improving the laboratory facilities of the Registrar of Pesticides, a sum of Rs.14.9 m was allocated under the National Organic Standards and Certification Project. This is a 5 year project. Under this project Rs. 11.3 m. was allocated for erecting an extension to the existing building to accommodate a new laboratory. An additional amount of Rs. 0.75m was allocated to purchase ancillary equipment and chemicals for smooth functioning of the mandated laboratory activities. It is anticipated to have supplementary funds through provisions for the year 2008.

Phasing out of Dimethaote, Fenthion and Paraquat

On recommendation of the Pesticides Technical and Advisory Committee, dimethoate, fenthion and paraquat were declared to be phased out over a period of 3 years starting from January 2008. The decision was based on the risks associated with above pesticides, which have been unacceptable under prevailing conditions, especially the recorded high incidences of acute poisoning.

In consequent to the above decision, it was suggested to carry out, awareness and monitoring programs on the effectiveness and farmer acceptance of alternative pesticides available for those that are to be gradually phased out.

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Table 3.1.4.2 Progress of activities

Item	Sub Activity	Total Annual Physical Target	Achievement up to End of the Year	%
01	Evaluation of original Registration applications	60	60	100
02	Evaluation of third- party Registration applications	100	102	102
03	Evaluation of Re-registration applications	120	145	121
04	Evaluation of data for local trials	35	48	137
05	Issue of import approvals	750	995	133
06	Evaluation of Pesticides Quality Certificates	750	995	133
07	Screening of labels for approval	420	546	130
08	Screening of advertising material for approval	160	139	87
09	Inspection of factories	12	02	17
10	Inspection of approved repacking facilities and stores	06	00	00
11	Inspection of premises for fumigation operations	12	07	58
12	Inspection and Certification of Pest Control Operators	15	05	33
13	Inspection of sales outlets	250	71	28
14	Publish of Newsletter	04	03	75
15	Officer Training Classes	05	07	140
16	Seminars for school children	03	05	107
17	Dealer training classes	08	24	300
18	Issue of dealer Training Certificates	1500	1380	92
19	Issue of dealer certificates	2000	1511	76
20	Field Complaints	03	07	233
21	Legal Prosecutions	05	02	40
22	Technical Advisory Committee Meeting	06	05	83
23	Formulation analysis	2000	584	29
24	Residue analysis	600	172	29
25	Disposal of obsolete stocks	04	01	25
26	Other activities such as field surveys	04	00	00

Publications

"Surekemu" the newsletter, Office of the registrar of Pesticides

Presentations during 2007

- Annual Conference of Authorized Officers under the Control of Pesticides Act
- Workshop on sprayer for the safe and effective use of pesticides
- Workshop on training of trainer on pesticides
- Workshop on reviewing pesticides recommendation procedure
- Three programmes to make aware Agriculture Instructors on Control of Pesticides Act (At Bombuwala, Kandy, Rajawaka)

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PLAN FOR 2008

- Evaluation of original registration applications
- Evaluation of third-party registration application
- Evaluation of re-registration applications
- Evaluation of data for local trials
- Issue of import approvals
- Evaluation of pesticides quality certificates
- Screening of labels for approval
- Screening of advertising material for approval
- Inspection of factories
- Inspection of approved repacking facilities and stores
- Inspection of premises for fumigation operations
- Inspection and certification of Pest Control Operators
- Inspection of sales outlets
- Publishing of Newsletter
- Officer training classes
- Seminars for school children
- Dealer training classes
- Issue of dealer training certificates
- Issue of dealer certificates
- Investigation on field complaints
- Legal prosecutions
- Technical Advisory & Committee Meetings
- Formulation analysis
- Residue analysis
- Disposal of obsolete stocks

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3.1.5 PLANT GENETIC RESOURCES CENTRE (PGRC) - GANNORUWA

The PGRC is responsible for exploration, collection, introduction, conservation, evaluation, exchange and documentation of plant genetic resources (PGR) in the country. The PGRC is the focal point to coordinate the activities related to conservation of Plant Genetic Resources (PGR) for Food and Agriculture.

The PGRC successfully completed the FAO project titled "National Information Sharing Mechanism on the Implementation of the Global Plan of Action (NISM-GPA) for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture (PGRFA)" during 2007. The country report on the status of conservation and utilization of PGRFA in Sri Lanka was completed and submitted to the FAO.

The PGRC coordinates 14 research and development projects under the Sri Lanka – USA Cooperative Germplasm Development Programme, which was commenced in 2002.

BUDGET

The annual budget for the year 2007 is given in Table 3.1.5.1.

Table 3.1.5.1: Annual budget - 2007 (Rs.)

Vote	Allocation	Expenditure
Recurrent	5,977,000.00	5,556,825.22
Capital	1,189,246.00	903,081.00
Projects		
SL / USA	13,248,597.00	4,524,644.54
CWR project	1,256,000.00	1,230,071.85
FAO/GPA-NISM /	733,810.00	352,742.00
Total	**22,404,653.00**	**12,567,364.61**

Projects

SL/USA – Sri Lanka- USA cooperative germplasm development project

FAO/GPA-NISM - Establishment of a National Information Sharing Mechanism on the Implementation of the Global Plan of Action (GPA) for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture (PGRFA),

CWR- *In situ* conservation of Crop Wild Relatives Project

PROGRESS

Exploration and Collection of Plant Genetic Resources (PGR)

During the year 18 fieled explorations were conducted in Anuradhapura, Kurunegala, Matale, Moneragala, Nuwara Eliya, Hambantota and Badulla Districts. Gap areas and areas for collecting samples were identified using the FLORA map software using passport data, herbarium data and other information on respective crop groups.

A total of 800 PGR samples were collected including rice: 06, coarse grains: 141, grain legumes: 127, vegetable legumes: 153, solanaceous vegetables: 140, cucurbit vegetables: 72, leafy vegetables: 34, other vegetables: 19, root and tuber crops: 08, spices and condiments: 14, oil seed crops: 54, fruit crops: 16, medicinal plants: 11, other and wild species: 05. A total number of 739 seed samples were sent to the gene bank for *ex-situ* conservation.

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Acquisition of PGR from other Institutes

Received 241 PGR samples from Regional Research Centers of Bandarawela, Bentota, and Ambalantota, during the year.

Introduction of PGR from other Countries

Received 86 PGR samples from abroad through RARDC, Aralaganwila as introductions.

Passport data

During the year 2007, passport data of 165 entries was sent to data management unit.

On farm Conservation Programme

The PGRC is responsible for *ex-situ* conservation and management of PGR as well as *in-situ* conservation of old and traditional land races and crop wild relatives in the country. Exploration and Collection Unit of the PGRC conducts on-farm conservation programmes for conservation of old and traditional land races of selected crop groups in their original habitats. Planting materials of indigenous varieties were distributed among selected farmers. PGRC staff conducted awareness programmes for farmers. On-farm conservation programmes were implemented in the Kandy (Meemure), Hambantota (Madunagala) Districts during the year 2007.

Establishment of Crop Herbarium

About 287 herbarium specimens of crops and their wild relatives were collected and mounted during the year 2007.

Seed Conservation

Table 3.1.5.2 shows the number of accessions presently conserved in the gene bank. During 2007, the gene bank received 368 accessions of PGR.

Table 3.1.5.2: Gene bank collection updated on 31.10.2007

Crop group	No. of Accessions
Rice & related species	4270
Other cereals & related spp.	1374
Grain legumes & related spp.	1843
Vegetable legumes	1154
Solanaceous vegetables, condiments & related spp.	1142
Cucurbit vegetables	712
Brassicaceae vegetables	30
Alliums	17
Other vegetables	341
Leafy vegetables	143
Root & Tubers	09
Mustard & related spp.	121
Oil crops	373
Fiber crops	66
Medicinal plants	22
Fruits	162
Total	11779

Germplasm Exchange

Following Germplasm samples were imported in 2007:

- **Sweet pepper**: 6 from Asian Vegetable Research and Development Center (AVRDC), Taiwan.
- **Tomato** : 35 from, AVRDC, Taiwan.
- **Wheat**: 49 from, International Maize and Wheat Improvement Center (CIMMYT), Mexico.

Distribution of Seeds

The gene bank distributed 921 seed accessions during 2007.

Characterization, Multiplication and Rejuvenation of Plant Genetic Resources

During 2007, 704 accessions belonging to following crop species have been multiplied and rejuvenated in the PGRC field (Table 3.1.5.3). In addition, 62 accessions were

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characterized and multiplied in collaboration with other research stations.

Table 3.1.5.3: Germplasm Multiplication and Rejuvenation

Crops	2006/2007 *Maha*	2007 *Yala*
Rice	60	84
Maize	36	20
Sorghum	04	34
Finger millets	55	44
Foxtail millets	14	04
Little millets	01	-
Pearl millets	03	-
Mustard	09	-
Okra	46	12
Luffa	20	-
Yard long bean	-	39
Sesame	15	-
Amaranthus	19	-
Brinjal	-	11
Cucurbits	04	10
Bitter gourd	-	16
Green gram	04	28
Vigna sp.	02	02
Cowpea	-	31
Black gram	-	12
Bean	08	-
Onion	23	23
Other	08	03
Total	**331**	**373**

The PGRC also conducts collaborative germplasm characterization programmes with CIMMYT, Mexico, RARDC Aralaganwila , GLORDC Angunakolapellessa, ARS Giradurukotte. About 52 accessions were multiplied and evaluated under this programme.

Identification of Un-reported Species

Two unknown *Vigna* species C 2003/9/320 and AC 10522 were identified as *Vigna stipulacea* and *Vigna trinervia* respectively.

Evaluation of Germplasm

Single plant selection was made from a local accession of "Pothu dambala" (*Phaesiolus lunatus*) with apparent resistance to "Bean yellowing" syndrome, a disease or disorder with unknown causal agent; this single plant will be further evaluated to observe the consistency of resistance to the above syndrome.

Evaluation of Rice Germplasm for Resistance to Brown Plant Hopper (BPH) Populations

About 120 rice accessions were screened for BPH resistance; 12 of them resistant to BPH were identified. Three of them, C 2006.2.47, C 2006.2.55 and C 2006.2.66 exhibited a very high resistance. Crosses are being made with recommended varieties to upgrade their resistance against BPH. Crosses are also being made with TN 1 and Ptb 33 in view of analyzing the genetics of BPH resistance of the above accessions.

Preparation of Core-collections

Core – collections for rice, maize and okra have been prepared; details of the rice core-collection have been handed over to the Gene Bank.

Characterization of Pest Populations

It was observed severe infestations of BPH in resistant rice variety Bg 379-2 in Matara, Badulla, and Pollonnaruwa Districts. These populations were considered as virulent populations. Altogether, 14 adult BPH samples were collected (preserved in 95% ethanol) from severely infested rice fields of resistant variety, Bg 379-2 and susceptible variety Bg 352 from above districts; these samples may include non-virulent as well as virulent strains of BPH; the BPH samples were taken for molecular

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analysis, which gave them a molecular marker; this marker could be used to differentiate non-virulent and virulent strains of BPH.

Three BPH cultures are being maintained at PGRC for the use of evaluation and characterization of rice germplasm as well as BPH biotypes; they include two virulent populations collected from Bg 379/2 from Hakmana and Kegalle and a virulent population descended from the culture of RRDI, Batalagoda.

Virulence of these populations against rice germplasm possessing different resistant genes against BPH is being tested; tested germplasm include *Kaharamana, Rathuheenati, Pokkali, Pokkaliyan* and *Bala Ma Wee*.

BIOTECHNOLOGY

Pyramiding of Genes for Resistance to Bacterial Leaf Blight (BLB), Brown Plant Hopper (BPH) and Gall Midge (GM) into New Rice Varieties

The RRDI screened F7 and F6 generations of rice varieties for BLB, GM and for BPH resistance in the field; F7 generation was screened for BLB resistance in the plant house; F8 generation was planted in the field for further advancement and screening; selected lines were included for testing in preliminary yield trials. The laboratory work of the above project is being continued at PGRC.

- **BLB:** Resistant gene, Xa-21 was detected in F5 generation; an isolate collected from Matibokka in Galagedara area was tested for pathogenecity and genetic variability; analysis exhibited a high genetic variation in it, thus it was confirmed to be a different BLB isolate; molecular screening of F7 generation is in progress.
- **BPH:** Molecular screening of F7 generation is in progress. Resistant genes *bph2* and *bph10* were detected in two advance lines; analysis of PCR products of microsatellite marker 7314 showed a polymorphism among 3 BPH populations.
- **GM:** One Biotype similar to the Indian Biotype 5 was identified in Sri Lanka; F6 generation was screened and it was identified to be moderately resistant; molecular analysis could identify a marker linked to resistance.

Development of Rice Varieties with Resistance to the Rice Pest, Thrips (*Stenchaetothrip biformis*)

Two progeny lines of *Heenati* / Bg 360 cross were tested in preliminary yield trials (PYT) at RRDI, Batalagoda; studies confirmed the existence of a positive relationship between thrips resistance and leaf trichome density. Inheritance studies showed that the thrips resistance is a character that is inherited maternally. *Dahanala* (resistant to thrips) & *Suduru samba* (susceptible to thrip attack) were screened using molecular markers. Protocols for callus formation of F1 plants of *Dahanala* x *Suduru samba* & *Suduru samba* x *Dahanala* were developed.

DNA marker Based Detection of Tomato for Bacterial Wilt Resistance and Heat Tolerance

Bacterial Wilt Resistance

- By screening of 60 tomato accessions, 15 bacterial wilt resistant accessions were selected during *Yala* 2007; resistance to bacterial wilt of these accessions was confirmed by inoculation in the green house.
- 5 tomato varieties were characterized.
- Hybridity was confirmed in 2 hybrid varieties using molecular markers.

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- The pathogen of bacterial wilt was identified using a specific primer pair.

Heat Tolerance

Twenty one tomato accessions were screened under controlled conditions and one heat tolerant accession was identified; 18 accessions were grown for screening. Amplification of heat tolerance gene was partially optimized; 4 crosses of F1 generation and a cross of F2 generation were screened in the field for heat tolerance.

Tomato Yellow Leaf Curl Virus (TYLCV) Resistance

Two lines were selected with TYLCV resistance by screening of B1F4 generation of the cross Marglobe x *L. hirsutum*; in addition 2 lines with good fruit quality characters were selected; B1F5 generations of selected 2 lines were screened for fruit quality & TYLCV resistance; 4 crosses of F1 & a cross of F2 generations were evaluated for fruit quality.

TISSUE CULTURE

In-vitro Conservation

The *In vitro* conservation status at PGRC is indicated in the table 3.1.5.4.

Table 3.1.5.4: *In vitro* Conservation Status at PGRC

	No. of accessions	No. of cultures
Dioscorea	45	281
Sweet potato (CIP introductions)	09	108
Sweet potato	74	352
Banana	03	80
Citrus micro grafts (*in-vitro*)	217	
Conservation in green house-*Dioscorea*	65	
Sweet Potato	91	

Basic Planting Material Production through Tissue Culture

Pineapple: About 750 soil established tissue cultured pineapple plants (variety: Mauritius) were produced and handed over to Bibile farm; 4 accessions of potted plants were handed over to HORDI.

Sweet Orange Micro Grafting: A programme was initiated to produce 50 disease free sweet orange mother plants through micro grafting technique.

Wide Hybridization of Okra with Wild Relative *Abelmoschus angulosus* for Yellow Vein Mosaic Virus (YVMV) Resistance with the aid of DNA Markers

B_1F_2, B_1F_3 and B_2F_1 (MI-7 x B_1F_2 and B_1F_2 x MI-7) backcross progenies resulted from a cross between *Abelmoschus angulosus* and MI-7 were established in the field; the B_1F_2 progeny was screened for resistance to YVMV by both vector transmission and graft inoculation; screening of B_1F_3 and B_2F_1 progenies is in progress. Resulted progenies were characterized morphologically; molecular analysis was carried out partially for parents, F1, B_1F_1 and B_1F_2 populations. Results were published in the Annals of the Department of Agriculture, Sri Lanka, 2007.

Investigation of Population Structures of Wild Species of Banana *Musa acuminate* and *Musa balbisina* and Red Listing of Wild *Musa* Spp.

(Funded by-*In-situ* Conservation of Crop Wild Relatives (CWR) through Enhanced Information Management and Field Application Project)

A survey for the above study was conducted in the areas of Laxapana, Mulatiyana, Yatiyantota, Kandy,

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Kadugannawa, Balana and Mandaram Nuwara. Passport data and morphological data were recorded; information for red listing was collected based on a questionnaire. Nine *Musa balbsiana* and 5 *Musa acuminate* samples were collected; 13 *Musa acuminate* and 9 *Musa balbisiana* samples were characterized at molecular level. Population structure of *Musa acuminate* was estimated; 2 research papers in connection with this were published in the Ninth Annual Student's Research Session 2007, Faculty of Agriculture, University of Ruhuna and International Forestry and Environment Symposium.

PGR Information Management System

- Development of the database on PGR was continued; at present, the database contains passport data of 11,779 accessions and characterization data of 26 crops including rice, maize, finger millet, foxtail millet, sorghum, soybean, black gram, cowpea, mung bean, pigeon pea, ground nut, amaranthus, bean, winged bean, yard long bean, Brinjal, tomato, capsicum, okra, pumpkin, snake gourd, bitter gourd, smooth luffa, mustard, and sesame.
- Distribution maps were produced using DIVA-GIS for wild *Oryza* species and wild *Vigna* species. These maps are useful to streamline and plan the future conservation activities.
- Initial work has been completed to establish the Information Network. The Oracle 9i DBMS was installed and several programme modules have been completed.

Establishment of a National Information Sharing Mechanism on the Implementation of the Global Plan of Action (GPA) for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture (PGRFA)

The proposal for Global Plan of Action (GPA) for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture was formally adopted by representatives of 150 countries including Sri Lanka during the 4th International Technical Conference on Plant Genetic Resources, held in Leipzig, Germany in June 1996. The plan contains the priority activities identified, at local, national, regional and international levels and provides a framework for implementing conservation and utilization activities on a solid foundation. It will be a major contribution to the implementation of the Convention on Biological Diversity in the field of Food and Agriculture. All signatory countries are committed to implement the plan. FAO in collaboration with the governments developed a project (GCP/RAS/186/JPN) to promote the implementation of the GPA and to contribute towards the establishment of a monitoring framework of the plan at national and regional level. The long term objective of the project is to contribute to enhanced food security and socio-economic development, reduced poverty, and more sustainable agricultural systems through the conservation and sustainable use of PGRFA.

Immediate objectives of the project are:

- To assess the current status of PGRFA to identify needs and priorities for the conservation and sustainable utilization of PGRFA.

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- To establish a National Information Sharing Mechanism (GPA-NISM) on the implementation of GPA for sharing information and monitoring the GPA.

GPA-NISM project stakeholders include Research Centers and Institutes of the DOA, other Research Institutes (Research Institutes for Tea, Coconut and Sugar, Bandaranayake Memorial Ayurvedhic Research Institute, Forest Research Institute), Universities (Peradeniya, Rajarata, Sabaragamuwa), Ministry of Environment and two NGOO. Information from all institutes was collected and a database was designed by the data management unit of the PGRC to establish the GPA-NISM. A web site has also been designed to access the database. The URL to access the database through the site is http://220.247.224.71/gpa/lka.

SL-USA Germplasm Development Programme

This project initially was to be operational until June 2007, but was granted an extension up to June 2008. The programme is funding 14 different projects. Of the 14 projects, 9 projects are handled by the PGRC, 1 by RRDI, 2 by HORDI, 1 by NPQS, Katunayake and 1 by the Department of Botany, Faculty of Science, University of Peradeniya.

Training and Awareness Programme

PGRC conducts public awareness programmes on importance of PGR management and conservation; target groups for awareness include farmers, school students, students of Agricultural Schools and Universities; during 2007, 233 programmes were conducted for 205 schools, 08 for Universities, 07 for Agricultural Schools, 06 for farmers' organizations and 07 others groups.

PLAN FOR 2008

Exploration

- Continuation of exploration and collection of PGR.

Seed Conservation

- Continuation of seed conservation programme.

Biotechnology

- Continuation of activities for pyramiding of genes for resistance to Bacterial Leaf Blight. (BLB), Brown Plant Hopper (BPH) and Gall midge (GM) into new rice varieties.
- Development of Rice varieties with resistance to thrips (*Stenchaetothrip biformis*).
- Molecular breeding of tomato and okra.
- Initiation of a DNA gene bank.
- Evaluation and molecular characterization of germplasm.
- Study the genetics of BPH resistance of rice germplasm with BPH resistance.
- Basic planting material production through tissue culture.
- *In-vitro* conservation of germplasm.
- Development of protocols for citrus.

Characterization and Evaluation of Germplasm

- Characterization and multiplication of crop germplasm.
- Evaluation of crop germplasm for resistance to pest and disease.

Data Management

- Improvement of the information management system.
- Development of the National Information System to manage *In situ* conservation of crops.

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3.2 SEED AND PLANTING MATERIAL DEVELOPMENT CENTRE (SPMDC) - PERADENIYA

The mission of the Seed and Planting Material Development Centre (SPMDC) is to provide an assured supply of quality seed and planting material of the DOA mandated crops at a competitive price to the Sri Lankan farmer.

Following activities were conducted during the year 2007, which include activities during *maha* 2006/07 and *yala* 2007 seasons:

- Production of basic & certified seeds and planting materials in government farms.
- Supply of basic seeds to seed producers.
- Production of certified seeds through contract growers and supply them for commercial cultivators.
- Management of government farms.
- Seed enterprise development and co-ordination.
- Maintenance of buffer seed stocks.
- Co-ordination of seed & planting material supply.

BUDGET

The total allocation and expenditure under different votes are given in the Table 3.2.1.

Table 3.2.1: Annual budget – 2007 (Rs. million)

Vote /Project	Allocation	Expenditure	% Exp
Normal Capital (Consolidated Funds)	16.90	14.59	86.3
Normal Recurrent (Consolidated Funds)	14.88	13.36	90.0
Seed Production Programme	29.95	33.63	112.3
Seed Purchasing & Storage	47.28	42.60	90.0
Batista Agro Park	25.0	19.33	77.3
Crop Zoning Programme	10.0	5.28	52.8
Hybrid Seed Development Programme	1.0	0.58	58.0
Uplifting Orange Cultivation in Moneragala District	0.15	0.027	18.0
Farm Development under "Api Wawamu- Ratanagamu"	0.84	0.89	105.9
Total	**146.0**	**130.3**	**89.2**

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PROGRESS

PRODUCTION AND SUPPLY OF SEED PADDY

Basic Seed Paddy Production in Government Farms

Basic Seed Paddy (Foundation & Registered Seed Classes) of 27 recommended paddy varieties were produced in 7 Government Seed Farms. Foundation seeds were produced with Breeder Seeds supplied by the RRDI Batalagoda, RARDC Bombuwala, RRS Ambalantota and ARS Labuduwa. In addition, Certified Seed Paddy (CSP) was produced by the DOA seed farms utilizing the paddy fields which were not utilized for basic seed paddy production. Together with the quantity of down graded seed paddy from the basic seed production programme, the total quantity of CSP produced during the year was 6845 bushels (140.3 mt).

Under this programme, the target was to purchase 25,000 bu. and 30,000 bu. in 2006/07 *maha* and 2007 *yala* respectively. Even though the *maha* target was achieved, there was a short fall in the *Yala* season due to selling of produce by the contract growers in the open market because of the high paddy price prevailed. Hence during the *yala* season the SPMDC was able to purchase only 2667 bu, which was about 9% of the original target.

Certified Seed Paddy Production through Contract Growing Programme

Due to the limitations of land, the Certified Seed Paddy Production Programme was conducted through contract growers.

Table 3.2.3 shows the certified seed paddy purchased during year 2007. A total quantity of 26,952 bushels (552.52 mt.) of certified seed paddy was purchased under this programme in 08 ADA regions; this programme was not implemented in the Vavuniya region due to the disturbances prevailed in the area.

Table 3.2.2: Basic Paddy Production (in Govt. Farms)

Seed Farm	2006/07 *Maha* (mt)			2007 *Yala* (mt)			Total (mt)		
	FSP	RSP	CSP	FSP	RSP	CSP	FSP	RSP	CSP
Aluttarama	18.0	99.4	0.9	10.6	67.0	0	28.6	166.4	0.9
Ambalantota	8.0	41.7	22.2	1.7	47.9	8.2	9.7	89.6	30.4
Bata ata	0	19.7	0	0	14.4	0	0	34.1	0
Kantale	18.5	208.7	13.9	12.5	205.3	16.9	31.0	414.0	30.8
MI	16.5	193.4	0	11.4	84.7	0	27.9	278.1	0
Malwatta	9.9	131.8	0	4.1	147.4	0	14	279.2	0
Polonnaruwa	12.6	211.4	49.4	11.5	219.2	28.7	24.2	430.6	78.2
Total (mt)	**83.6**	**906.0**	**86.5**	**51.7**	**785.9**	**53.9**	**135.3**	**1691.9**	**140.3**
Total (bu)	**4076**	**44195**	**4217**	**2523**	**38336**	**2628**	**6600**	**82531**	**6845**

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Table 3.2.3: Quantity of Certified Seed Paddy Purchased

ADA Region	Production Performance			
	2006/07 *Maha*(mt)	2007 *Yala* (mt)	Total (mt)	Total (bu.)
Aluttarama	69.63	12.83	82.46	4022
Ampara	35.03	16.62	51.65	2520
Bata ata	20.62	0	20.62	1006
Kantale	0	0	0	0
MI	44.25	1.82	46.07	2247
Nikaweratiya	139.0	23.41	162.41	7922
Pelwehera	93.5	0	93.5	4561
Polonnaruwa	95.81	0	95.81	4674
Vavuniya	0	0	0	0
Total (mt)	**497.84**	**54.68**	**552.52**	
Total (bu)	**24285**	**2667**		**26952**

Certified Seed Paddy Production Programme with Public and Private Seed Enterprises

To increase the use of good quality seed paddy in commercial cultivation, the SPMDC carried out a collaborative quality seed production programme with the participation of several agencies, which included organizations of the private sector as well. For this programme registered seed paddy was issued to the relevant agencies and the crop was certified by the Seed Certification Service of the DOA.

Also, registered seed paddy was issued to certain farmers under the Secondary Seed Farm Programme for the production of quality assured seed paddy. The timely availability of registered seed at Ampara and Nikaweratiya regions could satisfy the demand for seed paddy by the early cultivators in certain parts of the Country.

The quantities of certified seed produced by various public and private sector organizations are given in Table 3.2.3. However, the actual quantity contributed by the private sector was higher than the quantity indicated in the table as some companies followed their own internal quality control systems. The quantity of CSP produced under the certification programme was 16,410.57 mt (733,110 bu.) during the year 2007 (Table 3.2.4), which is equivalent to 16.66% of the total seed paddy requirement. Any quantity above15% of the total seed requirement is considered to be satisfactory.

Quality assured seed produced using the DOA registered seed was estimated to be about 1,354 mt.(66,048 bu.). Hence, the total quantity of quality guaranteed seed paddy produced during the year through basic seed paddy was estimated to be 33,849 mt.(1,651,219 bu.).

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Table 3.2.4: Collaborative Certified Seed Paddy Production

Institute	2006/07 *Maha*		2007 *Yala*		Year 2007		Production	
	Quantity 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							522.0	26952
Prov.	47.27	596.0	41.1	531.0	88.37	1127.0	2155.39	95795
IP	29.21	522.5	26.9	527.5	56.11	1050.0	2008.13	89250
Ag.Ser.	3.89	33.0	2.27	47.0	6.16	80.0	153.0	6800
Mahaweli	17.32	169.0	24.29	527.5	41.61	696.5	1332.06	59203
Coop	23.2	387.25	19.22	408.5	42.42	795.75	1521.87	67639
Farmer Org.	42.8	493.0	99.5	1179.5	142.30	1672.5	3198.66	142163
Individual Farmers	35.64	394.5	30.34	439.0	65.98	833.5	1594.07	70848
Private Companies	56.12	1131.75	37.61	875.75	93.73	2007.5	3839.34	170638
Others	1.84	45.0			1.84	45.0	86.06	3825
Total	**257.29**	**3772.0**	**281.23**	**4535.75**	**538.52**	**8307.75**	**16410.57**	**733110**

Issue of Seed Paddy

The total quantity of seed paddy issued by the DOA for seed production and commercial cultivation during the year 2007 is given in Table 3.2.5. Foundation Seed produced from Breeder Seeds in the previous season was used to produce RSP in Govt. seed farms. RSP was supplied to the contract growers as well as to the private seed growers including the private sector organizations to produce CSP. The total supply of RSP during the year 2007 was 1,809.23mt (88,255 bu).The quantity of RSP issued to the seed growers was increased by 17.9% compared to that of the year 2006. The total quantity of CSP supplied during the year was 857mt (41,843 bu). This is a good progress, which was achieved through the re-introduction of CSP production programme.

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Table 3.2.5: Quantities of Seed Paddy Issued by the DOA (mt)

Season	Program	Foundation	Registered	Sub Total	Certified	Grand Total mt.	Grand Total bu.
2007 *Yala*	Farm	16.64	5.74	22.38	0	22.38	1092
	Cont.Growing	0.06	19.63	19.69	1.57	21.26	1038
	Private	0	273.06	273.06	8.17	281.23	13718
	Extension	0	359.46	359.46	338.23	697.69	34033
	Sub Total(mt)	16.70	657.89	674.59	347.97	1022.55	49880
	Sub Total(bu)	815	32092	32907	16974	49880	
2007 *Maha*	Farm	19.72	4.30	24.02	0	24.02	1172
	Cont.Growing	0.86	27.75	28.61	2.95	31.56	1540
	Private	0	288.38	288.38	29.61	317.99	15512
	Extension	5.82	825.09	830.91	477.27	1308.18	63814
	Sub Total(mt)	26.40	1145.52	1171.92	509.83	1681.75	82037
	Sub Total(bu)	1288	55879	57167	24870	82037	
Issues for the year 2007	Farm	36.36	10.04	46.40	0	46.40	2263
	Cont.Growing	0.92	47.38	48.30	4.52	52.82	2577
	Private	0	561.44	561.44	37.78	599.22	29230
	Extension	0	1190.37	1190.37	815.50	2005.87	97847
	Sub Total(mt)	37.28	1809.23	1846.51	857.80	2704.30	131917
	Sub Total(bu)	1819	88255	90073	41844	131917	

Production and Distribution of Other Field Crops (OFC)

Basic Seed Production

Total quantities of basic seed (Foundation and Registered) produced in the government seed farms and under contract growing program are indicated in table 3.2.6. Only the quantities of chilli and groundnut basic seeds produced are higher than those of the year 2006. This was mainly due to the restriction in the production of basic seed of certain varieties because of their availability in the stocks. Furthermore, some crops produced lower seed yields because of unfavorable climatic conditions during the harvesting period. As enough quantities of basic seed stocks were already available, basic seed production was restricted to some selected varieties during the year, hence the total quantities of basic seed produced showed a slight decrease (18.7%) compared to that of the last year (2006).

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Table 3.2.6: Basic Seed Production of OFC (Kg) – Year 2007

Crop	Foundation			Registered						Grand Total	Total Production of Basic Seed
	Govt. Farms			Govt. Farms			Contract Programme				
	2006/07	2007		2006/ 07	2007		2006/07	2007			
	Maha	*Yala*	Total	*Maha*	*Yala*	Total	*Maha*	*Yala*	Total		
Black gram	172	_	172	_	778	778	1288	183	1471	2249	2421
Chilli seed	69	474	543	_	_	_	_	_	_	_	543
Cowpea	513	777	1290	581	589	1169	236	712	948	2117	3407
Sesame	49	15	63	120	218	338	_	95	95	433	496
Green gram	243	627	870	1510	936	2446	99	1500	1599	4045	4914
Groundnut	1832	320	2152	2479	2722	5201	637	260	897	6098	8250
Finger millet	238	_	238	371	_	371	_	_	_	371	609
Maize seed (OPV)* 6202		_	768	768	1385	73	1458	2804	1172	3976	5434
Soybean	589	432	1020	606	293	899	_	581	581	1480	2500
Total	**3705**	**3411**	**7115**	**7052**	**5608**	**12660**	**5063**	**4503**	**9566**	**22226**	**29341**

(OPV* = Open pollinated varieties)

Certified and Commercial Seed Production

Certified seeds, baring hybrid maize, were mainly produced through contract growing programme (Table 3.2.7). The total quantity of certified seeds produced showed a slight increase (10.58%) when compared to that of the previous year. A limited quantity of commercial seed of sun hemp and *Sesbeniya rostrata* (green manure crops) were produced for use in the seed farms and research stations (Table 3.2.7 b) . Production of Commercial Seeds of selected OFC crops was carried out to cater the high seed demand for these crops (Table 3.2.7). Except maize,the quantities of seeds produced in all of the other field crops were higher than those of the year 2006.

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Table 3.2.7(a) : Certified & Commercial Seed Production (Kg.) in Government Seed Farms and Under Contract Growing - Year 2007

	Crop Contract Programme							Seed Farm							
	2006/07 *Maha*			2007 *Yala*				2006/07 *Maha*			2007 *Yala*				
	Cer.	Com	Total	Cer.	Com.	Total	Sub Total	Cer.	Com.	Total	Cer.	Com.	Total	Sub Total	Grand Total
Black gram	6132	_	6132	5997	967	6964	13096	269	11	280	_	6	6	286	13382
Chilli seed	111	_	111	1191	_	1191	1302	_	_	_	_	_	_	_	1302
Cowpea	2493	_	2493	4342	1117	5459	7952	_	65	65	50	56	106	171	8123
Sesame	527	_	527	565	_	565	1092	_	4	4	26	4	30	34	1126
Green gram	2612	_	2612	13561	294	13855	16467	_	56	56	_	1116	1116	1172	17639
Groundnut	5730	_	5730	9267	7462	16729	22459	_	25	25	_	_	_	25	22484
Finger millet	53	_	53	_	_	_	53	1502	_	1502	_	_	_	1502	1555
Maize seed (OPV)*	21750	_	21750	803	_	803	22553	660	_	660	_	10	10	670	23223
Maize seed (Sampath)	_	_	_	_	_	_	_	2468	_	2468	2110	_	2110	4578	4578
Soybean	_	_	_	4842	_	4842	4842	27	_	27	_	_	_	27	4869
Total	**39408**	**_**	**39408**	**40568**	**9840**	**50408**	**89816**	**4926**	**160**	**5087**	**2186**	**1192**	**3378**	**8465**	**98281**

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Table 07(b): Production & Issues of Sun hemp and Sesbaniya Seeds

Crop	Production (kg)			Issues (kg)		
	2007 *Yala*	2007/08 *Maha*	Total	2007 *Yala*	2007/08 *Maha*	Total
Sun hemp	631	575	1206	324	250	574
Sesbaniya	110	_	110	5	_	5

Issue of OFC Seeds during Year 2007

Quantities of seed Issued by the SPMDC are given in table 08. Similar to the OFC certified seed production, seed issued was also showed a significant increase (35.64%) during the year 2007 when compared to the previous year. Data showed that seed issues of black gram, cowpea, green gram, ground nut and maize (*Sampath)* had increased by 50% in comparison to those in the previous year. A total quantity of 138,000 kg of OFC seeds was issued in 2007 while it was 88,814 kg in 2006.

PRODUCTION & SUPPLY OF VEGETABLE SEEDS

Basic Seed Production

There are 53 DOA recommended varieties in 18 vegetable crops, grown in the country. Production of basic seeds of some varieties was carried out in 7 Government Seed Farms (Table 3.2.9). The total quantity produced was much lower than that of year 2006. It was due to the fact that very limited quantities were produced in certain varieties, because sufficient seed stocks were available under conditional storage facility.

Table3.2.8: Issue of OFC Seeds during Year 2007 (kg)

Crop	2007 *Yala*					2007/08 *Maha*					Total - Year 2007				
	Fou.	Reg.	Cer.	Com.	Total	Fou.	Reg.	Cer.	Com.	Total	Fou.	Reg.	Cer.	Com.	Grand Total
Black gram	106	1642	6058	0	7805	130	487	5212	561	6390	236	2129	11269	561	14195
Chilli Seed	131		591	0	722	75		527		602	206		1118		1324
Cowpea	172	1961	2682	0	4814	204	1589	2674	2318	6785	376	3550	5355	2318	11599
Sesame	65	378	658	0	1100	41	160	557		758	106	538	1215		1859
Green gram	464	3186	2649	0	6299	298	2359	12453	612	15723	762	5546	15102	612	22022
Groundnut	1405	962	7467	39	9872	1687	3810	7757	6999	20252	3091	4771	15224	7038	30124
Finger millet	0	464	285	0	749	1504	955	1134		3593	1504	1419	1419		4341
Maize seed (OPV)*	108	1033	4925	0	6066	2018	8432	25409		35859	2126	9465	30334		41925
Maize seed (Sampath)			2670	0	2670			3054		3054			5724		5724
Soybean	189	475	123	0	787	210	236	3655		4101	399	711	3778		4888
Total	**2639**	**10100**	**28106**	**39**	**40884**	**6168**	**18027**	**62432**	**10490**	**97117**	**8806**	**28128**	**90538**	**10529**	**138001**

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Table 3.2.9: Basic Seed Production in Government Farms -2007

Crop	Quantity Produced (kg)		
	2006/07 *Maha*	2007 *Yala*	Total
Bean	444.8	-	444.8
Bitter gourd	-	72.5	72.5
Brinjal	-	3.0	3.0
Bushitavo	56.3	-	56.3
Mea	14.2	-	14.2
Okra	281.8	-	281.8
Radish	28.5	-	28.5
Sweet Melon	9.4	16.3	25.7
Tomato	17.6	16.9	34.5
Winged Bean	-	133.1	133.1
Total	**852.6**	**241.8**	**1094.4**

Standard Vegetable Seed Production

The production of standard seeds was carried out by both public and the private sector. The quantities produced by the DOA in government farms and under contract growing program are indicated in Table 3.2.10.

The quantity of standard seeds produced during the year was also lesser than that of the year 2006, a trend which is similar to that observed in the Basic Seed production. This can be attributed to the fact of increased number of private sector entrepreneurs venturing into the standard seed production with the Basic Seeds supplied by the DOA.

Table 3.2.10: Standard Vegetable Seed Production by DOA -2007

Crop	Farm Programme			Contract Programme	Grand Total
	2006/07 *Maha*	2007 *Yala*	Total	2006/07 *Maha*	
Bean	-	-	-	5062.0	5062.0
Bitter gourd	50.8	-	50.8	-	50.8
Capsicum	17.6	-	17.6	-	17.6
Cucumber	129.8	-	129.8	-	129.8
Luffa	23.5	-	23.5	-	23.5
Mae	100.3	146.2	246.5	-	246.5
Pumpkin	16.4	11.3	27.7	-	27.7
Sweet Melon	38.7	36.0	74.7	-	74.7
Tomato	249.7	167.2	416.9	-	416.9
Amaranthus	-	63.4	63.4	-	63.4
Total	**626.8**	**424.1**	**1050.9**	**5062.0**	**6112.9**

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Hybrid Vegetable Seed Production

F1 hybrid seeds of two Brinjal varieties and one tomato variety were produced successfully in 3 seed farms. Quantities of F1 hybrid seeds produced in Govt. farms are given in Table 3.2.11.

Table 3.2.11: Hybrid Vegetable Seed Production (kg)

Crop	2006/07 *Maha*	2007 *Yala*	Total
Tomato	2.95	2.88	5.83
Brinjal	74.6	20.85	95.45
Total	**77.55**	**23.73**	**101.28**

Vegetable Seed Distribution

Vegetable seeds were distributed through the DOA sales outlets and registered dealer network. These dealers included Govijana Kendras, Cooperative societies, Farmer organizations, Provincial DOA and private registered seed merchants. Quantities of vegetable seeds supplied by the DOA are given in Table 3.2.12. The quantity of Basic Seed supplied was slightly lesser by 14% than that was in the year 2006. But, the supply of standard seeds and home garden packs were remarkably higher in 2007 by 143% and 462% respectively.

Table 3.2.12: Vegetable Seed Supplied by DOA - 2007

Crop	Quantity Supplied (kg)						
	Basic			Standard			Grand
	Yala 2007	*Maha* 2007/08	Total	*Yala* 2007	*Maha* 2007/08	Total	Total
Amaranthus	0.8	0.3	1.1	97	303	400	401.1
Bean	91	1513	1604	2449	4232	6681	8285
Bitter gourd	9	24.3	33.3	244	760	1004	1037.3
Brinjal	0.18	0.5	0.68	183	368	551	551.68
Bushitavo	83.5	96	179.5	715	1392	2107	2286.5
Capsicum	0.5	2.6	3.1	185	462	647	650.1
Cucumber	0.2	0.1	0.3	100	192	292	292.3
Luffa	42.8	68.5	111.3	175	516	691	802.3
Mea	38.5	48	86.5	855	1100	1955	2041.5
Okra	165.5	114	279.5	864.3	1387	2251	2530.5
Pumpkin	4.1	1	5.1	5	19.5	24.5	29.6
Radish	3	8.5	11.5	410	780	1190	1201.5
Snake gourd	63	37.4	100.4	287	562	849	949.4
Spinach	5.2	3.5	8.7	139	220	359	367.7
Sweet Melon	0.6	0.5	1.1	-	33	33	34.1
Tomato	16	5	21	282	345	627	648
Winged Bean	7.5	49	56.5	220	650	870	926.5
Total	**531.38**	**1972.2**	**2503.58**	**7210.3**	**13321.5**	**20531.5**	**23035.08**
Home Garden Packs				**76,346**			

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PRODUCTION & ISSUES OF SEED POTATO

Basic seed potato production through tissue culture based rapid multiplication technique was conducted in 5 up country farms in the Nuwara Eliya District. Under this programme, rooted stem cuttings from in-vitro plants in the net house and pre basic seed production in poly tunnels, basic seeds of G1, G2 & G3 generations and certified seeds of C1 & C2 generations of Desiree and Granola varieties were produced; the quantities produced are indicated in tables 3.2.13, 3.2.14 and 3.2.15.

Pre basic seed and basic seed produced were used as seed material for multiplication in farms and certified seed were issued to potato growers in the Nuwara Eliya & Badulla Districts for commercial cultivation.

Table 3.2.13: Production of Pre Basic Seed in 2007

Variety	Pre- basic seed (G_0)	
	No. of Tubers	Tuber wt.(kg)
Desiree	56,227	648
Granola	430,781	4,721
Raja	848	11.7

Table 3.2.14: Production of Basic Seed (kg) in 2007

Variety	Seed Class		
	G1	G2	G3
Granola	39,266	128,093	55,125

Table 3.2.15 : Production of Certified Seed (kg)

Variety	Quantity (kg)
Desiree	35,783
Granola	20,516

For the first time 22,202.8 kg of basic seeds of G2 seed class of variety Granola were issued to National Live-stock Development Board (NLDB) for seed production. This quantity would be sufficient to plant 9 ha and it is anticipated to produce at least 3600 mt of Certified Seed Potato by the end of two multiplications in the next two seasons.

PRODUCTION & SUPPLY OF PLANTING MATERIALS

In addition to the quantities produced in 118 registered private nurseries, the DOA continued to produce a significant quantity of quality fruit plants in 8 HORDI farms. The Horticultural Crop Training and Development farm at Bibile also produced quality planting materials. The total quantities produced and supplied by the Department of Agriculture are given in Table 3.2.16.

Though the total number of planting material produced (322,594) shows a 7% decrease compared to that of the year 2006 (349,765) , the production of grafted plants was increased by 23%.

This is a significant achievement by the DOA during the year. The total number of planting materials issued during the year was 272,904 which is 1.3% less than the issues of the previous year (276,746).

The infrastructure facilities required for production of quality planting materials were further strengthened in 2007 with financial assistance from Crop- Zoning project. A sum of Rs.5.2 million was utilized for the payment of contract labour salaries, construction of net houses, procurement of nursery equipment, and construction of propagators, provision of nursery inputs etc. and to upgrade facilities required for quality planting material production in government farms.

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Table 3.2.16: Production and Supply of Planting Material in DOA Farms

Crop	Prod.	Issues
Budded Plants		
Avocado	15,444	15,494
Belli	1,848	1,207
Durian	9,705	8,537
Guava	3,634	3,290
Jack	6,996	4,724
Jambu	1,297	1,136
Lime	12,467	9,683
Mango	91,592	61,087
Mandarin	5,217	2,975
Mangosteen	578	556
Orange	15,797	11,590
Rambutan	28,549	23,917
Sapodilla	927	1,014
Star fruit	2,176	2,107
Wood apple	3,072	3,141
Goraka	2,252	2,109
Other	2,890	3,505
Sub Total	**204,441**	**156,072**
Rooted Cuttings		
Grapes	3,072	3,141
Jambu	2,100	1,830
Pomegranate	612	447
Lemonine	5,174	3,569
Pepper	6,532	4,251
Pears	1,294	761
Other	570	434
Sub Total	**19,354**	**14,433**
Seedlings		
Amberalla	11,648	11,335
Anoda	2,155	2,458
Goraka	800	50
Papaya	27,545	24,708
Pomegranate	10,717	22,361
Guava	8,488	9,851
Beli	784	436
Jambu	3,236	2,362
Kathuru	2,187	2,222
Passion fruit	1,612	1,922
Mangosteen	7,046	1,443
Lime	15,659	15,788
Other	6,922	7,463
Sub Total	98,799	102,399
Grand Total	322,594	272,904

PRODUCTION OF OTHER COMMODITIES

Many other non-seed commodities were produced in government farms using available resources in order to earn additional income. Quantities of those commodities produced are indicated in Table 3.2.17. Total income gained through the sales of non-seed commodities were approximately Rs. 14.7 m in the year 2007.

Table 3.2.17 : Production of Other Commodities

Product	Quantity
Banana (kg)	30,991
Mango (kg)	6,923
Papaya (kg)	40,571
Orange (kg)	18
Guava (kg)	170
Pineapple (kg)	35
Avocado (kg)	210
Water melon (kg)	920
Grapes (kg)	293
Pomegranate (kg)	72
Consumption Potato (kg)	51,715
Consumption Vegetable (kg)	50,377
Consumption Paddy (kg)	172,259
Leafy Vegetables (bundles)	1,278
Cassava (kg)	586
Tamarind (kg)	68
Amberalla (kg)	3,557
Coconut (Nuts)	29,156
King Coconut (Nuts)	5,167
Mushrooms (Packets) (250g)	131
Animal Products	
Milk (L)	38,200
Cured (Pots)	3,830
Animal Fertilizer(kg)	41,500
Compost (kg)	49,000
Consumption OFC	
Maize (kg)	11,019
Maize (Cobs)	16,012

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Product	Quantity
Dry Chilli (kg)	1,578
Green gram (kg)	974
Cowpea (kg)	472
Sesame (kg)	138
Groundnut (kg)	1,769
Soya (kg)	926
Kurakkan (kg)	33
Black gram (kg)	165

PERFORMANCE OF THE ADVANCE ACCOUNT

The production of seed and planting material was carried out under the Advance Account. Performance of the advance account during the year under review is given in Table 3.2.18.

Table 3.2.18 : Performance of the Advance Account in Rs.

Farm	Expenditure	Value of Production	Loss/Profit
Ambepussa	5,488,583.64	232,847.25	-5,255,736.39
Bataata	7,707,669.45	2,464,219.95	-5,243,449.50
Ambalantota	3,953,540.97	1,733,505.02	-2,220,035.95
Middeniya	6,225,178.17	213,228.50	-6,011,949.67
Kantale	2,488,897.04	6,363,027.91	3,874,130.87
Kundasale	2,368,779.69	329,047.77	-2,039,731.92
Mahailluppallama	3,203,812.07	4,361,430.85	1,157,618.78
Malwatta	5,383,734.96	1,019,928.80	-4,363,806.16
Polonnaruwa	3,659,510.81	6,425,563.42	2,766,052.61
Kandapola	4,292,399.99	760,673.00	-3,531,726.99
Meepilimana	4,225,626.93	419,589.00	-3,806,037.93
Piduruthalagala	1,803,315.66	7,109,609.45	5,306,293.79
Sita Eliya	3,267,803.87	17,672,908.40	14,405,104.53
Udaradella	1,110,986.55	5,277,284.36	4,166,297.81
Total	**55,179,839.80**	**54,382,863.68**	**-796,976.12**

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3.3 SOCIO ECONOMIC AND PLANNING CENTRE (SEPC) - PERADENIYA

The SEPC functions as a major advisory body by supporting the DOA and the Ministry of Agriculture Development and Agrarian Services, in formulating agricultural policies and planning and conducting socio-economic research and agricultural policy analysis. The SEPC maintains a statistical unit to compile agricultural statistics and information. The Centre coordinates the activities of the local and foreign funded projects of the DOA as well.

In 2007, Socio-economic research and policy analysis was concentrated on focusing adoption of farm mechanization, resource utilization, international trade, technology dissemination, food security and food consumption patterns. The Centre contributed to streamline various research and development programs of the DOA through identifying and prioritizing research agenda and guiding policy makers in developing strategies for solving problems concerning food production, especially in the context of changes in government policies and global and domestic economic environment. The Centre investigated main socio-economic problems, policy aspects and resource utilization in the food crop sector. In addition, a comprehensive programme to build a database on cost and returns of all major food crops on district and seasonal basis was continued.

BUDGET

Table 3.3.1: Annual budget – 2007 (Rs.)

Vote	Allocation	Expenditure
Capital	991,630.55	819,206.41
Recurrent	2,169,500.00	2,013,453.13
GAP	85,000.00	53,125.00
Orange development	200,000.00	111,689.30
Crop zoning	15,00,000.00	59,5301.73
Total	**4,946,130.55**	**3,592,775.57**

PROGRESS

SOCIO-ECONOMIC RESEARCH

Costs and Returns of Crop Production

The data on costs and returns on the production of rice, subsidiary food crops, root and tubers and vegetables in *maha* 2005/2006 and *yala* 2006 seasons were published in September and December 2007, respectively. The data included average yield, gross and net returns, total and unit cost of production and farm gate price. The data is useful for decision making on crop production and marketing at the farm level and for policy decisions at national level. Unit cost of production derived for major food crops for the above seasons are given in table 3.3.2.

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Table 3.3.2: Unit Cost of Production for Major Food Crops

Crop 2005/2006	*Maha* 2006	*Yala*
	Unit cost (Rs/kg.)	Unit cost (Rs./kg)
Paddy (major irrigated)	11.10	10.95
Chilli	85.90	83.99
Red onion	30.28	27.89
Big onion	-	14.03
Potato	31.17	39.03
Maize	13.81	15.63
Green gram	49.10	33.54

An Assessment of the Impact of Granary Area Programme (GAP) in Polonnaruwa, Hambantota and Anuradhapura Districts in 2006 *Yala* Season

The Government decided in early 2000 to increase the national productivity of rice up to 5.0 mt/ha within three years. In order to meet this target, a yield level of 6.0-6.5 mt/ha should be reached in high potential areas of Sri Lanka. In this context, the Granary Area Programme (GAP) was launched in 2004 in the high potential major irrigation areas. To evaluate the impact of the GAP, a study was conducted in Polonnaruwa, Anuradhapura and Hambantota Districts during 2006 *yala* season

- It was observed that the extension services received by GAP farmers were substantially high in all three districts. Farmers who were not assisted by the GAP in Polonnaruwa and Anuradhapura were receiving extension services at a lower level.
- Study revealed that only 23% of non project assisted farmers in these two districts have received training from the extension service.
- Hence the extension service should pay more attention on this and ensure direct and lateral dissemination of technology to farmers who were not supported by GAP.

Evaluation of Sweet Orange Development Programme in Monaragala District

With the objectives of increasing farm income, reducing poverty and enhancing the fruit production in Sri Lanka, the DOA in collaboration with the Provincial Department of Agriculture, implemented the sweet orange development programme in late 2005 in the Moneragala District. To evaluate the progress and make recommendations to improve the ongoing programme, a study was conducted in August 2007. The farmers who received sweet orange plants from late 2006 to August 2007 were considered for the survey.

- The study revealed that 17,144 plants have been distributed among 931 farmers during this period. All the farmers have cultivated the variety '*Bibile Sweet*' and most of the plants were from nurseries of the DOA.
- It was observed that 54% of farmers have received less than 10 plants. Large scale cultivators who received more than 50 plants were only 3% of the sample.
- It was observed that 80% of farmers could get water for irrigation in close proximity where 15% suffered from water scarcity. Study found that 77% of farmers have irrigated the plants only when it was necessary.
- Study revealed that most of the farmers were not adopting correct agronomic practices. This may be due to their lack of prior knowledge before the project was started.

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Economic Analysis on the Use of Combined Harvesters in Paddy Cultivation in Ampara District

Labor cost of paddy farming in Sri Lanka is as high as 60% of the total cost of cultivation. Harvesting, threshing and winnowing are labour intensive operations that require about 40 man days/ha (i.e. 53% of total labour requirement). These operations account for 26% of total cost of cultivation. In order to solve the problem of high labour cost in paddy cultivation, combined harvesters have been introduced recently. This study attempted to assess the economic viability of using combined harvesters for paddy farming over existing manual harvesting and threshing with four wheel tractor. Multi-stage random sampling method was employed to collect primary data based on schedule from Ampara District. An empirical model was used to estimate the economic benefit based on the saving of labor and reduction in yield losses. Financial analysis was used to determine the profitability of combined harvester. Due to using of a combine harvester:

- A farmer can save 34.5 man days/ha, which is equivalent to saving of Rs. 7,832/ha as labour cost. On average, an additional income of Rs. 13,915/ha can be obtained.
- The unit cost of production of rice can be reduced by Rs. 2.34 per kg.
- Further, investment in procuring a combined harvester is financially viable. Use of combined harvester is economically viable to overcome difficulties in labor scarcity, high wage rate and, in addition to reduce the post harvest losses.

Analysis of Food Consumption Patterns in Sri Lanka with Special Reference to Energy Intake

The pattern of food consumption in Sri Lanka has been under going dramatic changes over the last two decades. This study examined the variation in food consumption pattern and economic parameters determining the demand for the period from 1980 to 2002. The cross sectional household data obtained from *Household Income and Expenditure Survey Reports (1980/81, 1985/86, 1990/91, 1995/96 and 2002) published by Department of Census and Statistics* were used for the analysis. Analysis was done using AIDS model.

- The study reveals that food consumption pattern is shifting from starch food to non-starch food. However, still rice is the cheapest source of energy.
- Own price elasticities of rice, wheat, pulses, meat, fish, milk and eggs were – 0.6788-0.6740,0.4231,-0.9732,-0.9321,-0.9632,-0.6321 respectively.
- Own price elasticities and expenditure elasticities for rice, wheat, pulses, meat, fish, milk and eggs were significant ($P<0.05$).Sri Lankan consumers are more responsive to price changes in rice as compared with wheat flour. Cross price elasticity of rice (0.2567) with respect to wheat is significant ($P<0.05$) implying that demand for rice is affected by the price of wheat.
- Therefore, reduction of subsidy on wheat in order to increase the demand for rice is an effective strategy to increase the income of paddy farmers.

Importance of Reducing Malnutrition through Agriculture in Sri Lanka

The study was published in the Annals of Sri Lanka Department of Agriculture (2007.9:103-11).

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- Though adequate food resources are available in Sri Lanka at present, still a significant level of malnutrition exists.
- Poverty and inadequate food accessibility are considered major causes of low level of nutrition.
- Benefit-cost ratio was also estimated with the intervention of nutritional investment. Estimation indicated annually 4-5.5 million people are affected with malnutrition and economic cost is substantial. The finding shows that return to investment in nutrition is 4.8. This implies that improving nutrition is imperative and potential exists for agriculture.
- Hence, vigorous agriculture involvement for micro nutrient enriched staple food approach and diversified food supply systems are required to reduce malnutrition in Sri Lanka

Status of Vegetable Production and Wastage in Sri Lanka

Vegetable production in Sri Lanka is characterized by high dependency on weather, small scale production, scattered production, perishability, high use of family labour; it is more concentrated in remote areas, where transport and other infra structure facilities including those for marketing are lacking. The situation results in price fluctuations and post harvest losses.

- Available secondary data were gathered for 16 vegetables for a period of 20 years in order to examine the changes in extent, production, and yield.
- The post harvest losses of vegetables in Sri Lanka are reported to be at 30%-45% in many reports; however, this higher level of losses is unrealistic and hence subject to controversy pertaining to certain vegetables, at least. Therefore this study was imitated to ascertain the wastage level for each crop. Hence, the per capita availability of vegetables and consumption were also looked into in detail.

Promotion of Maize Cultivation for Green Cobs Production in Wet Zone Areas

Maize is consumed as flour-based *pittu, rotti* and other flour- based forms, mostly by the rural people in Sri Lanka. A portion of maize production is also consumed as green cobs by the population. Vending of green cobs by the road side has become increasingly popular since recently in urban areas as well. Other than direct consumption, maize based products such as corn flake, corn oil, corn starch are used by a small section of wealthy citizens and foreigners and most of those products are imported to Sri Lanka. *Thriposha*, is also one of the popular food supplement programmes, which require about 8000 mt. of maize annually.

- Therefore, the annual human consumption accounted for 34% of the total national requirement in 2005.
- Considering these factors, a programme should be initiated at national level with the support of provincial officials to identify Wet Zone areas like Gampaha, Kegalle, Kandy and Matale to produce maize to satisfy the urban demand for green cobs, while the Dry Zone Districts could be encouraged to produce maize seed required for provender industry.

Trend Analysis Report on Department of Agriculture Website

This report presents data on the Extent, Production, Average Yield, Export and Per-capita Availability of other field crops. The crops included for this website are maize, green gram, cowpea, black gram, potato, *meneri*, soya bean, ground nut, red onion, big onion,

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chilli, sweet potato, manioc, sesame, sorghum and finger millet. This trend report, which covers the period from 1996 to 2005, will be useful for policy planners and other researchers.

Evaluation of Effectiveness of Agro-Technology Park at Gannoruwa in Technology Dissemination

The main objective of establishing the Agro Technology Park at Gannoruwa was quick dissemination of information and technology among various stakeholders of agriculture. This study was aimed at evaluating the impact of the park in terms of achieving its objectives and determining an optimal entry fee for the park. The overall effectiveness of park was evaluated by itemizing the different sections of the park.

- The majority of the visitors represented student category and a notable reduction in general public category could be observed in the year 2006.
- The visitors' overall perception on the park was very good.
- The provision of information to public needs to be further improved.
- The estimated optimal entry fee per person was Rs 24.00 and this amount would be sufficient to cover 34% of operational cost of the park.
- The park should attract more visitors especially from the category of general public and also people from major agricultural districts to realize the immediate benefit of the service.
- The park generated an annual social welfare gain of Rs. 14.86 million and when compared with the operational costs, it indicated a positive welfare gain to the society.

Agricultural Trade Liberalization of South Asian Countries

The South Asia's inter-regional trade negotiations have given fewer preferences for agricultural trade. The number of agricultural products covered in these negotiations is very limited and the items negotiated have no significant trade interest to the contracting parties.

- India dominates the agricultural trade in the region, which has export specialization in diverse groups of agricultural products.
- Though the margins of preference offered under trade agreements are low, trade agreements have significantly increased the intra-regional agricultural trade.
- Agricultural exports of the many SACs are concentrated in a small basket of goods.
- The development of the agricultural trade within the region during the past decade and prevalence of higher tariff protection indicate the potential for expansion of agricultural trade. The effort of agricultural trade liberalization is also influenced by the economy wide effects.
- Changes in terms of trade in agriculture and appreciation of real exchange rates have led many SACs to maintain relatively higher tariff rates for agricultural products than that of non-agricultural products. The reduction in competitiveness of agricultural production is experienced by Bangladesh and Sri Lanka due to appreciation of real exchange rates.
- The analysis indicates that there is a high potential for improving agricultural trade in the region and India and Bangladesh can provide more opportunities to promote agricultural trade in the region.

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- Reduction of specific tariff, removal of tariff rate quotas and improving market access for products with considerable export specialization can be considered as key issues for the regional agricultural trade negotiations.

PREPARATION OF POLICY DOCUMENTS AND PROJECT CONCEPT PAPERS

The Comprehensive Economic Partnership Agreement between India and Sri Lanka

This agreement requires more liberal trade between the two countries. The possibilities for reduction of agricultural items in the negative lists of Sri Lanka were examined in terms of impact on domestic producers, foreign exchange out flow and government revenue; recommendations were given to the Ministry of Agriculture and Agrarian Services to liberalize trade with respect to the items that have the least impact on domestic agricultural producers.

Project Formulation and Co-ordination

Following project proposals were prepared in collaboration with the Institutes and Centers of DOA and submitted to the Ministry of Agriculture Development and Agrarian Services and other agencies for obtaining funds from donor agencies.

- Promotion of biological pest control in vegetables and field crops in Sri Lanka.
- Popularizing cultivation of traditional rice varieties in LCWZ.
- Capacity building of agriculture research station Murunkan to encourage farmer oriented research in paddy and other field crops.
- Project proposal for maize hybrid development and seed production in Sri Lanka.

Preparation of Planning Documents

- The National Agricultural Research Plan (NARP) 2002-2010 – CARP.
- Position of Crop Production in Sri Lanka for past ten years (Operation to encourage domestic food production "*Api Wawamu Rata Nagamu*" 2007-2010).
- Action plan for "*Api Wawamu Rata Nagamu*" programme.

PARTICIPATION IN COMMITTEES INVOLVED IN NATIONAL LEVEL PLANNING

- Mr. J.A.T.P Gunawardena, Director served as a Member of the Board of Directors of Agricultural and Agrarian Services Insurance Board after being , appointed by the Hon. Minister
- Mr. J.A.T.P Gunawardena, Director served as chairman of the committee to investigate sale on seed paddy at different prices under the same roof within the Western province, after being appointed by the Secretary, Ministry of Agriculture Development & Agrarian Services
- Mr. J.A.T.P Gunawardena, Director served as a member of the Cadre Review Committee of the DOA, after being appointed by the secretary, Ministry of Agriculture Development & Agrarian Services Mr. J.A.T.P Gunawardena, Director served as chairman of the following committees after being appointed by the Director General of Agriculture.
- Evaluation Committee of the village development programme *Gama Negumata Kethata Aruna*
- The Committee of Postgraduate Training of AMOs, PAA, EAA
- The Board of Interview to select suitable candidates for the posts of Watchers in

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the DOA on 31.05.2007, 01.06.2007 and02.06.2007

- The Board of Interview for Scholarship Programme – 2007 / 08 Egyptian International Centre for Agriculture, appointed on 24.05.2007
- The Board of Interview for Scholarship Programme- 2007 / 08 Egyptian International Centre for Agriculture, appointed on 29.05.2007
- Interview Board for GTC. Agro bio technology 17.03.2008 – 09.08.2008 Japan, appointed on 13.11.2007
- The Interview Board for M.Sc in Agric. Systems – Thailand (2008 – 2009), appointed by on 26.11.2007

Mr. J.A.T.P Gunawardena, Director served as member of the following committees after being appointed by the Director General of Agriculture

- The Service Minute Amendment Committee of SLAgs of the Department of Agriculture
- The Agriculture Cluster - National Council for Economic Development (NCED)
- The Committee on Consultation Work of Crisis in the Fruit and Vegetable Export Sector
- The Project Management Committee – IRRI DOA Cyber Extension / SL RKB Project
- Monitoring Committee of Ambepussa Farm
- The National Committee of Crop Development – Floriculture
- The Committee on Commenting on the Report of the Secretary G./UNCTAD to the UNCTAD XII - Ministry of Export Development and International Trade, Dept. of Commerce Consultative Group
- The Interview Board of Annual Transfers of SLAgs Service
- The Interview Board of Annual Transfers of AII / RAA
- The Action Committee of the operation to encourage domestic food production programme "Api Wawamu Rata Nagamu"
- The Interview Board for Scholarship Programme – 2007 / 2008 Egyptian International Centre for Agriculture – Vegetable Production 15 – 30 April 2008, appointed on 11.10.2007

Mr. J.A.T.P.Gunawardena has acted also as a member/head/co-coordinator in following committees

- Co-coordinator of Formulation of Committees for Crop Development, appointed by the Director General of Agriculture
- Head of the partner Institutions of Crop Wild Relatives Conservation Project, appointed by the Director General of Agriculture
- Member of the National Committee on Socio Economics and Policy Analysis on behalf of the Department of Agriculture
- Member of the First disbursement of a development Tariff for Dendro Power Project and appointment of an Inter-ministerial Task Force of Dendro Energy Concept

Other Senior Staff of SEPC participated in following committees.

- Member of the Trade Facilitation Co-group WTO, Perera.T.H.C.S.
- Representative of SEPC in the Development of NARP (2008-2010) of CARP. Perera T.H.C.S.
- Member of the committee to prepare curriculum for recruitment, promotion and efficiency bar examination of Programme Assistant/Audio Visual

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Assistants/Media Assistants/legal Assistants/Agric. Monitoring Officers appointed by the Director General of Agriculture, Arunapriya S.A.

- Member of the committee to prepare curriculum for recruitment, promotion and efficiency bar examinations of Economist Assistants, appointed by the Director General of Agriculture, Arunapriya S.A.
- Members of the Crop Development Committees (National Domestic Food Production Drive) Gunawardena. J.A.T.P., Perera. T.H.C.S., Arunapriya A., Rafeek., M.I.M. Herath, R.M. & Karunagoda, K.S.
- Member, Technical Committee, Sri Lanka's Food Insecurity and Vulnerability Information System, K.S. Karunagoda.
- Member of the Sri Lankan delegation representing department of Agriculture at the "9th session of Sri Lanka – Pakistan Joint Economic Commission appointed by the director General of Agriculture, Arunapriya S.A.
- Overall Coordinator of Working Group of the DOA. Herath, RM.
- Member of Rice Knowledge Bank. Herath, R.M.

Crop Forecasting Programme

The production forecast of rice in 2007/08 *Maha* season is 2.13 million mt. This forecast is 0.16 million mt or 8% higher than the actual production of 1.97 million mt reported for 2006/07*Maha*.The projected production was sufficient for meeting the national requirement for seven months at the reported PCC of 8.85 kg/month. Despite the relatively high production forecast, a price drop was not anticipated due to domestic market forces generated by high prices prevailed for important cereals in world market. This situation could have expanded the demand for locally produced rice since high prices of rice in the world market might have obviously restricted imports. Further, the high price of imported maize would have induced usage of rice for animal feed thus reducing available supply of rice for consumption. The combination of these forces might have prevented reduction of rice price due to enhanced production within the country.

AGRICULTURAL INFORMATION AND DATABASE MANAGEMENT

Computerized Database

The SEPC collected statistics and information on crops, selected data on extent and production from Department of Census and Statistics, imports and exports data from Department of Customs and data on prices from HARTI, and updated for all major crops.

AgStat –2007

The booklet on Agricultural statistics comprising the salient facts of information on food crop sector was compiled and published in June 2007. AgStat 2007 – Vol. IV contained numerous information such as socio-economic data, land use types, extent and production, import and export, per capita availability, whole sale and retail prices etc. The statistical information provided here is widely used by the researchers, policy planners, students, academics, administrators, farmers and entrepreneurs.

Publications

- Cost of cultivation of agricultural crops *maha* 2005/2006. Socio Economics and Planning Centre, Department of Agriculture, Peradeniya.
- Cost of cultivation of agricultural crops yala 2006 Socio Economics and Planning Centre, Department of Agriculture, Peradeniya.

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- "Ag Stat" 2007 Vol. IV. A pocket book on agricultural statistics Socio-Economics and Planning Centre, Department of Agriculture, Peradeniya.

Seminar Presentations

- K.S. Karunagoda: Strengthening of Indo-Sri Lanka Agricultural Cooperation, 2007-05-14 -2007.05.17, Ministry of Agriculture, New Delhi, India.

Participation of Seminars, Workshops and Training Programmes

- Gunawardena, J.A.T.P. International Agricultural Co-operation Officials Seminar of South-South Co-operation Project. 11th to 20th September, 2007, in China.
- Gunawardena, J.A.T.P. The Regional Meeting on Towards a Joint Regional Agenda for the Alleviation of Poverty through Agriculture and Secondary Crop Development. 21-22nd November, 2007. in Thailand.
- Perera, T.H.C.S. Socio Economic Research Priorities. 25th May 2007 at CARP Colombo
- Perera, T.H.C.S. Productivity Improvement and Technological Needs for Agriculture Development-JICA. 4th 2007, at ISTI, Gannoruwa.
- Perera, T.H.C.S. Future of Rice Production in Sri Lanka 28th February 2007 at-SLAS Colombo.
- Perera, T.H.C.S. and Herath, R.M. International Trade Law Conference. 31st July to 1st August 2007 in Colombo.
- Perera, T.H.C.S. Training on Integrated Rural Development Egyptian International Centre for Agriculture (EICA) 01.10.2007-15.12.2007 in Egypt.
- Karunagoda, K. Plant Intellectual Property Rights Program, Michigan State University, USA, 15-07-2007 to 27-07-2007.
- Karunagoda, K. Plant Variety Protection Program, 21st August - 10th Nov. 2007, Tsukuba, Japan.
- Rajapaksha, D. Workshop on Repairing Science and Presentation Skills, Young Scientists Forum (YSF), PGIA, Peradeniya. 26th July 2007.
- Rajapaksha, D. A training course on The Assessment of Doha Outcome : A Development Perspective on the Global Agricultural Trade Regime in Sri Lanka International Policy Analysis Network (JAPAN), PGIA, Peradeniya 5th -16th November 2007 and 10th -20th December 2007.
- Chandrasiri, C. Training on Certificate in Project Management from July 30th to August 10th held at SLIDA.
- Chandrasiri, C. Training on Certificate in Environmental Impact Assessment and Social Impact Assessment from September 03rd to 14th at SLIDA.

Workshops/Training Programmes Conducted

- Practical Training on Research Prioritization 4th February, 2007 at ISTI, Gannoruwa.
- Training Programme on Practical Training on Research Prioritization 5th March 2007 at ISTI, Gannoruwa.
- Workshop on survey methodology for technical officers of the Department of Agriculture 23rd May, 2007 at ISTI, Gannoruwa.
- Seminar on Current issues on Sri Lankan Economy 23rd September, 2007 at ISTI, Gannoruwa.
- Productivity Improvement and Technological Needs for Agriculture Development –JIICA 04th April, at ISTI, Gannoruwa.

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- Training on Preparation of Project proposals for Youth Services Council Officers 4th October, 2007 at ISTI/ Gannoruwa.
- Training on Formulation of Small Enterprise Development project proposals for Uva Province Extension Officers 23rd August, 2007 at ISTI Gannoruwa.
- Agricultural Marketing and Marketing channels in Sri Lanka, for Ext. Officers in Monaragala I/P area. 01st October, 2007 at ISTI, Gannoruwa.
- Preparation of Agricultural project proposals for Banking officers of the HNB. 12th September, 2007 at ISTI, Gannoruwa
- The SEPC organized an exhibition stall at the Economic Week exhibition of University of Kelaniya during 27th Nov. to 29th Nov. 2007 under the theme of the National Food Production Campaign 2007 – 2010, "Api Wawamu Rata Nagamu" representing the Ministry of Agriculture & Agrarian services.

Infrastructure facilities development at SEPC

- Following items were purchased:
  - i. Computers - 03
  - ii. Flash drive (Pen drive) - 10
  - iii. Fax machine -01
  - iv. File Rack – 01
  - v. Ceiling fan – 01
  - vi. Mattress - 01

Staff Meetings

- By weekly staff meetings were held for technical and administration staff of the SEPC

PLAN FOR 2008

Socio - Economic Research

- Cost of Cultivation study for major food crops (Maha 2007/2008)
- Cost of cultivation study for major food crops (Yala 2008)
- Socio- economic impact of farm women service of the DOA
- Evaluation of sweet orange development programme in Moneragala district-2008 programme
- Study the impact of Granary Area programme in Anuradhapura, Hamabantota and Polonnaruwa districts
- Evaluation of TV and Radio programmes of DOA
- Evaluation of socio economic impact of pesticide use in Agriculture in Sri Lanka – ASDA-2008
- Varietal performance study on papaya
- Maize farming study in Mahaweli River basin area
- Study on fertilizer demand for paddy cultivation in Sri Lanka
- Study on consumer preference toward organic products
- Technological assessment in paddy farming
- Economic evaluation of Hybrid rice cultivation
- Food insecurity and vulnerability; An economic analysis
- An economic evaluation of the public project investment on potato cultivation
- An economic evaluation of risks in maize cultivation
- An economic appraisal of organic farming activities
- Socio economic impact of the use of local true seed vs imported true seed in big onion cultivation in Dambulla area

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- Identification of the farmers' expectations on new grain legumes and groundnut varieties
- Review of technological change in paddy cultivation over last 25 years
- Evaluation of the changes of technical, allocative and economic efficiency in paddy sector in Sri Lanka
- Effect of labour movements in agriculture on poverty – ASDA-2008
- Credit access by agriculture based industries and their performance

Production and Marketing

- Market research in fruits and vegetables in Sri Lanka
- Study the market share of Green cob vs dry cob of maize cultivation in Mahaweli 'H' area
- Changing methods of payments is improving contract OFC seed production programme
- Study the marketing issues and its influence on consumer prices of up country vegetables in Sri Lanka
- Temporal price and market integration analysis for rice market in Sri Lanka
- Demand for Sri Lankan fruits in export markets. A time series analysis

Agricultural Policy Analysis

- Comparative advantage of growing hybrid maize
- Welfare implications of trade policy on potato
- Comparative advantage of paddy production in Sri Lanka
- Impact of structural changes in farm income in Sri Lanka
- Impediments for non-traditional agricultural exports
- Assessment of Doha Outcome on Agriculture sector in Sri Lanka
- Economic of plant variety production in Sri Lanka
- Impact of trade liberalization on rice sector
- Impact of trade liberalization on export demand in Sri Lanka – ASDA-2008

Environmental Studies

- Study on water pollution due to agricultural activities
- Environmental efficiency of potato cultivation

Collection, Analysis and Publication of Agricultural Information

- Collection and management of agric. Information
- Publishing Ag. Stat-2007
- Collection and conservation of previous data and information
- Crop forecasting – maha 2007/08
- Crop forecasting – yala 2008
- Crop Enterprise budgets
- SEPC Annual Report-2007
- Preparing monthly progress reports (2007 Yala and 2007/2008 Maha)

Human Resources Development

- Computer training for technical officers of the SEPC
- Computer training for administrative staff of the SEPC
- Domestic food production campaign awareness programme

Project Handling and Planning

- Preparation, planning and co-ordination of agricultural research and development projects
- Preparation of research and development planning documents
- Evaluation of MoUs signed by the Sri Lankan government with other countries
- Development and strengthening Sammanthurai ARS – project proposal
- Development of project proposal for CAPSA crops

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3.3.1 PROGRESS MONITORING AND EVALUATION UNIT (PMEU) - PERADENIYA

The PMEU is responsible for monitoring and evaluation of activities and programmes of the different Institutes, Centres and Units of the DOA and preparing relevant reports for the Ministry of Agricultural Development and Agrarian Services. The PMEU also plays an important role in streamlining the functions of the DOA through a process of performance appraisal. Monthly progress review meetings are also convened for effective utilization of funds allocated to different units.

BUDGET

Allocations received and expenditure incurred under different votes for the year 2007 is given in table 3.3.1.1.

Table 3.3.1.1: Annual budget – 2007 (Rs.)

Vote	Allocation	Expenditure
Capital	910,350	385,241
Recurrent	1,305,000	965,685
Projects		
Crop Zoning	500,000	83,950

PROGRESS

Progress monitoring of Capital and Recurrent expenditure

Monitoring of the physical and financial progress of capital work and recurrent expenditure was continued during 2007.

Progress Monitoring of Special Projects

Progress of the following special projects was monitored during the year.

Special Projects under DOA Votes

- Construction of Administration building
- Construction of Horana laboratory and building
- Infrastructure development of Fruit Crop Research & Development Centre, Horana
- Strengthening research capacity of Crop Research & Development Centre, Horana
- Strengthening research capacity of Rice Research & Development Institute
- Hybrid seed production programme
- Uplifting orange cultivation in Moneragala District
- Training and capacity building
- Land improvement of Schools of Agriculture
- Organic product export development programme
- Media programme
- Strengthening crop production and training facilities at Horticultural Training & Development Institute, Bibile
- National seed production programme
- Sri Lanka – United States Development Agency germplasm development programme

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Special Projects under Ministry Votes

- Granary area programme
- Strengthening small farmer entrepreneur groups under 'Kethata aruna' programme through 'Gama neguma' concept.
- Lak kantha saviya
- District agricultural coordination programme
- Establishment of Agricultural Resource Centres at government schools
- Home gardening programme at Hambantota
- Enhancement of national bee honey production
- Productivity enhancement of selected other field crops (Maize, Kurakkan, Green gram, Soy bean, Onion)
- Promotion of organic farming and integrated plant nutrition
- Implementation of soil conservation act
- Enhancement of fruit productivity through micro irrigation
- Solar powered drip irrigation project
- Rain water harvesting programme
- Krushi seva piyasa
- Agricultural Entrepreneurship Development & Information Service (AgEDIS) development programme
- Agro Park – Gannoruwa (One stop shop)
- Establishment of provincial market complex at Galle
- Crop forecasting programme
- Bata-atha agro technical park
- Jathika saviya
- Farm Broadcasting Service
- Home garden development at Anuradhapura
- National organic standards and certification programme
- Crop zoning programme
- Sales outlet for farm women organizations
- Delay of plant viruses using simple virus control techniques

Monitoring Studies

Crop Zoning Programme

- Monitoring activities under crop zoning programme were continued for the year 2007.

Achievements of DOA

- Achievements of DOA in the year 2007 were compiled and submitted to the Ministry of Agricultural Development and Agrarian Services for inclusion in the progress report for the parliamentary budget speech and for the annual report of the Central Bank.

Administration Report

- Administration report of the DOA for the year 2006 was prepared in Sinhala, Tamil and English languages and distributed to all relevant Ministries, Universities, libraries and other relevant institutions.

Monitoring and Updating of Physical Resources Database

- Data on physical resources such as land, buildings, vehicles and equipment of the different Institutes, Centres and Units of the DOA for the year 2007 were compiled.

Participation of PMEU Staff in Training Programmes

- Sajeevani, G.R.L.D. 'Training on financial Management' held at In-service Training Institute, Gannoruwa, Sri Lanka.
- Sooriyaarachchi, A.T. ' Database application using MS Access' held during 10.09.2007 – 18.09.2007 at Sri Lanka Institute of Development Administration, Colombo, Sri Lanka.

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- Sooriyaarachchi, A.T. 'Certificate in Project Management' held during 30.07.2007 – 10.08.2007 at Sri Lanka Institute of Development Administration, Colombo, Sri Lanka.
- Sooriyaarachchi, A.T. 'Computer hardware training' held during 23.07.2008 – 24.07.2007 at Audio Visual Centre, DOA, Gannoruwa, Sri Lanka.
- Warnakulasooriya, H.U. 'International Trade Law Conference – 2007' on the theme "The Doha Development Agenda and the future of the Multilateral Trading System" held during 30th July – 1st August 2007, Colombo, Sri Lanka.
- Warnakulasooriya, H.U. WTO/ UNESCAP Regional Seminar on Agricultural negotiations for Asia-Pacific Economics held during 28th – 29th November 2007, Bangkok, Thailand.
- Sajeevani, G.R.L.D., Sooriyaarachchi, A.T. 'Workshop on Survey Methodology for Technical Officers of the Department of Agriculture' on 23rd May 2007 at In-service Training Institute, Gannoruwa, Sri Lanka.
- Sajeevani, G.R.L.D., Sooriyaarachchi, A.T. and Warnakulasooriya, H.U. ' Use of Statistical Techniques for Scientific Research' held on 10.10.2007 at the Sri Lanka Foundation Institute, Colombo, Sri Lanka.

Participation in Committees

- Members of the Crop Development Committees (National Domestic Food Production Drive). H.U. Warnakulasooriya, AE and A.T. Sooriyaarachchi, AE.
- Member of the Potato Crop Development Committee, H.U. Warnakulasooriya, AE.
- Member of the 'Committee on Commenting on the Report of the Secretary G./ UNCTAD to the UNCTAD XII – Ministry of Export Development and International Trade, Dept. of Commerce Consultative Group', H.U. Warnakulasooriya, AE.
- Member of the 'Committee to review the Draft Act on the Plant Variety Protection', D.T. de S.L. Bogahawatta, Senior Deputy Director.
- Coordinator of activities implemented by the DOA under Memoranda of Understanding signed with foreign countries and others, D.T. de S.L. Bogahawatta, Senior Deputy Director.

PLAN FOR 2008

- Prepare monitoring plans for DOA programmes
- Monitor the progress of Capital and Recurrent work and special projects
- Conduct monthly physical and financial progress review meetings
- Provide information for the Central Bank report and the budget speech.
- Prepare and distribute the DOA administration report for the year 2007
- Monitoring and evaluation of important programmes such as '*Api wawamu, Rata nagamu*'

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3.4 EXTENSION AND TRAINING CENTRE (ETC) - PERADENIYA

The goal of the Extension & Training Division is to achieve highest level of productivity in the food crops sector to ensure food security of the country as well as improve living standards of the farming community. Achievements of the division are listed on four main areas: extension, training, communication and, agricultural education & examination. Following activities were conducted during the year 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 Fertilizer Unit.
- Conduct agriculture enterprise development and OFC development programs and women's Agricultural Extension work.
- Training and development activities at Bibile Horticultural Crops Training & Development Institute.
- Conduct training programs for Agriculture Research and Production Assistants at Wariyapola, Anuradhapura, and Labuduwa Schools of Agriculture and Horticultural Crops Training & Development Center, Bibile.
- Planning & Monitoring.

BUDGET

Table 3.4.1: Annual budget – 2007 (Rs.)

Vote	Allocation in million	Expenditure in million
Capital	26.662	16.746
Recurrent	97.25	89.217
Special Capital Projects		
1. Training and capacity building	10.404	9.397
2. Improvement of citrus cultivation in Bibile and Moneragala	5.5	3.74
3. Agricultural Training Farms	6.936	6.098
4. Organic product export development programme	14.3	10.48

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5.	Media Programme	12.505	11.918
6.	Strengthening crop production and training facilities at HTDI Bibile	7.3	4.82
7.	Strengthening small farmer entrepreneur groups through *Gama Neguma* Program	12	6.434
8.	*Lak kantha Saviya* Project	7	4.06
9.	District/Provincial agricultural coordination	4	3.253
10.	Establishment of Agriculture. Resource Centers at govt. schools	2	1.3
11.	Enhancement of bee honey production in Sri Lanka	2	1.9
12	Productivity enhancement program of selected OFC (maize, green gram, *kurakkan*, soy bean, onions)	10	6.817
13	Establishment of micro irrigation systems program implemented by Department of Agriculture	4.5	4.48
14	Program for establishment of solar power drip irrigation systems	2	1.54
15	Establishment of regional Agro Enterprise Development & Information Units	2	0.929
16	Establishment of Agricultural Supply Points known as "*Krushi Seva Piyasa*" at private level	1	0.198
17	Establishment of provincial market centers to promote local food	2	2.241
18	Techno Park, Gannoruwa	3	2.742
19	Granary Area Program	11.5	11.355
20	*Jathika Saviya* Program	3.5	1.68
21	Integrated home garden development program at IP Hambantota	1	0.823
22	Agro Park, Bata atha	5	4.866
23	Organic certification and standards	2	1.33
24	Improvement of training facilities of Agricultural Marketing Complex at Labuduwa SOA	4	2.191
Total		**259.357**	**210.555**

PROGRESS

PROJECTS

Training and Capacity Building

Four sub projects were conducted under this project.

- **One Year Training for Agricultural Research & Production Assistants**

Objective

To train 440 Agricultural Research & Production Assistants (ARPA) in Agriculture for one year.

Progress:

One year training was given for 246 under this project. .

- **Training & Capacity Building at New Schools of Agriculture**

Objectives

To train additional 50 skilled agriculture diploma students; to increase utilization of appropriate technology for competency based training of agriculture diploma students.

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Progress:

Re-started Karapincha School of Agriculture and training facilities at school of agriculture Anuradhapura were improved.

- **Technology Park Gannoruwa**

Objectives

To disseminate agricultural information and knowledge and develop skills through live demonstrations, digital information and communication technology, extension, training and education strategies while establishing an economically viable and self-sustaining agricultural information center.

Progress:

Agro-Technology Park at Gannoruwa maintained under this project attracted 204,892 visitors (students, farmers and general public) during the year.

- **Improvement of Capacity and Facilities at ISTI and FMTC**

Objective:

To improve capacity and facilities of training centers.

Progress:

Facilities pertaining to lecture halls, physical environment for practical work, accommodation and technology transfer at training centers were improved.

Improvement of Citrus Cultivation in Bibile and Moneragala

Objectives:

To improve living condition of small scale farmers (Less than 0.5 ac) in Moneragala District by providing them with additional income through orange cultivation; to revive Bibile Orange cultivation in Moneragala District.

Progress:

Established new orange plantations in 106.6 acres during the year; about 21,323 orange plants were distributed among farmers at a subsidized price of Rs. 30/= per plant. Conducted a survey for the evaluation of the project.

Agricultural Training Farms

Objectives:

To enhance learning experience and the usage of appropriate technology by the students; to provide a better learning environment with improved training facilities; to enhance learning experience through application of appropriate technology; to develop a productive demonstration farm.

Progress:

At SOA Angunakolapelessa: renovated the poly-tunnel and net-house, purchased items for irrigation system, developed the road system and purchased inputs for the school farm; developed roads at SOA Kundasale; repaired irrigation channels at SOA Pelwehera; erected a fence around the land at SOA Vavuniya; developed infra structure, established a garden of medicinal herbs and cultivated fruit crops at SOA Karapincha; established fruit crops at SOA Anuradhapura; established a micro irrigation system; developed the nursery; installed display boards at SOA Labuduwa; installed a water management system; erected a permanent trellis at Wariyapola; improved land at Bedde Farm and other Training centers.

Organic Product Export Development Programme

Objective:

To introduce sustainable agricultural systems; promote production of organically certified fruits, vegetables and rice; research on organic farming; promote production of inputs required in organic farming.

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Progress:

Conducted 12 organic research trials at 6 research centers; while maintaining 104 organic villages (established in year 2006), 25 new villages were established; work initiated to produce organic seeds at RRDI, Bombuwala.

Media Programme

Objective:

To create awareness among farmers and general public on new agricultural technology and promote agricultural development programs.

Progress:

Produced, edited and telecasted 220 TV programs and broadcasted 1725 of radio programs; conducted 15 agricultural exhibitions /stalls; edited (2), printed (12) and distributed (625) different technical publications.

Strengthening Crop Production and Training Facilities at HTDI Bibile

Objectives:

To optimize utilization of 12 acres of land; establish crops for continuous production; strengthen and upgrade training facilities.

Progress

Upgraded training facilities; established cash crops in 12ac; maintained existing crops in 52.5ac; developed farm structures.

Strengthening of Small Farmer Entrepreneur Groups through *Gama Neguma* Program

Objective:

To up-lift living standard of identified small farmer groups through empowering and raising them to commercial level of farming.

Progress:

Planned and implemented projects in 886 selected villages to solve identified problems.

Lak kantha Saviya Project

Objectives:

To improve the standard of living of the farm families and community through enhanced contribution of women to increase agricultural production; marketing of value added products of women entrepreneurs.

Progress:

Promoted 289 entrepreneurship organizations representing 6272 members, of which 768 became successful entrepreneurs; also promoted 4174 of nutritional home gardens.

District/Provincial Agricultural Coordination

Objectives:

To enhance co-ordination between agencies of central government and provincial councils; facilitate flow of technological know-how to farming community; strengthen training institutes to improve quality of training.

Progress:

Provided toll free advice through "*Govi Sahana Sarana Sevaya*"; established 9 cyber units in 8 agricultural training institutes of the central government and provincial councils; conducted special training programs for staff officers of the provincial councils.

Establishment of Agriculture Resource Centers at Public Schools

Objectives:

To encourage the school leavers to start economically viable agricultural projects; to utilize the primary school system of the country

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as agricultural information centers to facilitate flow of information on new agricultural technology to the society.

Progress:

Established agricultural resource centers in 97 selected schools; provided agricultural information to these centers with interactive multimedia CDs and DOA publications; conducted training programs for 87 teachers; produced 2 video programs.

Enhancement of Bee Honey Production in Sri Lanka

Objectives

To improve the training facilities of bee honey development institutes; improve the knowledge and skills of officers and farmers on bee keeping; increase the production of apiculture equipment needed for beekeeping and honey production; establish bee honey producing villages.

Progress:

Established 13 bee honey producing villages; trained 240 of farmers on bee keeping; also conducted special training for 85 officers and bee keepers.

Productivity Enhancement Program of Selected OFC (maize, green gram, *kurakkan*, soy bean, onions) Crops

Objective:

To enhance productivity of maize, *kurakkan*, green gram, soy bean, onions.

Progress:

Established 30 productivity societies of farmers on OFC cultivation.

Establishment of Micro Irrigation Systems under the Program Implemented by Department of Agriculture

Objective:

To increase productivity of fruit & vegetables by introducing micro irrigation technology; assure stability of production by establishing commercial farms; improve post-harvest technology.

Progress:

Established 58 micro irrigation systems; distributed 2720 high yielding guava plants among farmers.

Program for Establishment of Solar Power Drip Irrigation Systems

Objectives:

To increase production and productivity in fruit and vegetable cultivation.

Progress:

Maintained 8 demonstrations on micro irrigation systems in 4 agricultural training centers; conducted 31 training programs for officers and farmers; printed 3000 copies of a manual on micro irrigation.

Establishment of Regional Agro Enterprise Development & Information Units

Objectives:

To enhance the productivity of under utilized agricultural properties by introducing appropriate agricultural projects or by amending current practices; generate new employment opportunities by creating and promoting agricultural enterprises.

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Progress:

Established 6 Agro Enterprise Development Units in 6 inter-provincial areas; provided office equipment for those units.

Establishment of Agricultural Supply Points "*Krushi Seva Piyasa*" as Private Enterprises

Objectives:

To establish 30 village based agriculture business centers (*Krushi seva piyasa*) managed by qualified entrepreneurs to provide a broad, reliable and convenient service to the clients; improve rural infrastructure and enhance private sector participation in agricultural development.

Progress:

Selected 30 potential entrepreneurs to function the proposed units.

Establishment of Provincial Market Centers to Promote Local Food

Objectives:

To popularize consumption of traditional food and establish a sustainable market for products of farm women.

Progress:

Established 7 sales outlets at district level for local food items produced by women.

Granary Area Program(GAP)

Introduction:

Granary Area Program was commenced during 2003/ 2004 Maha as a pilot project in the districts of Polonnaruwa, Ampara, Hasalaka. Since then it was extended to other major irrigation schemes of inter-provincial areas in Ampara, Anuradhapura, Polonnaruwa, Hambantota, Hasalaka, Moneragala, and provincial areas of Hambantota, Ratnapura, Kurunegala, Puttalam, Batticaloa, Trincomalee, and Mannar. The other institutes involved in the programme are Rice research institute, Food research unit, Socio Economic and Planning Center, Plant Protection Service, Audio-Visual center, Department of Census and Statistics.

The total expenditure during year 2007 is Rs.11.35 million out of the allocated sum of Rs12.1 million and the value of the increased production is expected to be about Rs.1814 million in addition to indirect social benefits.

Objective:

The main objective of the GAP was to improve the production, productivity and quality of rice and increase the rice consumption through implementation of planned extension activities such as rice production yaya program, organic manure application promotion campaigns, and setting up of cyber extension units.

- **Rice Production Yaya Program**

Objective:

To organize farmers as a group to raise their working capacity, to collectively focus towards achieving higher productivity and to facilitate implementation of technical activities, such as promotion of organic manure application, crop production campaigns, training classes, charcoal kunthani demonstrations and promotion of cow dung collection etc.

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Table 3.4.2: Extent and the Coverage of rice production yaya program

Unit	No. of Yaya	No. of Farmers	Extent (ha)
Anuradhapura	300	3789	3936
Ampara	1358	46316	29267
Batticoloa	50	925	1250
Hasalaka	205	6575	5392
Hambantota (IP)	612	18619	17427.7
Hambantota (P)	18	280	180
Kurunegala	95	6838	2626
Mannar	91	2710	2360
Monaragala	114	1408	562.2
Pollonnaruwa	1032	22936	25313
Puttalam	28	309	310
Trincomalee	105	2625	2100
Total	**4008**	**113330**	**90723.9**

Table 3.4.3: *Saruketha yaya* (Revolving Fund) Program

	Year 2007
No. of new yaya	150
Farmers	1000
Continuation of existing yaya	473
Farmers	12120
Extent (ha)	7861.2

• Promotion of Organic Fertlizer

Progress:

Applied organic manure in an extent of 115,000ha; conducted campaigns and 1200 training classes; introduced 750 Kunthani Burners to produce charcoal; established 825 cow dung collecting pavements and provided three bags of cement to identified farmers to build cement floors for cow dung collection.

Table 3.4.4: Details on promotion of organic manure

Unit	No. of Burners	No. of Pavements
Anuradhapura	160	0
Ampara	334	592
Batticoloa	12	18
Hasalaka	78	76
Hambantota (IP)	34	13
Hambantota (P)	15	0
Kurunegala	0	0
Mannar	54	4
Monaragala	16	4
Polonnaruwa	24	111
Puttalam	07	0
Trincomalee	16	10
Total	**750**	**828**

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- **IRRI-DOA Collaborative Program**

The committee appointed to implement the program on the local Rice Knowledge Bank held 6 committee meetings; two senior officers of the DOA followed an Information Technology Course in Bangkok; with the assistance of two IRRI scientists under IRRI -DOA collaboration, conducted a work shop on Cyber Extension and local Rice Knowledge Bank; created a website on Local Rice Knowledge Bank in local languages.

- **Cyber Extension Program**

Established 6 cyber units in Hambantota (IP), (Kalthota & Yodakandiya) in Ampara (Mayadunne), Monaragala (Siyabalanduwa), Anuradhapura (Padaviya) and Puttalam (Palakuda); provided telephone facilities with SLT/ CDMA and e-mail for 08 cyber units; GAP provided funds for 23 cyber units operational in the programme area.

- **Media Program**

Conducted 19 Rupavahini Video programs; purchased materials for 20'x16' display boards, with two being completed.

Table 3.4.5: Details of Farmer Training

	2005/06 *Maha*	2006 *Yala*	Total
No. of Sessions	3616	2349	5965
No. of Participants	49387	40550	89937

Table 3.4.6: Details of Officer Training

	2005/06 *Maha*	2006 *Yala*	Total
No. of Sessions	43	20	63
No. of Participants	1181	779	1960-

- **Rice Quality Improvement Activities:**

Designed equipment in collaboration with FMRC and IPHT for small scale manufacture of quality noodles; developed a rice biscuit; developed a rice pudding; conducted training programs on nutritive aspects of rice and rice based products, and development of new rice products.

- **Rice Branding Program:**

To enhance quality and marketing of rice the concept of rice-branding was promoted during year 2006.Branded rice varieties include: Bg 300, Bg 352, Bg94-1, Bg 358, Bg 360, At 362. The branding committee appointed to promote this concept had 9 meetings; Conducted 9 training sessions for millers; Held 3 discussions with Central Bank regarding facilitation of credit at 8% of interest to 31 millers; introduced the first branded rice bag to the public by Hon. Agriculture minister Mr. Chamal Rajapaksa on 2007.10.12; "Ceylon Cargills Ltd.", which agreed to promote the branded rice, introduced the branded product to the market on 2007.11.21; This company supplies 50 tons of branded rice of 6 popular varieties per month to consumers through their super market chain.

Evaluation

The evaluation survey on the GAP program was conducted by the Socio Economic and Planning Centre (SEPC). The study was conducted by drawing a sample of eighty farmers in the districts of Polonnaruwa, Hambantota, and Anuradhapura.

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Table 3.4.7: Details on evaluation of the GAP program

Item	Polonaruwa		Anuradhapura		Hambanthota	
	GAP Farmer	Non Farmer	GAP Farmer	Non Farmer	GAP Farmer	Non Farmer
Average Yield (Kg/ha)	5977	5303	5854	4732	6140	5955
Price of produce (Rs/kg)	16.14	15.22	15.8	14.13	14.94	14.84
Gross income (Rs/ha)	96474	80708	92490	66863	91738	88374
Profit including imputed cost (Rs/ha)	38886	22662	34171	7836	31758	29380
Profit excluding imputed cost (Rs/ha)	66908	48589	57911	27804	49800	47278
Unit cost including imputed cost (Rs/kg)	9.63	10.9	9.96	12.47	9.77	9.91
Unit cost excluding imputed cost (Rs/kg	4.99	6.11	5.91	8.25	6.83	6.9

It has been revealed that the unit cost of GAP assisted farmers in all districts was lower than that of the non GAP farmers because of the high yield received by the GAP farmer, which is due to proper agronomic practices applied by GAP assisted farmer.

Jathika Saviya Program

Objective:

To utilize fallow land along the borders of the main road from Habarana to Polonnaruwa.

Progress:

Roadside land (146 acres) from Habarana to Polonnaruwa was carried out, for which seed, planting material and fertilizer were provided.

Integrated Home Garden Development Program in IP Hambantota

Objectives:

To increase food production; improve the productivity of home gardens; improve nutritional standard of farm families; increase income of the farm families.

Progress:

Established 1000 home gardens; conducted 85 training programmes for farmers; also provided 1000 of sprayers, seeds and planting materials for above home gardens.

Agro Park, Bata atha

Introduction:

The park complex has following components viz: Rain water harvesting farm; orchard; floricultural gardens; dry zone home garden; herbal garden; improved *chena*; demonstration on evolution of the paddy cultivation; demonstration on crop wild relatives; banana cultivation; crop museum; irrigation methods; demonstration on seed; resting areas/bathing places; auditorium for video presentations; bee keeping unit; Open-air theatre; sales centre; the information centre.

Objectives:

To facilitate technology transfer to the farmer; demonstrate agricultural technologies; promote agro tourism; distribute seeds, plants, and technical literature; create a

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focal point of technology dissemination; generate employment opportunities.

Progress:

Renovated road system; developed land; landscaped the entire complex; established demonstrations; decorated the entrance with a pandal.

Improvement of Training Facilities at Agricultural Marketing Complex at Labuduwa SOA

Objective:

To provide better quality service to the trainees and clients.

Progress:

Repaired the facilities of the Audio Visual unit, hostel, and mushroom unit; installed an ADSL unit; purchased laboratory equipment & furniture.

EXTENSION ACTIVITIES

Inter-Provincial Area – Ampara 2007 *Yala:*

RICE:

Conducted 248 of *Saruketha Yaya* (maximum yield) demonstrations (3720 ac, 3447 farmers) and 468 of Yaya production programs; promoted application of straw, paddy husk charcoal, balance fertilizer (organic and inorganic); cultivated 1110 ha for certified seed paddy production; 815 of farmers cultivated self seed paddy.

OFC:

Promoted cultivation of chilies, ground nut, maize, vegetables and fruits.

2007/2008 *Maha:*

RICE:

Conducted 278 Saruketha yaya demonstrations (6158 acres, 4500 farmers); promoted rice based income generation activities; farmer productivity societies ;farm women extension activities, and organic farming; cultivated 4215 ha for certified seed paddy production; about 2750 of farmers cultivated self seed paddy; conducted 37 IPM yaya (618 ha, 815 farmers).

OFC:

Promoted cultivation of chilli, maize, ground nut, *kurakkan*, big onion, red onion, and green gram.

FRUITS:

Promoted cultivation of fruits (papaw:15 ha & banana: 4150 ha).

Farmer Training:

Conducted farmer training on rice (1461 for 37675 farmers), on OFC (26 for 1316 farmers) and on fruits and vegetables (20 for 357 farmers).

Field Days:

Conducted 430 field days on paddy, OFC, vegetables, fruits and others.

Inter-Provincial Area - Polonnaruwa 2007 *Yala:*

RICE:

Conducted 531 yaya demonstrations (11911 farmers,13125 ha), 107 *Saruketha Yaya* demonstrations under revolving funds (1176 farmers,1074ha); 330 IPM programs; cultivated 56ha under certified seed paddy production programme.

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OFC:

Promoted cultivation of chilli (16.5ha), maize (91.7 ha), ground nut (50.5 ha), *kurakkan* (32.2 ha), gingelly (46 ha), green gram (56.3 ha), vegetable (105 ha) and fruits (50 ha); established 363 farmer production societies.

Farmer Training:

Conducted 563 training programmes on rice, 12 programmes on OFC, 10 programmes on vegetables and fruits.

Field Days:

Conducted 122 field days on rice, OFC, vegetable and fruit production.

2006/2007 *Maha:*

RICE:

Conducted 531 Yaya demonstrations (11911farmers and 13125ha), 107 *Saruketha Yaya* under revolving funds (1176 farmers and 1074ha), 330 IPM programs; cultivated 56 ha for certified seed paddy production.

OFC:

Promoted cultivation of chilli (41.5 ha), maize (372 ha), ground nut (172.5 ha), *kurakkan* (7.5 ha), green gram (25.5 ha), vegetables (223.5 ha) and fruits (300 ha).

Farmer Training:

Conducted 262 training programmes on rice, 12 programmes on OFC, 03 programmes on vegetables and fruits.

Field Days:

Conducted 122 field days on rice, OFC, vegetable and fruit cultivation.

Inter-Provincial Area, Anuradhapura

2007 *Yala:*

RICE:

Conducted 135 Special yaya rice demonstrations; 34 one acre maximum yield demonstrations; applied straw to an extent of 3820 ha; organic matter to 1520 ha; paddy husk charcoal to 888 ha; produced self seed paddy by 535 farmers; conducted IPM yaya in 30 ha; used tarpaulin by 223 farmers; conducted 179 training programmes on rice cultivation.

Extent:

OFC:

Conducted 1124 training programmes on OFC., vegetable and fruit cultivation; also conducted activities with 17 YFC clubs.

2006/07 *Maha:*

RICE:

Conducted 229 Special yaya rice demonstrations; 21 one acre maximum yield demonstrations; applied straw to an extent of 3189 ha; organic matter to 1256 ha; paddy husk charcoal to 290 ha; produced self seed paddy by 240 farmers; conducted IPM yaya in 32 ha; used tarpaulin by 225 farmers; conducted 177 training programmes on rice cultivation.

OFC:

Conducted 30 training programmes on OFC., vegetable and fruit cultivation; conducted YFC activities with 8 clubs.

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Table 3.4.8: Extents cultivated

Crop	2007 *Yala*		*Maha*	
	Target (ha)	Progress (ha)	Target (ha)	Progress (ha)
Rice	10914	11613	28994	25422
Chilli	110	92	350	370
Maize	520	1340	4000	2961
Cowpea			375	138
Black gram			1025	760
Soya bean	2500	1293		
Big onion	400	371		
Ground nut			125	110
Kurakkan			450	70
Vegetables	600	1188	2000	1102
Banana	8	22	150	164
Papaw	8	12	20	49
Mango			40	16

Inter-Provincial Area, Hambantota

2007 *Yala:*

RICE:

Conducted 300 yaya demonstrations (10472farmers , 9588.6ha), 22 Saruketha Yaya with revolving funds (330 farmers, 440ha); 22 IPM yaya(29.3ha) for certified seed paddy production; produced self seed paddy with 2000 farmers;

OFC:

Conducted demonstrations 5 in maize, 2 in gingelly; cultivated chilli in 81.1ha , maize in 10.5 ha, ground nut in 7.25 ha , vegetables in 616.92 ha , and fruits; banana in1946.65 ha and papaw in 102.8 ha.

Farmer Production Societies

Established 40 soceties.

Farmer Training:

Conducted 324 programmes on rice, 57 on OFC, 163 on fruit and vegetables.

Field Days:

Conducted 91 field days on rice, OFC, vegetables, fruits and others.

2006/2007 *Maha:*

RICE:

Conducted 231 yaya demonstrations (9024farmers,12134.8 ha), 56 *Saruketha Yaya* with revolving funds (1052 farmers,1115.6 ha); 474 IPM yaya(34 ha) for certified seed paddy production; produced self seed paddy with 2000 farmers;

OFC:

Conducted demonstrations 10 in chilli, 13 in maize. Cultivated chilli in 95 ha, maize in 218 ha , ground nut in 93 ha, *kurakkan* in 66 ha, green gram in 459 ha, vegetables in 403 ha , papaw 65 ha and banana in 1174 ha.

Training Programmes:

Conducted 221of training programmes on rice, 45 on OFC, and 54 on vegetables.

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Field Days:

Conducted 10 field days on rice, OFC, vegetables, fruits and others.

Inter-Provincial Area - Kandy

Major irrigation schemes of Minipe, Sorabora, Dambarawa, Mapakadawewa, Nagadeepa, Badulu Oya and Bathmedalla in Kandy, Matale and Badulla Districts are included in Kandy Inter Provincial Area. The total extent under above schemes is approximately 11304 ha.

2007 *Yala:*

RICE:

Conducted 97 yaya demonstrations (3283 farmers ,2785 ha), 16 1 ac maximum yield demonstrations; 4 variety adaptability trials; cultivated 109 farms(69.5ha) for certified seed paddy production.

OFC:

Cultivated chilli in 20 ha, maize in 1926 ha, green gram in 115 ha, ground nut in 4 ha, *kurakkan* in 2.5 ha.

2006/07 *Maha*

RICE:

Conducted 289 yaya demonstrations (9272 farmers,7626 ha), 52 one ac maximum yield demonstrations; 10 variety adaptability trials; cultivated 118 farms(6ha) for certified seed paddy production.

OFC:

Cultivated chilli in 11 ha, maize in 166 ha, green gram in 11 ha.

Farmer Training:

Conducted 105 programmes on rice, 39 on OFC, 2 on fruit and vegetables.

Field Days:

Conducted 12 field days on rice, OFC, vegetables, fruits and others.

Inter-Provincial Area, Moneragala

Agricultural activities in Kumbukkan Oya Amuna, Muthukandiya, Handapanagala, Ethimale Wewa and Kotiyagala Wewa projects are implemented by Moneragala Inter Provincial unit.

2006/07 *Maha*

RICE:

Conducted 300 yaya demonstrations (10472 farmers, 9588 ha); 22 Sruketha Yaya (330 farmers, 440 ha) with revolving funds; cultivated 18 yaya under IPM program for certified seed production (24.3 ha); self seed produced with 1987 farmers.

OFC:

Cultivated chilli in 67 ha, maize in 10 ha, vegetales in 621 ha; banana in 1807.5 ha and papaw in and 82.8 ha.

Farmer Production Societies:

Established 38 societies.

Training Programmes:

Conducted 401 of training programmes on rice, 36 on OFC, 171 on vegetables and fruits.

Field Days:

Conducted 87 field days on rice, OFC, vegetables, fruits and others.

2007 *Yala* Progress

RICE:

Conducted 86 yaya demonstrations (1520 farmers, 1328 ha); 54 Sruketha Yaya

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(650 farmers, 281 ha) with revolving funds; cultivated 8 yaya under IPM for certified seed production (14.3ha); 400 farmers produced self seed paddy.

OFC:

Cultivated chilli in 26 ha, maize in 60 ha, ground nut in 12 ha, vegetables in 97 ha; banana in 555 ha and papaw in 17 ha.

Farmer Production Societies:

Established 72 societies.

Training Programmes:

Conducted 181 of training programmes on rice, 17 on OFC, 24 on vegetables and fruits.

Demonstrations:

Conducted 7 on maize.

Field Days:

Conducted 35 field days on rice, OFC, vegetables, fruits and others.

IN-SERVICE TRAINING INSTITUTE, GANNORUWA

This is the main agricultural training institute at national level, which is responsible for improving knowledge, skills and attitudes of agricultural officers, entrepreneurs, farmers and other trainees interested in agriculture.

A total of 196 training programmes conducted in year 2007 (12662 man days), of which 94 were for officers (8744 man days), 34 for farmers (1665 man days); also conducted 68 field training programmes (2253 man days); held 96 work shops, seminars, meetings, discussions (7146 man days), and 2 outdoor training activities (42 man days).

IN-SERVICE TRAINING INSTITUTE, ANGUNAKOLAPELESSA

This Institute offers in-service training for officers in agriculture sector and farmers in Galle, Matara, Hambantota Provincial Districts and Hambantota Inter Provincial area. During the year, a total of 74 training programmes were conducted (4537 man days) which included 59 for officers (3982 man days) and 15 for farmers (555 man days); also 4 work shops, seminars, meetings, discussions (228 man days), 11 field training programmes (388 man days) and 04 outdoor training classes (214 man days) were conducted.

IN-SERVICE TRAINING INSTITUTE, HANSAYAPALAMA, ARALAGANWILA

This Institute offers services especially for farmers and officers of Mahaweli B, C. and G Zones, Ampara, Polonnaruwa, Mahiyangana and Batticaloa areas. In the year 2007, 12 programmes for officers (302 man days), 05 programmes for school students (153 man days), and 03 programs for other organizations (67 man days) and 47 outdoor training programmes for farmers (1585 man days) were conducted.

FARM MECHANIZATION TRAINING CENTRE

Farm Mechanization Training Center (FMTC) located in Anuradhapura is the sole national level training institute for providing training on farm machinery. The FMTC grants its support to the field extension staff in carrying out extension activities related to farm mechanization. Apart from that, FMTC provides advisory service on farm mechanization to needy institutions.

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The major activity of the FMTC is providing training on operation and maintenance of tractors, water pumps, plant protection equipment, paddy reapers, paddy threshers, paddy combine harvesters and hand implements. In addition to above, the FMTC also provides training on micro irrigation technology. Generally, the service of the FMTC is provided to farmers, officers in the agricultural sector, university undergraduates of faculties of agriculture, students of the schools of agriculture, technical colleges and general schools, private sector personnel involved in farm mechanization etc. During the year 2007, the FMTC conducted 24 training programmes (1140 man days) for officers, 16 programmes (1000 man days) for farmers, 31 field training programmes (3041man days) and 01 outdoor training programme (80 man days) for farmers.

DISTRICT AGRICULTURAL TRAINING CENTRE, WEERAWILA

During the year the DTC conducted 25 training programmes. Subjects covered under these programmes were mushroom cultivation, floriculture, pest and disease control in vegetable cultivation, home gardening, betel cultivation, fruit cultivation, vegetable cultivation, nursery management, budding and grafting, compost production, introducing "*Kiri ala*" as an alternate cash crop, utilization of banana leaves as a food packaging material, food preservation techniques, and paddy cultivation. The facilities of the cyber extension unit, which is established in DTC, were utilized in training activities.

DISTRICT AGRICULTURAL TRAINING CENTRE, AMPARA

During the year a total of 52 training programmes were conducted (1344 man days) including 19 for officers (581 man days), 33 for farmers (763man days), and 21 work shops, seminars, meetings, discussions (736 man days).The subjects covered were mainly on fruit cultivation, home gardening, and hybrid rice production.

Women's Agricultural Extension Programme (WAE)

The mandate of this Programme in 2007 was to improve the standard of living of farm families and community through enhanced contribution of women to agricultural production, human nutrition and marketing of agriculture commodities (fresh and value added). The major emphasis in 2007 was to establish organized women's groups. These groups were used to impart knowledge and skills to promote crop production, family nutrition and agro -based entrepreneurship. This programme was implemented in 26 districts.

Progress:

Trained 1651 (101 classes) district agriculture extension personnel; established 795 women's agricultural organizations (13583 members); promoted entrepreneurship (721 classes, 11717 trainees) and created 2408 sustainable enterprises; developed skills on resource management (582 classes, 8227 trainees) and developed 2619 households; facilitated to improve family nutrition (741 classes, 11406 trainees) and established 13991 home gardens; conducted 8 TV and 12 radio programmes, 58 field days, 21 exhibitions; organized 12 study tours for women; published 19 journal articles, 63 handouts,12 leaflets and 1 booklet; organized 2 campaigns.

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Special Activities:

Initiated work for the establishment of eight sales outlets in 7 districts to popularize traditional food through women organizations, of which 4 are already opened; conducted a three day residential training programme on Promotion of Entrepreneurship for WAE officers in liaison with Association of Business Initiatives, Sri Lanka; conducted 4 one day workshops on promotion of entrepreneurship utilizing locally available crops for 360 Ceylinco Grameeya Bank beneficiaries; celebrated Rural women's day on 16/10/2008 with an exhibition of women's organizations at Maha Illuppallama, on the theme to popularize locally grown grain crops with participants from Anuradapura, Polonnaruwa, Vavuniya, Trincomalee, and Kurunegala Districts.; published a booklet on recipes of grain crops and local lyrics to popularize "nutritional " home gardening.

AGRO ENTERPRISE DEVELOPMENT & INFORMATION UNIT

The mandate of AgEDIS is to provide information and service needed by clients to start new agro-enterprises or to develop existing agro-enterprises. In year 2007 AgEDIS conducted training & awareness programs on agricultural enterprises, provided advisory service on farm development, technical awareness programs (11), skill development programs (20), TV/radio programs (6), exhibitions (9), visit to new sites (17), field monitoring programs (7), field days (6). For these training programs 615 entrepreneurs have participated and upgraded their knowledge on agro enterprises. Collection of agricultural information and data on 5 prioritized items (production and processing techniques, marketing and prices, production/imports & exports, agro enterprise related service providers and cost of production) was completed. Also sixteen farms developed and follow up activities carried out in 7 farms belonging to private sector.

In addition to above, the unit was involved in the coordination of four special projects namely, (a) Uplifting orange cultivation in Monaragala District, (b) Establishing *"Krushi Seva Piyasa"*, (c) Productivity improvement of selected other field crops, (d) Establishing regional agro enterprise development units, all of them funded by the Ministry of Agriculture. In the project *Krushi Sewa Piayasa*, the objective is to offer service to agro entrepreneurs in collaboration with the private sector; 30 entrepreneurs were selected and trained to start *"Krushi seva piyasa"*, one stop agriculture centers, across the Island.

BEE DEVELOPMENT UNIT, BINDUNUWEWA, BANDARAWELA

The main bee keeping unit is located in Bandarawela with 3 sub units in Colombo, Ratnapura, Buttala and Mawathagama. Activities conducted during the year included production of bee keeping appliances, production and processing of bee honey, training on bee keeping and manufacture of equipment, maintenance and multiplication of colonies for marketing, certification of bee keeping equipment produced by private sector manufacturers, coordination with private and public sector organizations, assistance for research programmes on bee development.

During the year the unit produced 220kg bee honey, 232 bee hives, and 692 bee boxes and certified 9250 bee boxes.

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Also conducted 03 training programs for officers (181 man days), 13 programs for farmers (614 man days) on bee keeping and 3 programmes (99 man days)on manufacture of bee keeping equipment.

YOUNG FARMERS CLUB (YFC) & MOBILE EXTENSION SERVICE UNIT

Vision of the YFC is to uplift the living standard of the youth by motivating them to enter the agriculture sector and participate in the development activities of the country.

Objectives of the YFC programme is to establish sustainable organizations at village level, mould youth capable of self sustenance, create a farmer generation knowledgeable of new technologies, uplift entrepreneurial abilities of youth and reduce unemployment through agriculture.

During the year 2007, island wide programs were conducted to attract young farming generation to facilitate agricultural extension.

Established 136 new YFCs (2725members) and 665 existing YFCs (13300 members) were reactivated. Conducted176 training programs, 13 field days and 09 field tours were organized during the year. Also 749 of special projects were implemented with young farmers and women farmers.

Conducted 20 mobile extension programmes under the special project "Organic Farming for Export", creating awareness among farmers. About 727 farmers, 160 students and 118 officers participated in these programmes. Sold technical publications worth Rs. 34, 227 during these programmes.

IRRIGATION MANAGEMENT AND ADVANCED AGRICULTURAL TECHNOLOGY UNIT

In the year 2007, the Unit implemented a number of programmes at provincial and inter-provincial level with the objective to popularize advanced technologies such as micro irrigation, solar powered drip irrigation and advanced technology for nursery management, fertigation, green houses and poly tunnel management.

Training Programmes:

During the year, the Unit conducted 65 training classes on micro irrigation management for officers (Agriculture Instructors, Agrarian Development Officers, and other field officers) and farmers. It also conducted 15 awareness programmes on protected agriculture for officers and farmers who have already adopted or willing to adopt the technology.

Small Farm Development Project through Solar Powered Drip Irrigation (SPDI) Technology

Consequent to the success of pilot projects on solar powered drip irrigation technology implemented during year 2002, the Government of Australia agreed to provide 5000 Solar Powered Drip Irrigation Systems on credit basis in the year 2005. The main objective of this project implemented since the year 2005 is to provide solar powered drip irrigation systems for small scale vegetable grower enabling him to utilize a land extent of 1/2 an acre for crop production.

Progress:

Potential recipient farmers of micro irrigation units were selected on the lists submitted by Agrarian Development Officers and Samurdhi Officers.

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The Unit trained officers and farmers to impart required technical knowledge. During the year 2007, the Unit trained 500 officers and 1500 farmers; distributed 2200 irrigation units among selected farmers in the first phase. The project will be continued for the next two years. Four demonstrations have been established and maintained at School of Agriculture Wariyapola, HORDI Bibila, ISTI Angunakolapalassa and FMTC Puliyankulama in order to provide practical knowledge required in the training of officers and farmers.

About 40 farmers were selected to conduct demonstrations (5 farmers in each of 8 districts) and necessary seeds and fertilizers were provided with to make the demonstrations successful.

Achievement:

Farmers have been able to increase their yield in 2-3 folds by adopting the technology. For instance, they have harvested 16000 Kg and 11500 Kg of yield per acre per season from big onion and chilli respectively.

The Project for Enhancement of Productivity of Vegetable and Fruits through Micro Irrigation Technology

The primary objective of the project initiated in the year 2006, which is being continued up to year 2008, is to popularize micro irrigation technology among farmers. In year 2007, 56 Drip Irrigation Systems were given to farmers having 1/2 ac land at a concessionary rate.

Small scale farmers in the Dry Zone were selected by the Agricultural Instructors of the DOA. They were made aware of the technology at the moment of their selection. They were given initial and secondary level training on the relevant technology.

The Unit, distributed 2720 guava plants among farmers to enhance fruit production with drip irrigation

Achievement:

About 70 farmers are successfully cultivating guava under micro irrigation technology achieving a significantly higher level of production.

Micro Irrigation and Water Management Programme, the Regional Economic Advancement Project (REAP) - Matale

The above programme, initiated in the year 2003 and continued till 2007 in Matale District by utilizing agro wells for micro irrigation for agriculture, has achieved a great success. Under the programme, technology on micro irrigation, fertigation and advance nursery management has been popularized among farmers. In 2007, several training programmes were conducted, where weak farmers were identified and trained them properly to achieve project objective. The farmers have been able to increase their yield by 2-3 folds, harvest fruit and vegetable during off-season and maximize their profit by saving fuel, water and labor.

Protected Agriculture and Hydroponics

With a view to popularize the above technology among farmers, activities of training of officers and farmers, providing leaflets, creation of awareness were carried out in the year 2007. In addition to the national programme on the above technology, 50 farmers were trained on anthurium cultivation in protected houses and 25 farmers have started their cultivation in 2007.

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PLANNING AND PROGRESS MONITORING UNIT

The Planning and progress monitoring unit focuses on preparing action plans, monitoring and evaluating financial and technical activities of special projects conducted by the Extension & Training Division. The unit is also involved in preparation of seasonal crop forecasting, preparation of indicative targets for the annual implementation programme, providing information for central bank report and budget speech and disseminating information to relevant agencies.

RUPAVAHINI & FARM BROADCASTING SERVICE (FBS)

The main objective of this unit is to create awareness among general public on agricultural technologies, demand, supply, marketing and pricing of agricultural produce, current trends in agricultural production, government policies and also to motivate people to use relevant information to enhance their income and to provide answers to the problems of the farmers. The FBS programmes are accessible through out the country via different radio channels.

The main Farm Broadcasting unit is located at Narahenpita, Colombo while three subunits are located at Anuradhapura, Kandy and Angunakolapellessa (Ruhuna).

The FBS broadcast radio programs mainly in Sinhala and Tamil, and also in English whenever required. The main unit at Colombo is also dealing with the television programs in both Sinhala and Tamil Languages as the situation demands. The FBS produces a wide variety of programs. With the objective of receiving a proper feed back for further improvement and popularization of the programmes, the FBS introduced the concept of "Listeners' clubs", which have attracted more than 1500 members island wide. They are rewarded with facilities and training programs to strengthen the programs further.

Programmes of Colombo Unit

- Tuesdays - Gewatte (Live) at 8.45 to 9.45 a.m. on Swadeshiya sevaya
- Thursday - Saraboomi at 7.45 to 8.00 p.m. on Swadeshiya sevaya
- Isuru Piyasa – Wednesday – at 2.00 to 2.30 pm on Swadeshiya sevaya
- Fridays - Govi Gedara at 6.45 to 7.00 p.m. on commercial services
- Tuesdays - Sanhinda at 6.45 to 7.00 p.m. on commercial services
- Saturday – Govi Pana at 7.30 to 8.00 pm on Swadeshiya sevaya
- Saturday – "Govi Pana" quiz at 7.30 to 8.00 pm
- Thursday – "Derana Gewatta" on Derana TV channel
- Daily - Bulath Hurulla (Short messages) at Mornings and afternoons on Swadeshiya sevaya and commercial services
- Daily – "Andaraya" at Mornings and evenings on Swadeshiya sevaya, commercial services and city FM
- Daily –"Singithi Paha Saraniya" at Mornings and afternoons on Vidula services
- Daily – Short messages – when needed on all the services

Tamil Programs

- Tuesdays - Witta Thottam at 7.30 to 8.00 p.m. on Tamil Services
- Wednesdays - Wayalodu Wasanthum at 10.00 to 10.30 p.m. on Tamil Services
- Fridays - Wannaratham at 10.00 to 10.30p.m. on Tamil Services

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- Fridays - Women programs at 1.00 to 1.30 p.m. on Tamil Services
- Tuesdays & Thursdays - "Nethra" morning on Rupavahini
- Tuesdays - Gewatta at morning on Derana

KANDY UNIT

Sinhala Programs

- Saturdays - Govibima at 5.30 to 5.45 p.m. on Kandurata sevaya
- Friday - Aswenna at 8.30 to 9.00 a.m. on Kandurata sevaya
- Tues. /Friday - Ape Govithena at 6.45 to 7.00 p.m. on Kotmale sevaya
- Daily - Kalavita (Short messages) at 7.50 to 8.10 a.m. on Kandurata sevaya
- Daily - Wagava (Short messages) at 6.25 to 6.30a.m&pm. on Kotmale sevaya
- Last Monday – Live From Kotmale at 8.30 to 9.30am on Kotmale sevaya

Tamil Programs

- Wednesday – Muhadukal – Agricultural drama at 10.00 pm to 10.30 pm on Tamil service -Kandurata sevaya
- Tuesdays – Kurinchi Malaralhal – Tamil service - at 7.30 pm to 8.00 pm on Kandurata sevaya

ANURADHAPURA UNIT
(RAJARATA SEVAYA)

- Thursday - Saruketha at 6.30 to 6.45 p.m. on Rajarata sevaya
- Sunday - Ayyanayake Adaviya (Agricultural Drama) at 6.30 to 6.45 p.m. on Rajarata sevaya
- Twice a day - Short message on Rajarata sevaya
- Once a week – Rajarata Gewatta – morning on Rajarata sevaya

RUHUNA UNIT
(ANGUNAKOLAPELESSA)

- Tuesday - Ruhunubimai Govi dethay at 6.45 to 7.00 p.m. on Ruhunu sevaya
- Thursday - Ruhunu Gewatte at 9.00 p.m. to 9.30p.m. on Ruhunu sevaya
- Friday - Divimangata Athwelak at 3.00 to 3.15 p.m. on Ruhunu sevaya

UWA SERVICE

- Daily - Short messages on Uwa Sevaya
- Once a week – Uwa recorded – Evening on Uwa Sevaya

RANGIRI DAMBULLA

- Once a week –Recorded Kiniththa–on Rangiri Dambulla
- Daily - Short message on Rangiri Dambulla

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ACTIVITIES OF "SRAVAKA SAMAJAYA"

Table 3.4.9: Activities of 'Sravaka Samajaya'

Training	Location of Training	No participated
Rice based products	Colombo, Gannoruwa Angunakolapellessa	93
Home Gardening	Walpita, Anuradhapura, Gannoruwa, Anguna	172
Vegetable Conservation	Colombo	22
Bee Keeping	Gannoruwa	60
Technical park	Gannoruwa	45
Aswenna Educational Workshop	Kandy	70
"Srawaka Samaja"	Angunakolapellessa	23

AUDIO VISUAL CENTRE

Agricultural Technology Park at Gannoruwa

The Gannoruwa agricultural complex, which was transformed in year 2004 to a tropical agricultural theme park with an agricultural science garden and a live crop museum, continued to attract a large number of visitors including students, farmers, entrepreneurs and general public.

Agriculture Technology Park, Bata Atha, Hambantota

The Bata Atha technology park was was opened on 07th January 2008 by the President, His Excellency Mahinda Rajapaksha. The objectives for establishing this agro park are:

- Technology transfer to the farmer through live specimens
- Demonstration of agricultural technologies
- Promotion of eco-tourism for local and foreign tourists
- Distribution of seeds, plants, leaflets and other technical literature
- Create a centre to disseminate information
- Generate new employment opportunities

National Agricultural Information Network (Cyber Agricultural Extension)

Objective of this program initiated in 2004 was to establish an electronic information exchange mechanism for the agricultural sector of Sri Lanka. The projects included establishing of Cyber Extension Units (Rural Knowledge Centers) at all *Govijana Kendrayas* in the country with links to Research Centers, Extension and Training Center (ETC) of the DOA and also to private sector organizations. At the initial stage an information dissemination system utlilizing interactive CDROM disks was established.

The pilot project was implemented with the assistance of CARP and IRRI at 35 *Govijana Kendrayas* in 2004. Each Cyber Extension Unit is managed by an AI trained for the purpose. These centers were provided with a computer, scanner, printer, digital still camera, and a web camera. Interactive multimedia CDROMs were also provided. CARP will fund the production of CDROMs for all agricultural crops during the next two years.

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CDROMs already produced by the Audio Visual Center of the DOA on flip chart technology will be useful for the village level extension workers to produce low cost audio visual aides at village level, which could be used in training classes. Farmers can also bring live samples to the Cyber Extension Unit and send pictures through e-mail to Research Centers.

Activities completed and training material produced during year 2007 are listed below.

Video / Radio

* *Mihikatha Dinuwo(Sinhala)*- 50
* *Govibimata Arunalu* - 49
* Other documentaries - 04
* TV spots - 08
* Recording / Editing for Radio- 25
* Recording / Editing for Video - 139
* Telecasting – *Mihikatha* - 50
* Telecasting – *Arunalu* - 48
* Telecast (TV spots) - 05

Graphic Communication

* Technical books - 19
* Cover pages - 20
* Leaflets/Folders/Handouts etc. -65
* Instructional Posters(digital) -282
* Hoarding (digital) - 06
* Name Boards (digital) - 509
* Posters (Normal) - 412
* Invitation cards - 08
* Certificates - 08
* Banners - 463

Training

* 5 day programmes - 02
* No of participants (man days) -200
* Cyber training programmes- 13
* No of participants (man days) -557

Information Technology

* Updating DOA Website(No of pages)789
* IMM CD ROM Production- 08
* CD ROM Copying - 7000

AV Aides

* Desktop slide presentation - 30
* Photography digital - 19071
* VCD - 525
* DVD - 80
* AV assistance for presentation- 58

Exhibitions & Performing Arts

* Stalls/exhibits - 10
* Street drama - 07
* Muppet shows - 03

Toll free Advisory Service

* Advisory service (over the phone)-39,271
* Advisory service (written replies) -1,309

Other Activities

* Printing A4 colour - 978
* Laminating A4/A3 - 619
* Laminating (Roller) Yds - 334

INFORMATION CENTER

The responsibility of this unit is to distribute printed publications of the DOA. The main sales center is located at Peradeniya while 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. The new sales center has become popular among visitors. Income earned during the year from sales at the main center and Gannoruwa sales center was around Rs.2.3 million. In addition, the total value of publications issued on issue order as well as of those issued free of charge was Rs. 32,407 & 10825 respectively.

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DOA PRESS

Following publications were printed in the year 2007.

Books and Booklets

List of video programs	-	2000
Cost of production	-	365
List of registered fruit nursery men	-	1000
Education research	-	200
Lak kantha saviya	-	310
Fertilizer recommendation	-	2945
Tissue culture	-	2000
Agstat	-	495
National agricultural policy	-	9025
Mushroom cultivation	-	5050
"*Api wawamu Rata Nagamu*"	-	51046
ASDA	-	1382
ASDA farmers' day	-	400
Crop protection programme	-	350
Surveyor report of orange	-	100
Cost of production	-	210
Registers and ledgers (for financial division)	-	4000
Bee keeping	-	11975
Orange	-	2015
Diseases of Banana	-	5000
Papaw	-	2000
Mushroom	-	2010
Mango	-	1000
Home Garden	-	20000
Crop Forecasting	-	24000
Extension log book	-	506
Administration report	-	235
Posters (10 types)	-	18500
Letterheads	-	15000
Invitation cards (9 types)	-	11500
Certificates (5 types)	-	1825
Home garden seed packet label	-	149110
"*Goviya*" news paper	-	15050

Regular Publications

Govikam sangarava	-	3025
Agtec.	-	1390
Krushi	-	1010
Leaflets	-	15205

AGRICULTURAL EDUCATION

The five Schools of Agriculture located at Kundasale, Pelwehera, Angunakolapelessa Vavuniya and Karapincha offer a two year program 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. A total of 209 students followed the second year training program for Diploma in Agriculture at four Schools of Agriculture. The number of students in the different SOA is given in the table.

Table 3.4.10: No. of Students in the Schools of Agriculture 2007

Agriculture School	Year	Medium						Total	G. total
		Sinhala		Tamil		English			
		Boys	Girls	Boys	Girls	Boys	Girls		
Kundasale	1st	28	24	12	11	11	18	104	216
	2nd	37	20	15	10	5	25	112	
Angunakollpellessa	1st	32	10					42	82
	2nd	19	21					40	
Pelwehera	1st	17	7					26	57
	2nd	19	12					31	
Vavuniya	1st			8	7			15	41
	2nd			15	11			26	
Karapincha	1st	20						20	20
	2nd								
Total		**172**	**96**	**50**	**39**	**16**	**43**	**416**	**416**

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EXAMINATION UNIT

Examinations: Agricultural Schools

The 2005/2007 final examination of the two year diploma course was conducted from 12.03.2007 to 22.03.2007. Results of the above examination were released on 26.10.2007. A total of 182 students passed the diploma at the above exam including 84 from SOA Kundasale, 34 from SOA Angunakolapellessa, 35 from SOA Pelwehera, 29 from SOA Vavuniya.

Entrance Examinations: Agricultural Schools

Entrance examination for the academic year 2008/2010 was held on 31st August 2007. A total of 1679 candidates fulfilled the requirements to sit the examination. A competitive examination to enter the SOA for officers of the public sector was also held on 11 December 2007 and 25 candidates sat the examination.

Departmental Efficiency bar Examinations

A total of 18 different Efficiency bar examinations were held in the year 2007; 863 candidates sat for these examinations.

FERTILIZER UNIT

In the year 2007 the major extension activities implemented by the fertilizer unit included program activities on organic farming for export, IPNS manual, and collection of soil test data.

Organic Farming for Export

The programme for development of organic farming was initiated in the year 2005 with a sum of Rs. 2.5 million. In the year 2007, about Rs. 13.239 million was allocated to the Extension and Training Division to implement the activities under organic farming programme. This amount was allocated to 43 different units for activities as indicated below:

Table 3.4.11: Financial Progress of Activities under Organic Farming for Export

No.	Activity	Allocation	Progress
1	Organic Research	3.8	2.9
2	Establishment of organic villages	2.8	1.7
3	Organic seed production	0.6	0.5
4	Demonstrations at training centers	1.3	1.16
5	Organic resource center	2.239	1.6
6	Mass media	1.55	1.55
7	Mobile extension	0.1	0.1
	Director finance for last years payments	1.85	1.74
	Total	**14.239**	**10.70**

As there were outstanding vouchers amounting to Rs 1.85 m at the end of the financial year, the total value of work carried out during the year was Rs 12.55.

- **Extension Activities on Organic Farming**

A sum of Rs 2.8 million was allocated to Extension Units of Provincial and Inter-provincial areas to establish 150 organic villages in the long run. Already work has been started in 138 villages. It was also planned to establish 25 organic rice *yayas* of which only 03 units were established. The short fall was mainly due to free availability synthetic fertilizer at low cost. Total expenditure was 1.7 million out of 2 million annual allocation.

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- **Research on Organic Farming**

Approximately Rs. 3.8 million was allocated for research activities of which Rs. 2.9 million was spent during the year. The HORDI, Gannoruwa has conducted trials on organic vegetable cultivation, preparation of vermi-compost, production of liquid organic extract. At RRDI Batalagoda, several activities viz: preparation of the land of three acres for organic farming, planting of green manure trees, production of low land green manure seeds, screening of suitable rice verieties for organic farming, evaluation of grain quality of organic rice were carried out

- **Organic Rice Seed Production**

At the RRDI, Batalagoda and Bombuwala, an organic seed paddy production programme was carried out with a total budget of Rs 1 million. About 350 bushels of seed paddy were produced in five varieties and distributed to farmers for organic cultivation with a total cost of Rs 0.5m.

- **Demonstration at Training Centers**

As many as 15 demonstrations were planned to be established at the training institutes of the DOA and Provinces. All of them were conducted successfully. The total budget for this activity was Rs 1.3 million and the expenditure incurred was Rs.1.16 m.

- **Resource Center for Organic Farming.**

It was intended to conduct local fairs for organic products. Owing to limitation in the availability of products, it was not possible to conduct fairs of organic products, though some of the producers were linked to private sector exporters for entering into forward contracts.

- **Officer Training**

A total number of 210 field officers were trained on organic farming during the year 2007 in five training programs. The resource persons for these training programmes conducted on organic farming and IPNS were mainly from the Extension Division and the Fertilizer Unit. The duration of the each course was 3 days. Also, 3 programmes (Polonnaruwa, Matale & Gampaha) were conducted for 150 field officers on pre-testing of the IPNS manual.

- **Establishment of an Organic Certification Authority and Formulation of Organic Standards**

During the year Fertilizer Unit was able to finalize the National Organic Standards and submit them to the technical committee of the SLSI.

A company, by the name National Organic Certification (Guarantee) Limited, was formed to carry out organic certification. The ADA (fertilizer) is working as one of the directors of National Organic Certification body. This company has been registered under the Registration of Companies Act, Sri Lanka.

- **Printing of IPNS Manual**

Revision of English, Sinhala and Tamil versions of the IPNS manual was completed during the year. The Sinhalese version was handed over to JICA office for publication

With JAICA assistance an IPNS programme was implemented in 03 districts to enhance the yield by improving soil fertility. The programme was implemented in all AI ranges of Kurunegala, Polonnaruwa and Hambantota Districts. Farmers were educated on how to prepare organic manure and how

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to apply them to the field with chemical fertilizer.

Collection of Soil Data

Table 3.4.12: Collection soil data

Research Station	Number of data
Bandarawela	375
Maha Iluppallama	90
Bombuwala	111
Angunakolapelessa	91
Gannoruwa	212
Seetha Eliya	113
Aralaganwila	122
Makandura	126
Total	1116

Organic Standards and Certification

Under this program a sum of Rs. 2.0 million was allocated to the Fertilizer Unit for providing foreign training to the extension officers on organic certification. Under this, 10 officers were sent to India to study on the subject. They have also participated at the Indian Organic Fair 2007 held in Delhi. The total expenditure by the Fertilizer Unit during the year under this activity was Rs. 1.3 m with the balance being withdrawn by the Ministry. Two workshops were conducted by Mr. Menon, an expert from India, to develop the organic farming in Sri Lanka, with the participation of 38 and 78 officers respectively in each of the programmes. Also, 18 officers from the ministry of agriculture attended the training. Participants were awarded a certificate on organic farming.

Resource Persons

Officers of the Fertilizer Unit participated in 4 radio programmes. They also participated in training of officers and farmers organized by the extension and training division at various training centers.

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4.1 ADMINISTRATION DIVISION - PERADENIYA

The DOA has an approved cadre of 6407 belonging to different services, who are mainly officers of the SLAgS, MLTS, and few officers from SLEngS, SLAS, SLAcS and other personnel belonging to different categories. The role of the Administration Division is to facilitate smooth functioning of the entire establishment of the DOA by executing tasks relevant to general administration. In its routine work, the Division has to deal with numerous institutions namely the Ministries, Provincial Councils, Public Service Commission, the Judiciary, Human Rights Commission, Attorney General, Parliamentary Advisory Committee and various other state agencies.

Salient information and data pertaining to the status quo of the DOA, which are directly relevant to the routine activities of the Administration Division, are presented in this report.

BUDGET

Table 4.1.1: Annual budget – 2007 (Rs.)

Vote	Allocation	Expenditure
Capital	12,445,000	10,054,867
Recurrent	37,706,800	36,694,587
Total	50,151,800	46,749,454

Appointments

Table 4.1.2: Appointments during 2007

Post	No. of appoinments	
SLAS, Class 11/11	01	(Made by the Secretary, Ministry of Public Administration)
Public Management Assistant Service, Class 111	12	(Made by the Director General of Combined Services)
Carpenter, Class 111	01	
Electrician, Class 111	01	
Machinist, Class 111	01	
Plant Operator, Class 111	01	
Machine Attendant, Class 111	01	
Earth Mover Operator, Class 111	01	
Store man, Class 111	01	
Watcher	24	
Laborer	46	
Budder	04	
Cook	02	

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Table 4.1.3: Promotions in 2007

Post	No. of promotions
SLAS,	
SLAS Class 11/1	02
SLAccS	
SLAccS, Class 11/101	
SLAgS	
Class 1 on Supernumerary Basis	
Research Officers	14
Agricultural Officers	03
Subject Matter Specialist	01
Class 11/1	
Research Officers	34
Agricultural Officers	03
Lecturers	12
Curator	01

Table 4.1.4: Recruitments in 2007

Post	No. recruited
Recruitments to SLAgS, Class 11/11	
Research Officers	31
Agricultural Officers	28
Agricultural Economists	07
Recruitments to SLTS	
Research Assistant, Class 1	01
Agricultural Instructor, Class 1	01
Agricultural Instructor, Class 11	23
Recruitments to PMAS	
PMAS, Class 1	16
PMAS, Class 11	17
Research Sub Assistant, Class 1	05
Driver, Class 1	07
Driver, Class 11	14
Store man 1/1	03
Store man 1/11	05
Mason 1/1	01

Table 4.1.5: Retirements from the Service

Post	No. of retired
SLAgS	- 14
SLAS	- 01
SLES	- 01
SLACcS	- 01
PMAS	- 02
Research Sub Assistants	- 03
Agricultural Instructors	- 15
Technical Officers	- 01
Work Supervisors	- 02
Farm Machinery Instructors	- 01
Seed Technicians	- 01
KVSN	- 01
PMAS Class I	- 13
PMAS Class II	- 10
PMAS Class III	- 01
Librarians	- 01
Graduate Assistants	- 01
Farm Clerks	- 01
OES I	- 06
OES II	- 01
Watchers	- 11
Sanitary Laborers	- 01
Seedmen	- 01
Laborers	- 02
Cooks	- 01
Drivers	- 12
Mechanics	- 01
Carpenters	- 01
Plant Operators	- 03
Welders	- 01
Electricians	- 01
Store Keepers	- 01
Special Laborers (Stores)	- 02

Deaths

The DOA reports with grief passing away of following officers during year 2007,

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while they were in service.

Post	No.
Research Sub Assistants	01
Agricultural Instructors	01
PMAS Class II	01
Drivers	01
Lorry Cleaners	02

Temporary Appoinments

- Temporary appointments were granted for 11 driver posts on 01.01.2008. Applications have been called for the filling of 15 driver posts. Interviews and practical tests were conducted on 23.01.2008 and 31 for promotions of 13 Earth Mover Operator posts, 1 Plant Operator Post, 4 Water Pump Operator posts and 5 mechanic posts.

Absorption to Cadre

- Three Seed Technicians have been absorbed to posts of Agricultural Instructor.

Officers Released to Other Posts:

Programme Assistants (Agriculture) - 23

Agricultural Monitoring Officer - 07

Research Assistant - 02

Agricultural Instructor - 02

Officers Released to Provincial Councils

SLAgS - 04

SLES - 01

Agricultural Instructors - 14

Vacation of Posts

SLAgS Supernumerary - 01

SLTS II/II - 02

Agricultural Monitoring Officers - 03

Agricultural Instructors - 01

Resignation from Service

Agricultural Monitoring Officers - 01

Agricultural Instructors - 02

Obtaining of No-pay Leave for Employment Abroad

PMAS II - 01

Agricultural Monitoring Officers - 03

OES II - 01

Obtaining of No-pay Leave for Service in Projects

Agricultural Monitoring Officers - 03

Overseas Visits for Post Graduate Studies

For M.Sc.

Research Officers - 02

Lecturers - 02

For Ph.D None.

Returned after Completing Post-Graduate Studies

For M.Sc.

Research Officers - 03

Lecturers - 03

(01 officer has not completed the degree)

For Ph.D

Research Officers - 02

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Visits Abroad for Training, Workshops and Other Conferences

DGA	- 03
Directors	- 11
Deputy Directors	- 15
Asst. Director of Agriculture	- 09
Agricultural Economists	- 03
Engineers	- 05
Agricultural Officers	- 05
Research Officers	- 08
Research Assistants	- 02
Registrar of Pesticides	- 02
Lecturers	- 01
Agricultural Monitoring Officers	- 06
Programme Assistants	- 01
Agricultural Instructors	- 15

Local Training

- Clerical training for PAMS (III)
- Training for Office Employee Service
- Training for office laborers on office activities
- Driver training
- Training for farm clerks
- Training for officers regarding preliminary investigations/Formal Disciplinary Inquiry/F.R. 104 (1) Inquiries

Recoveries

The total recoveries to the Government from officers who breached agreements in 2007 are Rs.1608448.04.

Agrahara Insurance Scheme

- The value of claims forwarded to reimburse hospital charges and spectacle bills- Rs. 6677687/=
- Number of claim forms received - 625
- Number of natural death compensation - 07
- Number of accidental death compensation - 02

Security Deposits

- Preliminary action has been taken to recover security deposits from newly recruited officers as indicated below:

Agricultural Instructors	- 87
SLAgS Officers	- 60

- Number of officers who were referred to the salary management I Branch for the deduction of security deposits from their salary in 2007 - 57
- Number of persons whose security deposits were released on their retirement - 103
- Value of security deposits already released - Rs. 1,349,256.44

Loans Granted and Types of Advance Loans

Distress loans

Number of vouchers approved: 852
Amount Paid: Rs. 14,254,444/=

Push Bicycle loans

Number of vouchers approved: 08
Amount Paid: Rs 48,000/=

Property loans

Number of Vouchers approved
Amount Paid: Rs.122,644,480/=
Number of vouchers forwarded to Banks: 106

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Number of vouchers paid by banks: 12

Vehicle loans

Number of vouchers approved and forwarded to Banks: 49
Amount: Rs.23,011,125/=
Number of vouchers paid by banks: 07

Amount paid by banks Rs. 1,896,875/=

Tsunami Loans

Vouchers approved: 07
Amount paid Rs. 73,578/=

Inquiries

Disciplinary Inquiries

Number of disciplinary inquiries which were pending in 2007 - 102

Number of disciplinary inquiries which were commenced in 2007 - 54

Number of disciplinary inquiries which were completed in 2007 - 84

Number of disciplinary inquiries were pending as at 2007.12.31 - 27

F.R. 104 Inquiries

Number of FR 104 inquiries were pending in 2007 - 571

Number of FR 104 inquiries were commenced in 2007 - 104

Number of FR 104 inquiries were completed in 2007 - 79

Number of FR 104 inquiries were pending as at 2007.12.31 - 596

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4.2 ENGINEERING DIVISION - PERADENIYA

The main functions of the Engineering Division include Civil Engineering work pertaining to maintenance and construction of buildings, procurement of vehicles, machinery and equipment and disposal of unserviceable vehicles, machinery and equipment. The operation and maintenance of the drinking water supply scheme in Kundasale, maintaining of records of DOA vehicles, acquiring and assigning of vehicles are other important services performed by the Division. The Division also provides engineering advisory services to all divisions of DOA.

BUDGET

The budgetary allocations and expenditure under different votes for year 2007 are given in Table 4.2.1.

Table 4.2.1: Annual budget - 2007 (Rs.)

Vote	Allocation	Expenditure
2001- Construction/ maintenance of buildings	1,076,843.00	1,076,790.50
2002 – Maintenance of Machinery	86,700.00	68,500.00
2003 – Repairing of Vehicles	260,100.00	254,888.00
2102 – Procurement of Office Equipment	346,800.00	335,283.96
2103 – Procurement of Machinery and Equipment	86,700.00	14,035.00
Total	1857143.00	1749497.46

PROGRESS

The progress of the year 2007 can be categorized as follows:

1. Civil engineering work: New Constructions and Repairs
2. Procurement:
   a) Procurement of new machinery and equipment
   b) Procurement of works: Servicing and repairing of machinery and vehicles

The procurement of goods and works below were carried out by the Engineering Division Procurement Committee.

1. The value of Civil Engineering work undertaken for each division is given in Table 4.2.2.

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Table 4.2.2: Value of Civil Engineering Work Undertaken

Division	Allocation (Rs.)	Expenditure (Rs.) (Rs.)	Percentage of Expenditure %
Administration Division	2569892.91	2110401.25	82.12
Finance Division	1101872.00	873068.52	79.24
Economic Division	216750.00	167980.55	77.50
NRMC - Peradeniya	100000.00	88414.00	88.41
SCPPC	666900.00	489512.32	73.40
HORDI	9689965.88	7271726.16	75.04
Extension & Training Division	14177189.00	5576706.07	39.34
Farm Division	13782572.00	5654576.41	41.03
Engineering Division	1040400.00	928683.35	89.26

2. a) The value of new machinery and equipment procured by the Engineering Division for all the Divisions of the DOA is given in Table 4.2.3.

Table 4.2.3: Value of New Machinery and Equipment Procured by the Engineering Division

Division	Expenditure (Rs.)
Engineering Division	357,188.96
Finance Division	251,950.00
Administrative Division	196,925.00
PMEU	167,775.00
Extension & Training Division	35,650.00
NRMC	612,750.00
SPMDC	1,124,050.00
SEPC	412,200.00
HORDI	518,146.00
SCS	545,972.00
PPS	862,700.00
NPQC	198,650.00
FCRDI	211,0342.00
RRDI	18,850,000.00
RARDI	421,297.00
SCPPC	15,150.00
FCRDI	375,700.00
Total Value	**27,056,445.96**

b) Procurement of Work

- Registration of workshops and service stations
- Provision of technical advice and recommendation for repairing of motor vehicles
- Registering of motor vehicles

Water Supply Scheme at Kundasale

This scheme pumps approximately 200,000 gallons of water per day from the Mahaweli River. The Pumping Station works 18hrs daily and the power consumption is approximately 60kW. This water is distributed for the following users through the treatment plant.

1. School of Agriculture , Kundasale
2. Seed Farm , Kundasale (For domestic use and for special irrigation system)
3. Poultry Farm, NLDB
4. Office of ADA (Seeds)
5. All government quarters in Agriculture Complex
6. University Farm, Domestic use
7. Power House

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Other Services

The Division assisted many Institutes, Centres 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 and machinery. Inspection and valuation of condemned vehicles, machinery and equipment were also carried out by the Division. The Division actively participated in technical evaluations and provided advisory service to the tender boards.

Staff of the Engineering Division

The working capacity, the efficiency and the performance of the Division were seriously affected due to lack of trained technical staff in the Division. There exists a number of vacancies in the cadres of technical staff. Owing to this constraint, numerous difficulties have been encountered in carrying out new civil engineering work as well as routine work such as operation of water supply scheme, Kundasale etc. At present, the division does not have a sufficient number of Inspectors of Work, Building Overseers and Draughtsmen to handle the work load in the Civil Engineering Section. Also, Engineering Assistants, Technical Officers and Electricians are not available to handle Mechanical or Electrical work. Few of above cadres are employed on contract basis for short durations.

Considering the volume of work to be completed annually in the civil, mechanical and electrical disciplines, the non availability of technical staff is a severe constraint, which hampers the efficient performance of the Engineering Division.

PLAN FOR 2008

Vote	Description	Allocation (Rs.)	Expecting Time
2001	Repairing of staff quarters	880000.00	May to July 2008
2001	Repairing of staff quarters	50000.00	August 2008
2102	Office furniture and Equipment	279000.00	March 2008
2103	Mechanical Tools	69750.00	March 2008

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4.3 FINANCE DIVISION-PERADENIYA

The main objective of the Finance Division is to establish a sound financial management system through planning, monitoring and evaluation in order to facilitate the accomplishment of the objectives of the DOA.

Following are the main activities carried out by the Division:

01. Preparation of annual revenue & expenditure estimates
02. Maintenance of bank accounts.
03. Allocation of Departmental & Ministry provisions.
04. Collection and accounting of revenue of the DOA.
05. Make all recurrent and capital expenditure including personal emoluments.
06. Performing internal audit activities.
07. Preparation of financial progress reports and evaluation.
08. Co-ordination of financial activities with local, foreign, government and non-government organizations.
09. Foreign payments.
10. Implementation of farm advance account activities.
11. Preparation of final accounts including Appropriation and Revenue accounts.
12. Conducting annual board of survey.
13. Payment of loans to employees
14. Training of personnel on computer applications and financial management.

Table 4.3.1: Capital Expenditure – 2007 (Rs.)

Project	Project Description	Revised Estimate	Expenditure	Progress %
285-1-1	Administration & Establishment Services	43,897,000	39,043,881	88.94
285-2-2	Agricultural Research and Development	185,130,000	114,163,127	61.67
285-2-3	Agricultural Extension and Training	85,150,000	66,546,317	78.15
285-2-4	Seed Certification and Plant Production	189,416,000	160,567,875	84.77
Total		503,593,000	380,321,200	75.52

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Table 4.3.2: Recurrent Expenditure – 2007 (Rs.)

Project	Project Description	Revised Estimate	Expenditure	Progress %
285-1-1	Administration & Establishment Services	185,411,191	175,941,822	94.89
285-2-2	Agricultural Research and Development	572,791,257	562,590,294	98.22
285-2-3	Agricultural Extension and Training	425,452,472	415,264,571	97.61
285-2-4	Seed Certification and Plant Production	320,310,654	309,937,844	96.76
Total		1,503,965,574	1,463,734,531	97.33

Table 4.3.3: Summary of Recurrent Expenditure by Category

Category/Object Title	Revised Estimate	Expenditure End of the Year Rs.	Progress %
Personal Emoluments	1,177,217,574	1,170,877,217	99.5
Traveling	26,400,000	24,167,387	91.5
Supplies	62,277,000	54,319,023	87.2
Maintenance Expenditure	26,319,000	20,950,799	79.6
Contractual Services	1,47,682,000	139,979,820	94.8
Transfers	63,470,000	53,440,285	84.2
Total	1,503,365,574	1,463,734,531	97.4

Table 4.3.4: Operation of the Advance Account Activities

	Approved limit Rs. (Revised)	Actual Rs.
1. Maintenance of agricultural farms		
Maximum limit of Expenditure	268,000,000	194,724,809
Minimum limit of receipts	162,000,000	211,179,353
2. Public Officers adv.Account		
Maximum limit of Expenditure	142,000,000	125,243,578
Minimum limit of receipts	86,000,000	99,022,691

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Table 4.3.5: Allocation Received under Ministry Votes

	Project/Programme Name	Revised Allocation	Expenditure	Progress %
1	Granary area programme	14,072,321	12,341,284	87.7
2	Agricultural productivity improvement	32,000,000	24,418,163	76.31
3	Implementation of Tree Felling & Soil Conservation Act	2,250,000	1,580,290	70.24
4	Micro irrigation development & rain water harvesting	7,250,000	6,042,612	83.35
5	Agro based industries development	12,500,000	5,733,797	45.87
6	Crop forecasting	2,000,000	1,999,991	100.00
7	Crop Zoning	43,830,000	36,328,793	82.89
8	Agricultural technology park Bata-atha	30,000,000	13,731,864	45.77
9	Home garden development	475,000	438,872	92.39
10	National Organic Standards & Certification	33,900,000	3,655,968	10.78
11	Training for fertilizer merchants	9,000		
12	Establishment of Agri. Equipment Centres	40,000		
13	Virus controlling – Homagama (PVIC)	200,000	61,472	30.74
14	To minimize damages of harvesting	1,100,000		
15	To popularize the traditional rice	274,200		
Total		179,900,521	106,333,106	59.11

Table 4.3.6: Revenue Earned by the Department

Category	Estimate (Rs.)	Actual Receipts (Rs.)
Loan interest	12,215,063	13,301,462
Sales of Capital Assets		
Other Receipts	8,500,000	27,374,760
Rent	165,000,000	15,879,828
Departmental Sales & other charges	40,000,000	37,831,029
Total	76,715,063	94,387,079

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Virus diseases in strawberry cultivation

Wilting in pineapple caused by mealy bug

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K. Sribalasundaram	*Dip. in Agric., AO, Agric. Extension*

PDOA, EASTERN PROVINCE

K. Pathmanathan	*M.Sc. (Agric.), PD, Extension*
R. Hariharan	*M.Sc. (Agric.), AO, Agric. Extension*
A.S.M. Haris	*B.Sc. (Agric.), DD, Agric. Extension*
K. Navendran	*B.Sc. (Agric.), DD, Agric. Extension*
P. Uganathan	*Dip. in Agric., DD, Agric. Extension*
T. Vetharaniyam	*B.Sc. (Agric.), ADA, Agric. Extension*
S.M. Hussain	*M.Sc. (Agric.), DD, Extension*

PDOA-CENTRAL PROVINCE

T.B. Herath	*M.Sc., PD, Extension*
W.G.D.A. Wimalarathna	*M.Sc., Deputy PD,*

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	Extension
S.M.K.Dissanayake	*B.Sc., ADA, Crop Science*
W.S.C.Perera	*M.Phil., DD, Crop Science*
P.R.P.Y.Pallemulla	*Postgrad. Dip., DD, Soil Science*
P.K.Senewiratne	*B.Sc., ADA, Horticulture*
S.M.B.Weerasekara	*Dip. in Agric., ADA, Extension*
D.M.H.Dissanayake	*Dip.in Agric., ADA, Horticulture*
M.P.K.Dodamwala	*B.Sc., ADA, Animal Husbandry*
V.N.Egodawatta	*Dip. in Agric., ADA, FWAE*
DGN Sandamalee	*B.Sc., ADA*
CSB Udangamuwa	*B.Sc., ADA*

PDOA-SOUTHERN PROVINCE

S. Rathnasiri	*B.Sc., PD(Acting), Extension*
L.B. Nimalarathna	*B.Sc., DD*
S.K.N. Rubasinghe	*B.Sc., ADA*
Mahesh Subasinha	*Dip. in Agric., ADA*
I.M.T. Pushpalatha	*Dip. in Agric., ADA*
M.M. Senanayake	*Dip. in Agric., ADA*
K.S. Sri Lal	*Dip. in Agric., DD*
P. Abeysinha	*Dip. in Agric., ADA*
M.W.S.A. de Silva	*Dip. in Agric., ADA*
C. Nanayakkara	*Dip. in Agric., ADA*
R.M.U. Gunawardhana	*B.Sc., ADA, Extension*

ADMINISTRATION DIVISION

W. Gamage Wickramasinghe	*Director (Administration)*
H.A.R. Wickramaratne	*B.Sc., DD, (Administration)*
L.A.D. Geetha Indrani	*B.A., Asst. Director, (Administration)*
R.M.M.S.B. Kobbekaduwa	*Asst. Director (Administration)*
K.B. Gunaratne	*M.Sc., ADA (Communication)*

ENGINEERING DIVISION

A.T.S. De S. Abeysuriya	*B.Sc. Eng., PG Dip., Act.Chief Engineer*
G.R.S.B. Gamlath	*B.Sc. Eng., C.Eng, MIESL, Civil Engineer*
K. Anpini	*B.Sc.Eng., C.Eng, MIESL, Civil Engineer*
P. Rajapakse	*B.Sc. Eng., C.Eng, MIESL, Civil Engineer*
B.M.W.L. Balasooriya	*B.S. Eng., AMIESL, Mechanical Engineer*
A.K.S.P.S. Wijayasoma	*B.Sc. Eng., Electrical Engineer*

FINANCE DIVISION

P.G.Weeratunga B.A., DPFM.DCS, Director (Finance)

W.K.S.Amarasinghe B.Sc. (Public Administration) ICA.(Lic), AAT, M.Sc. (Economics), DD(Finance)

A.M.I.B.Adikari *B.A,DPFM , DD(Internal Audit)*

K.M.Kularathna *ICA (Lic.), AD Public Service,* DD(Finance Management) *M.F.M.Fais B.Com., DD (Development)*

S. Siriwardana *GCE (A.L) IPFD, DD (Farm Accounts)*

D.K.Rajapathirana *B.Com. HNDA, ICA, Deputy Director (Salaries – II)*

Daya Disanayaka*B.Com. (special), Assistant Director* (P.O.Advance Accounts)

E.R.M.S.H.Ekanayake B.Com. (special), LICA, Assistant Director (Other Payments)

W.A.G.Weerasinghe B.Sc.(Business Management), AAT, IPFD, Assistant Director (Engineering Accounts)

U.G.C.AberathnaB.Sc.Mgt.(Special) Business Admin., Chartered Accountancy

(final), Assistant Director (Other Payments)

K.L.P.Rajakaruna B.Sc. Business Admin.(sp) Professional Part I – ICASL , Assistant Director (Project)

K. Sridharan
Diploma in PFM., Assistant Director (Salaries – I)

* On study leave

** On no pay leave

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7 STAFF POSITION (As at 2007.12.31)

CADRE POST	FCRDI					HORDI										RRDI		ETD	SCPPC	SPMDC	SEPC	ADM	ENG	FIN	TOTAL
	FCRDI	FMRC	GLOC RDC	RARDC/ARL	RARDC/VAV	HORDI	FCRDC	FRU	NRMC	PVIC	RARDC/BAN	RARDC/MK	ARS/SE	ARS/TW	ARS/GK	RRDI	RARDC/BW									
Sri Lanka Agricultural Service																									
Director General of Agriculture																						1			1
Director of Agriculture						1										1		1		1	1				5
Addl. Director of Agriculture			1				1		1																3
Deputy Director of Agriculture						1					1	1				1	1	10	2		3				20
Asst. Director of Agriculture																1		28				1			30
Registrar of Pesticides																			1						1
Asst. Registrar of Pesticides																									
Agricultural Officer									4									11	13	16	1				45
Research Officer	23		12	5	10	33	10	3	8	3	10	9	6	2	2	11	12		26						185
Lecturer																		46			1				47
Subject Matter Specialist									1	1								11							13
Agricultural Economist	1															1					11				13
Curator																									
Mechanical Superintendent																									

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(As at 2007.12.31)

CADRE POST	FCRDI					HORDI										RRDI		ETD	SCPPC	SPMDC	SEPC	ADM	ENG	FIN	TOTAL
	FCRDI	FMRC	GLOC RDC	RARDC/ARL	RARDC/VAV	HORDI	FCRDC	FRU	NRMC	PVIC	RARDC/BAN	RARDC/MK	ARS/SE	ARS/TW	ARS/GK	RRDI	RARDC/BW									
Superintendent of Press																									
Administrative Officer			1	1							1							1	1	2		3	1		11
Sri Lanka Administrative Service																									
Director (Administration)																						1			1
Deputy Director (Administration)																						1			1
Assistant Director (Administration)																						2			2
Sri Lanka Accountancy Service																									
Director (Finance)																								1	1
Deputy Director (Finance)																								6	6
Assistant Director (Finance)																								4	4
Accountant																									
Sri Lanka Engineering Service																									
Chief Engineer																							1		1
Engineer (Civil)																							3		3
Engineer (Mechanical)		3																1		1			1		6
Engineer (Electrical)																							1		1

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	FCRDI	FMRC	GLOC RDC	RARDC/ARL	RARDC/VAV	HORDI	FCRDC	FRU	NRMC	PVIC	RARDC/BAN	RARDC/MK	ARS/SE	ARS/TW	ARS/GK	RRDI	RARDC/BW								
Translator (English)																		1			2	2		1	6
Translator (Tamil)																					1				1
Economist Assistant							1			1	1	1				1		1			5				11
Statistical Assistant																									
Graduate Assistant																		1							1
Agricultural Monitoring Officer	1			1		2		3		4	1	3				6	3	27	22	3	1				77
Librarian						3																			3
Programme Assistant	7	1	8	2		18	7	5	5	9	9	7	4	4	1	9	7	53	22	4	9				191
Legal Assistant																			1			1			2
Media Assistant																		5							5
Audio Visual Assistant																		3							3
Development Assistant						1	1												1						3
Cartographer									1																1
Agricultural Productivity Enhancement Officer																									
Middle Level Technical Service																									
Agricultural Instructor	18	3	13	6	9	79	16	3	8	6	17	33	8	7	8	24	12	382	160	113	2				927
KVSN											3														3

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STAFF POSITION
(As at 2007.12.31)

CADRE POST	FCRDI					HORDI										RRDI		ETD	SCPPC	SPMDC	SEPC	ADM	ENG	FIN	TOTAL
	FCRDI	FMRC	GLOC RDC	RARDC/ARL	RARDC/VAV	HORDI	FCRDC	FRU	NRMC	PVIC	RARDC/BAN	RARDC/MK	ARS/SE	ARS/TW	ARS/GK	RRDI	RARDC/BW									
Research Assistant	7			1	2	11	1	2	2	1		6	2	3		4	8	4	18	1					73
Agricultural Research & Productivity Officer							1																		1
Instructor																									
Engineering Assistant																									
Farm Machinery Instructor		1																1		1			1		4
Soil Surveyor									5																5
Building Overseer/ Work Inspector														1			1						4		6
Foreman (Engineering)		1																		1					2
Budget Assistant																								2	2
Land Valuation Officer																									
Draughtsman		1																					1		2
Mechanical Officer																		1							1
Garden Assistant																		1							1
Foreman (Agriculture)																									
Photographer/ Dark Room Assistant																		1							1
Foreman (Press)																									
Composer																		3							3
Computer Operator																									
Matron																									
Research Sub Assistant	7				2	13			2				1						3						28

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CADRE POST	FCRDI					HORDI									RRDI		ETD	SCPPC	SPMDC	SEPC	ADM	ENG	FIN	TOTAL
	FCRDI	FMRC	GLOC RDC	RARDC/ARL	RARDC/VAV	HORDI	FCRDC	FRU	NRMC	PVIC	RARDC/BAN	RARDC/MK	ARS/SE	ARS/TW	ARS/GK	RRDI	RARDC/BW								
Audio Visual Technician																		1							1
Seed Technician																			15						15
Foreman (Garden)																									
Garden Conductor						1																			1
Secretary – Agriculture School																									
Artist																		2							2
House Warden																									
Librarian (Supra)																									
Cinema Machine Operator																		4							4
Sri Lanka Management Assistance Service	17			2			5		9			11	4				7	126	45	81	12	114		129	562
Clerk (Supra Grade)																									
Clerk		2	7		1	29		4		1	11			3									18		76
Typist – Sinhala																									
Typist – Tamil																									
Typist – English																									
Shroff																									
Store Keeper (Supra Grade)																									

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	FCRDI	FMRC	GLOC RDC	RARDC/ARL	RARDC/VAV	HORDI	FCRDC	FRU	NRMC	PVIC	RARDC/BAN	RARDC/MK	ARS/SE	ARS/TW	ARS/GK	RRDI	RARDC/BW								
Store Keeper				1			1			1								4							7
Stenographer – English/ Tamil																									
Stenographer – Sinhala																									
Book Keeper (Supra)																									
Book Keeper																									
Welfare Officer																									
Data Entry Operator																									
Farm Clerk						14						4						6	1	28					53
Telephone Operator																									
Roneo Operator																									
Book Binder																									
Book Binder (Press)																		1							1
KKS Arachchi																									
KKS			1			2			1		3	1						15	6	4	3	19		11	66
Peon		1					1																1		3
Office Watcher									2										2		2				6
Sanitary Labourer (Combined Service)																									
Office Labourer							6		4	4								3	4		7				28
Garden Labourer															40										40

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	FCRDI	FMRC	GLOC RDC	RARDC/ARL	RARDC/VAV	HORDI	FCRDC	FRU	NRMC	PVIC	RARDC/BAN	RARDC/MK	ARS/SE	ARS/TW	ARS/GK	RRDI	RARDC/BW								
Factory Clerk																									
Wharf Clerk																									
Time Keeper																		1							1
Proof Reader																									
Driver	6	2	7	4	1	14	4	1	6	2	6	4	2	2	1		1	63	34	41	8	6	2		217
Tractor Operator	5	1	2	4			1				3	4								21					41
Machine Attendant/ Machine Minder																		3							3
Machinist		1				2												2							5
Mechanic		1				4						1								7					13
Plumber		1																							1
Storeman	1	2					1												1	7		2			14
Lorry Cleaner																		3	2	9					14
Carpenter				1		5					1				1		1	5	1	4		2			21
Mason			1	1		2					1	1						1		1		2			10
Fitter																									
Welder		2	1			4												1	1	1					10
Blacksmith		1	1	1																					3
Tinker		1																		1					2
Electrician	1			1		4		1				1						2	5	3		1			19

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	FCRDI	FMRC	GLOC RDC	RARDC/ARL	RARDC/VAV	HORDI	FCRDC	FRU	NRMC	PVIC	RARDC/BAN	RARDC/MK	ARS/SE	ARS/TW	ARS/GK	RRDI	RARDC/BW									
Painter						1					1							1							3
Latheman		1																							1
Grass Cutter						1						1													2
Sprayer Operator																									
Earth Mover Operator						3									1			10							14
Sub Overseer																									
Machine House Operator		1						1																	2
Machine House Attendant		1																2							3
Pump Operator						2						2	1					2					1		8
Machine Operator						2												3	1	6					12
Label Designer																									
Bee Keeper																		7							7
Bee Demonstrator						1																			1
Budder	1			1		11					2	3								4					22
Circuit Bungalow Keeper	1			1		2					1	1					1	2	2	3					14
Garden Kangani																									
Livestock Keeper																									
Hostel Keeper																		2							2
Farm Manager											1							3							4
Assistant Farm Manager																									
Laboratory Sub Assistant								3			1								2						6

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	FCRDI	FMRC	GLOC RDC	RARDC/ARL	RARDC/VAV	HORDI	FCRDC	FRU	NRMC	PVIC	RARDC/BAN	RARDC/MK	ARS/SE	ARS/TW	ARS/GK	RRDI	RARDC/BW									
Steward																		1							1
Cook																		27							27
Tree Cutter																									
Tree Feller																									
Nurseryman						3						1	1												5
Watcher	9	4	14	10	4	55		4			9	8	1	3	4		2	63	28	68		6	2		294
Sanitary Labourer	1	1				2		1				1		1			2	12	1	6		4			32
Seedman																			3						3
Special Store Labourer												2						1	3	1			1		8
Special Laboratory Labourer						9						1	1	1					3						15
Unskilled Labourer (Grade III)	134	14	65	55	61	290		6			104	85	17	8			14		70	255		32	19		1229
Labourer (Casual)	138	9		38	9		59	5		9	49			18					30						364
TOTAL	378	56	134	136	99	625	116	42	59	42	236	193	48	52	58	59	72	972	530	697	69	193	64	154	5084

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8 TECHNICAL STAFF QUALIFICATIONS (As at 2007.12.31)

Institute / Centre / Office / Division / Unit		Diploma	B.A.	B.Com./B.Ed.	B.Sc.	M.I.E.	Postgrad.Dip.	M.A.	M.Sc./ M.Ed	M.Phil.	Ph.D.	Total
FCRDI	FCRDI	24			13		2		12	3	3	57
	FMRC	4	1		4							9
	GLOCRDC	11	1		17				4	2		35
	RARDC/ARL	7			5				1	1	1	15
	RARDC/VAV	1			4				5			10
HORDI	HORDI	79			26				12	5	11	133
	PVIC	9			10				2	1	1	23
	FCRDC	16	3		4				8	5	1	37
	FRU	4			5				5		1	15
	NRMC	16			10				5	1	2	34
	RARDC/BAN	15			1							16
	RARDC/MK	32	3		13				1	5	1	55
	ARS/SE	8			10				7		1	26
	ARS/TW	9		1	5				1		1	17
	ARS/GK	8	1		2				1			12
RRDI	RRDI	27	1		17				11		3	59
	RARDC/BW	15			15				5	2	2	
SCPPC	SCPPC	1			3				4			8
	SCS	130			10				4	1	2	147
	PPS	6			2				1			9
	NPQS	13			9				9	1	1	33
	ROP	7			5				3		1	16
	PGRC	15			3		2		7	3	5	35
	SPMDC	108			16				5	1	2	132
	SEPC	2	8		8				7		2	27
	ETC	392			122		3	2	87	7	5	618
ADM	ADM		2		1				1		1	5
	ENG				1	4	1					6
	FIN		2	4	3				1			10
	TOTAL	**959**	**20**	**5**	**341**	**4**	**8**	**2**	**208**	**38**	**47**	**1638**

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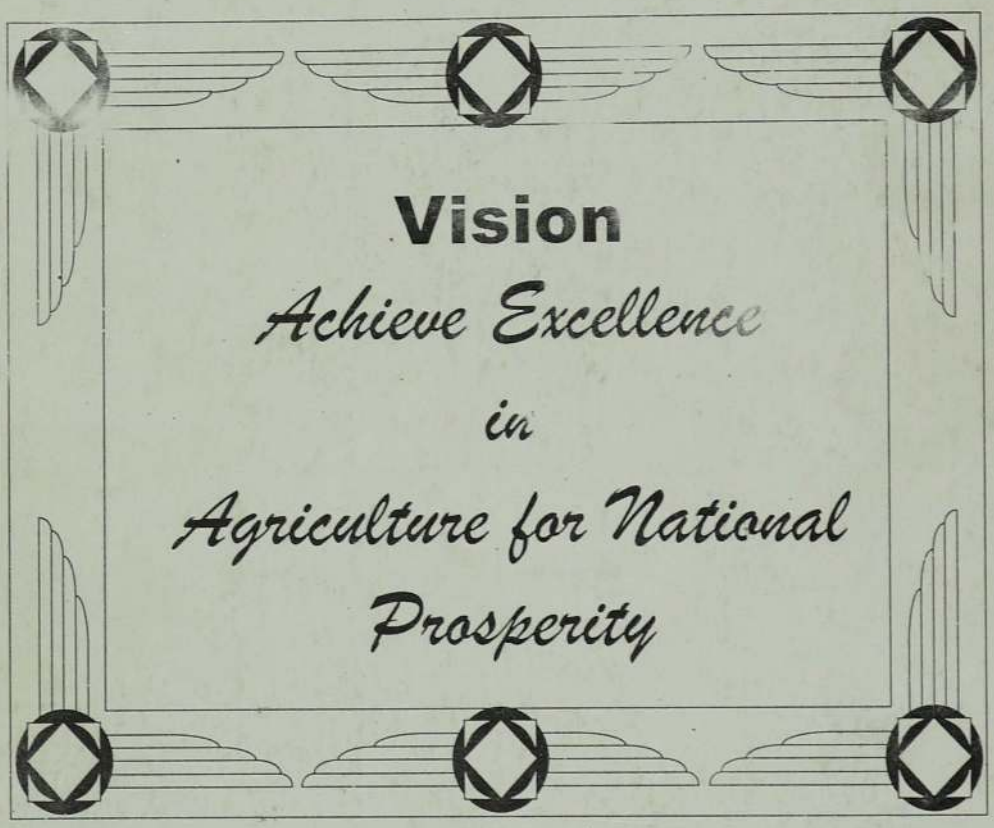

Agricultural Department Press, Gannoruwa, Peradeniya

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