



# **PERFORMANCE REPORT 2013**

**DEPARTMENT OF AGRICULTURE  
PERADENIYA  
SRI LANKA**

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## **Vision**

*Achieve excellence in agriculture for national prosperity.*

## **Mission**

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

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# CONTENTS

Foreword .....	vii
Abbreviations & Acronyms.....	viii
1.1 Field Crop Research & Development Institute (FCRDI) – Mahailuppallama .....	1
1.1.1 Grain Legume and Oil Crop Research & Development Centre (GLORDC) - Angunakolapelessa .....	14
1.1.2 Regional Agricultural Research & Development Centre (RARDC) – Aralaganwila .....	24
1.1.3 Regional Agricultural Research & Development Centre (RARDC) - Kilinochchi .....	29
1.2 Horticultural Crop Research and Development Institute (HORDI) - Gannoruwa.....	32
1.2.1 Food Research Unit (FRU) – Gannoruwa .....	54
1.2.2 Regional Agricultural Research & Development Centre (RARDC) – Bandarawela.....	58
1.2.3 Regional Agricultural Research & Development Centre (RARDC) – Makandura .....	64
1.2.4 Agriculture Research & Development Centre (ARDC) - Sita Eliya.....	70
1.2.5 Agriculture Research Station (ARS) - Telijjawila .....	76
1.2.6 Agricultural Research Station (ARS) - Girandurukotte .....	81
1.3 Fruit Research & Development Institute (FRDI) - Horana .....	85
1.3.1 Fruit Crop Research and Development Station (FCRDS) - Gannoruwa .....	100
1.3.2 Plant Virus Indexing Centre (PVIC) – Homagama .....	105
1.4 Rice Research & Development Institute (RRDI) - Batalagoda .....	112
1.4.1 Regional Rice Research & Development Centre (RRRDC) – Bombuwala.....	131
1.5 Natural Resources Management Center (NRMC) – Peradeniya .....	137
2.1 Seed Certification & Plant Protection Centre (SCPPC) – Gannoruwa.....	149
2.1.1 Seed Certification Service (SCS) – Gannoruwa .....	154
2.1.2. Plant Protection Service (PPS) - Gannoruwa.....	165
2.1.3 Office of the Registrar of Pesticides (ROP) – Peradeniya .....	170
2.1.4 Plant Genetic Resources Centre (PGRC) – Gannoruwa .....	181
2.2 National Plant Quarantine Service (NPQS) – Katunayake.....	187
2.3 Seed & Planting Material Development Centre (SPMDC) – Peradeniya.....	192
2.4 Socio Economics & Planning Centre (SEPC) -Peradeniya .....	205
3.1. Extension & Training Centre (ETC) - Peradeniya .....	210
3.2 Information & Communication Centre (ICC) – Peradeniya.....	232
4.1 Administration Division - Peradeniya .....	241
4.2 Engineering Division – Peradeniya .....	247
4.2.1 Farm Mechanization Research Centre (FMRC) – Mahailuppallama .....	251
4.3 Finance Division - Peradeniya.....	254
4.4 Progress Monitoring & Evaluation Unit (PMEU) – Peradeniya .....	257
5. Weather Report .....	262
6. Publications & Presentations .....	275
7. Senior Staff.....	284
8. Technical Staff Qualifications.....	304
9. Staff Position .....	305

## FOREWORD

Department of Agriculture, with a proud history spanning over 100 years is the main institute vested with the mandate of developing the agriculture sector in Sri Lanka. The Department owns a staff over 10,000 attached to 192 Institutes, Centres and Units spread throughout the island.

This Annual Performance Report presents the activities carried out by 10 technical institutes and 3 support service divisions of the Department of Agriculture during 2013. Information contained in this report will be of immense benefit for the researchers, policy makers and legislators in planning their future activities.

Department of Agriculture received a total allocation of Rs. 3,977 million for the year 2013, out of which more than Rs. 450 million were spent directly for the production and purchase of seeds and development of farms.

The Department has taken steps forward in the journey from green revolution to a white revolution, launched with the aim of continuous production throughout the year similar to white poly tunnel agriculture and transforming agriculture into a profitable, high-tech and environmentally friendly industry with due recognition and youth attraction. Marking steps in this journey, 3 new rice varieties and 4 new vegetable varieties have been developed during 2013 and seed production of certified other field crops and vegetables has increased by 16 % and 50 % respectively compared to year 2012.

Four new 'Krushi Seva Piyasa' were established to enhance transfer of new technology to farming community while 2 new 'Hela Bojun Alewi Piyasa' were set up in Peradeniya and Bata Atha, to improve women agricultural entrepreneurship and promote local food. Department of Agriculture won the award for the best exhibition site in the 'Deyata Kirula' exhibition in 2013.

The year 2013 marked another accomplishment for the Department through recruitment of the highest number of employees to its staff in a year, leading to overcome the dearth of staff prevailed for years considerably.

I wish to sincerely thank the entire staff of the Department of Agriculture for their contribution, commitment and support towards making such a remarkable progress and number of achievements. I also wish to extend a word of appreciation to the staff of the Progress Monitoring & Evaluation Unit and officers engaged in translation for their untiring effort in compiling, editing, translating and publishing the report amidst various difficulties.

  
Dr. R.R.A. Wijekoon  
Director General of Agriculture

## ABBREVIATIONS & ACRONYMS

Ac	-	acre	DATC	-	District Agricultural Training Centre
ADA	-	Assistant Director of Agriculture	DD	-	Deputy Director
Addl.D.	-	Additional Director	DD (R)	-	Deputy Director (Research)
AE	-	Agricultural Economist	Dip.	-	Diploma
AER	-	Agro Ecological Region	DL	-	Low Country Dry Zone
AFACI	-	Asian Food & Agriculture Cooperation Initiative	DOA	-	Department of Agriculture
AI	-	Agricultural Instructor	DRF	-	Dependable Rainfall
AMIE	-	Associate Member of the Institution of Engineers	dS	-	deci Siemens
ANSOFT	-	Asian Network for Sustainable Organic Farming Technology	DUS	-	Distinctness, Uniformity and Stability
AO	-	Agricultural Officer	ESCAP	-	Economic and Social Commission for the Asia Pacific
AVRDC	-	Asian Vegetable Research and Development Centre	FAO	-	Food and Agricultural Organization
AWRN	-	Api Wawamu Rata Nagamu	FSV	-	Farmer Services Vote
B.B.A.	-	Bachelor of Business Administration	FTF	-	Farmer Trust Fund
BL	-	Rice Blast	GAP	-	Granary Area Programme
BLB	-	Bacterial Leaf Blight	GM	-	Gall Midge
BPH	-	Brown plant hopper	GPS	-	Global Positioning System
B.Sc.	-	Bachelor of Science	HERP	-	High grade Eppawala Rock Phosphate
BSV	-	Banana Streak Virus	ICRISAT	-	International Crop Research Institute for Semi Arid Tropics
Bu	-	bushel	IITA	-	International Institute for Tropical Agriculture
CABI	-	Commonwealth Agricultural Bureau International	IL	-	Low Country Intermediate Zone
CARE	-	Cooperative Assistance and Relief Everywhere	IM	-	Mid Country Intermediate Zone
CARP	-	Council for Agricultural Research Policy	INFORM	-	Information for Agricultural Research Management
CCAFS	-	Climate Change, Agriculture & Food Security	INGER	-	International Network for Genetic Evaluation of Rice
CEC	-	Cation Exchange Capacity	IPM	-	Integrated Pest Management
CIP	-	International Potato Centre	IPO	-	Intellectual Property Office
CLS	-	<i>Circospora</i> Leaf Spot	IRFAON	-	International Rice Fine and Aromatic grain Observation Nursery
CNLD	-	Chilli Narrow Leaf Disorder	IRRI	-	International Rice Research Institute
CRI	-	Coconut Research Institute	IRSSTN	-	International Rice Soil Stress Tolerance Nursery
CRVT	-	Coordinated Rice Varietal Testing			
CZP	-	Crop Zoning Project			
DAS	-	Days After Sowing			

ISCAP	– Implementation of Soil Conservation Act Programme	NIAS	– National Institute of Agrobiological Sciences
ISPM	– International Standards on Phytosanitary Measures	NPK	– Nitrogen, Potassium and Phosphorus
ISTA	– International Seed Testing Association	OFC	– Other Field Crops
IU	- Up Country Intermediate Zone	PCCC	– Permanent Crop Clinic Committee
IW/ CPE	– Irrigation Water/ Cumulative Pan Evaporation	PD	- Provincial Director
JICA	– Japan International Cooperation Agency	PECRODEP	– Perennial Crop Development Project
KKS	– Karyala Karya Sahayaka	PET	– Potential Evapotranspiration
KOPIA	– Korean Project on International Agriculture	PeTAC	- Pesticide Technical Advisory Committee
KVSN	– Krushikarma Vyapthi Seva Niladhari	PGR	– Plant Genetic Resources
LCWZ	– Low Country Wet Zone	Ph.D.	– Doctor of Philosophy
L.L.B.	- Bachelor of Laws	ppm	– Parts per million
LSVAT	– Large Scale Varietal Adaptability Trial	PTWG	– Provincial Technical Working Group
M.A.	- Master of Arts	PYT	– Preliminary Yield Trial
M.Ec.	– Master of Economics	RA	– Research Assistant
M.Sc.	– Master of Science	RAPD	- Random Amplified Polymorphism Detection
MAI	– Moisture Availability Index	REAP	- Regional Economic Advancement Project
mg	– Milli gram	RGM	– Rice Gall Midge
ml	– Milli litre	RO	- Research Officer
mm	– Milli meter	ROIC	- Research Officer In Charge
MPET	– Medium density Poly Ethylene Terephthalate	RSC	– Rooted Stem Cuttings
mt	– Metric ton	RYP	– Red Yellow Podzolic
MYMV	– Mung bean Yellow Mosaic Virus	SLANRMP	– Sri Lanka Australia Natural Resources Management Project
MYT	– Major Yield Trial	SLUSDA	– Sri Lanka – United States Development Agency
NARP	- National Agricultural Research Project	SMS	- Subject Matter Specialist
NBPGR	– National Bureau of Plant Genetic Resources	SOA	– School of Agriculture
NCB	– Non Calcic Brown	SriLanKoRDAA	– Sri Lanka – Korea Rural Development Administration Allium
NCRVT	– National Coordinated Rice Varietal Trial	TOT	– Training of Trainers
NCVT	– National Coordinated Varietal Trial	TSP	– Triple Super Phosphate
NEAP	– National Environmental Action Plan	VAT	- Variety Adaptability Trial
		VRC	- Varietal Release Committee
		WL	– Low Country Wet Zone

- WM – Mid Country Wet Zone
- WMO - World Meteorological  
Association
- WU - Up Country Wet Zone

## 1.1 FIELD CROPS RESEARCH AND DEVELOPMENT INSTITUTE (FCRDI) - MAHAILLUPPALLAMA

Field Crops Research and Development Institute (FCRDI), Mahailuppallama and its satellite stations are responsible for developing varieties, other associated technologies and primary dissemination of the same to its stakeholders. In addition, it produces adequate quantities of nuclear seeds of all crops under its purview. FCRDI also caters to the enhancement of the productivity of regionally important rice and Dry Zone fruits and vegetables. *In-situ* conservation and utilization of indigenous germplasm of all Dry Zone food crops is also a mandate of the institute.

FCRDI system comprises of the main research station at Mahailuppallama, Grain Legume and Oil Crop Research and Development Center (GLORDC) at Angunakolapellessa, Regional Agriculture Research and Development Centers (RARDC) at Aralaganwila and Kilinochchi, Agriculture Research Stations (ARS) at Thirunelvely, Vavuniya, Karadiyanaru.

### BUDGET

**Table 1.1.1: Annual budget – 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	26,014,207	22,341,567	86
Recurrent	30,963,654	30,341,903	98
Projects			
Development of hybrid varieties of chilli, maize and onion	65,000,000	39,720,469	61
NARP			
I. Onion	1,000,000	920,310	92
II. Chilli	1,000,000	965744	97
III. Water Management	1,928,000	1,533,930	80
IV. Vegetable	200,000	167,097	84
KOPIA	3,131,000	1,113,759	36
<b>Total</b>	<b>129,236,861</b>	<b>97,104,779</b>	<b>75</b>

## PROGRESS

### CROP IMPROVEMENT

#### Condiments

##### Chilli

###### Chilli hybrid variety development program

- **F1 hybrids for NCVT**  
Eighteen (18) local F1 hybrids were tested and 6 F1 hybrids were selected for National Coordinated Varietal Trial.
- **New F1 crosses**  
Twenty (20) new F1 crosses were done and seeds were produced for field evaluation.
- **Development of parental lines**  
One hundred fifty (150) progenies with better agronomic traits were advanced up to F4 generation and 25 progenies with better agronomic traits were advanced up to F2 generation.
- **Development of male sterile lines**  
Crosses with male sterile line and 5 promising hybrid parent were done and 1<sup>st</sup> back cross were completed.
- **Evaluation of exotic chilli hybrids**  
Twenty five (25) exotic chilli hybrids were evaluated and five exotic chilli hybrids were identified as adaptable.

###### Chilli open pollinated (OP) variety development program

- **Production of chilli (OP) varieties**

###### F1 generation

30 new F1 crosses (single, double and three way crosses) were done and seeds were produced for field evaluation.

Eight new F1 crosses with Kochchi were performed to proceed with embryo rescue

to transfer the leaf curl tolerance trait. For virus tolerance, crosses and back crosses were made with MI-1 variety and Waraniya varieties to introduce the virus tolerance trait to MI-1 variety. Study is in progress.

###### F2 generation

Seventeen (17) selected populations with better agronomic traits were advanced for field evaluation.

- **Purification, selection and evaluation of Waraniya variety**

Plants were selected from segregating populations of Waraniya Green type.

Sixty plants were selected for the purification programme.

- **Maintenance and evaluation of local chilli landraces**

Jaffna selection, Hene miris having desirable characters were selected and off types were removed.

- **Purification of variety-MI 02**

Off types were removed and selected the plants with identical characters to maintain varietal purity of MI-02.

- **Promising Chilli lines**

The promising line PC 1, suitable for both green and dry chilli has short conical shape pods with light green colour and high pungency. It shows the yield potential of more than 15 t/ha of green chilli. This line will be submitted for varietal release committee.

## Onion

- In the varietal improvement programme, one line superior over Dambulla selection was identified. Confirmation of results are in progress.
- Storability of bulbs is a very important factor that should be considered in varietal development of onion. Out of the evaluated 18 lines, four big onion lines showed better storability than recommended variety Dambulla selection.
- National Coordinated Varietal Trials (NCVT) and Varietal Adaptability Trials (VAT) were conducted and adaptable varieties were identified.
- In the hybridization programme, 10 No. of families of F<sub>2</sub> generation were advanced to F<sub>3</sub> generation. Two new F<sub>1</sub> generations were developed.
- To enhance the diversity in variability of onion, mutations were induced by chemical means. Experiment is in progress.
- Exotic varieties should be checked under research conditions before introducing to farmers. Out of eight exotic big onion varieties evaluated in Yala 2013, 02 exotic varieties showed similar yielding ability to Dambulla selection.
- Varietal evaluation and selection programme consisting of 17 lines of cluster onion showed that the yields of 4 lines were higher compared to recommended varieties Vethalan and Thinnaveli Red. Experiment will be repeated to confirm the results.
- Development of a seed setting cluster onion variety is a timely need. A seed setting cluster onion line was evaluated for its seed production ability with the control

variety Vethalan. The new line produced higher seed yield than Vethalan.

- National Coordinated Varietal Trials (NCVT) were conducted to identify adoptable varieties.
- Salinity in soil is more critical in onion cultivation that can be developed with flood irrigation in the Dry Zone. Partially burnt paddy husk (PBPH) is used in rice cultivation to reduce salinity in paddy fields. Therefore, an experiment is designed to investigate the effects of PBPH incorporated at various depths of the beds grown with the onion variety Dambulla selection for bulb and seed production. The experiment was initiated Yala 2013 and will be continued until Yala 2015.
- In onion, rate of bulbing is strongly depend on red: far red ratio in particular photoperiod. Therefore an experiment was implemented in Yala 2013, to investigate effectiveness of coloured polythene compared to clear polythene in bulb and seed production of onion and the experiment will be continued till Maha 2014/15.

## Coarse Grains

### Maize

- Srikandikuning “MIOPV1”, an Indonesian open pollinated variety produced 4-5 t/ha at farmer fields which is comparable to the check variety, Ruwan.
- Six maize hybrids were received from CIMMYT (International Maize and Wheat Improvement Center), Mexico. These hybrids showed comparable yields (6-7 t/ha) with the commercial check hybrid

variety. The parental inbred lines of these six hybrids were also received from CIMMYT, Mexico and F1 seed production of selected hybrids were performed.

- Fourteen maize hybrids were received from CIMMYT, India. These hybrids were evaluated at two locations at FCRDI and GLORDC. Three promising hybrids having average yields of 5.5-6.5 t/ha were selected.
- Ninety four (94) new maize single crosses were developed from new maize inbred lines received from CIMMYT and these new single crosses will be evaluated in yield trials.
- Nine (09) exotic (imported by private companies) maize hybrids and two sweet corn hybrids were evaluated. Evaluation reports of maize hybrids PAC 296, PAC 293, Bigking, F4452, P4181, DK 9955, DK 9901 and DK 6818, were submitted.

### **Finger millet**

- Four (04) promising finger millet accessions were tested under VAT and the accessions were submitted for DUST.
- Eight (08) promising finger millet accessions were evaluated under advance yield trials. Those accessions showed average yields of 3.4-3.8 t/ha.

### **Sorghum**

- Six (06) promising sorghum accessions were evaluated under advanced yield trials. Those accessions showed average yields of 3.5-4.0 t/ha.

### **Foxtail millet**

- Six (06) foxtail millet accessions were evaluated under advanced yield trial, these accessions showed average yields of 2.0-2.5 t/ha.

## **Grain Legumes**

### **Mungbean**

- Eleven (11) mungbean F1 populations, having desired characters were established in the field.
- Twenty one (21) F<sub>2</sub> and 9 F<sub>3</sub> populations selected from F<sub>1</sub> and F<sub>2</sub> generations were established in the fields as bulk populations for generation advancement.
- Five promising lines having potential yields of 2 t/ha were tested in NCVT programme.
- Two (02) high yielding lines (MIMB 901 & MIMB 904) were tested in VAT to test the adaptability in the farmers' fields.
- High yielding line MIMB 113 was submitted for the DUST test.

### **Cowpea**

- Crosses were made and eight (08) cowpea F1 populations were obtained. These crosses were made to improve the varietal quality.
- Seven (07) cowpea populations selected from F<sub>1</sub> to F<sub>4</sub> generations were established in the fields for generation advancement.
- Five promising cowpea lines/ varieties were evaluated under rain-fed condition.
- Five cowpea lines with 3 standard varieties were evaluated under NCVT.

## **Black Gram**

- Nine (09) blackgram F1 populations identified with desirable characters were established in the field.
- Five (05) F2 populations were established in the fields for generation advancement.

## **Oil Seeded Crops**

### **Soybean**

- Eight (08) soybean F1 populations were evaluated for large cream coloured seed, high yield (> 6.5 t/ha), early maturity (85-90 days), determinate growth type, high N fixing ability, shattering tolerance and lodging tolerance.
- Seven (07) soybean germplasm received from AVRDC were evaluated for identifying better parents for future hybridization programme.
- Five (05) vegetable soy bean lines were evaluated with the standard variety, PB 1 in NCVT.

## **Vegetables**

### **Okra**

- Two (02) okra lines, OKS 1 and OKS 3 were identified for next Varietal Adaptability Trials.
- Three (03) okra lines were identified as suitable parental lines for future breeding programme.
- Six (06) new F1 crosses were made and seeds were produced.
- Three (03) exotic okra hybrids were evaluated for the adaptability and susceptibility to common pest and diseases under local conditions.

## **Fruits**

### **Grapes**

- Different training structures were evaluated with different grapes varieties. French MI and Israel Blue were the best performing varieties under all training systems.
- Gliricedia, Gansuria, Ipil-Ipil and Kilaway tree stems were tested as cost effective alternative poles for training grapes.
- Sixteen (16) varieties of grapes germplasm were maintained. Recommended varieties of grapes were also maintained as mother plants while producing the basic planting materials.

### **Mango**

- Twenty six varieties of exotic mango varieties and seven local varieties were maintained for future crop improvement programme. In addition, 100 plants of mango from different varieties produced by grafting were planted at the station.

### **Wood Apple**

- Eight wood apple accessions collected from dry zone of Sri Lanka were evaluated to identify high yielding accessions with good quality fruits.

### **Water melon**

- Eight exotic varieties were tested and one variety was identified as suitable for cultivation in the dry zone.

## **AGRONOMY**

- ‘Apsim Oryza’ crop model was parameterized and field validated for rice

crop. Parameterization and validation for maize and mungbean is in progress.

- Responses of maize crop to a temperature gradient across an environmental gradient was studied. There were statistically significant response patterns in terms of growth and yield. Optimum temperatures for growth and yield for the maize variety, Ruwan were identified.
- Significant differences were observed in phenology, growth and yield of mung bean, when grown at Kundasale and Mahailuppallama. These variations could be due to the response of the crop to the difference in temperature between two sites.
- Integrated effect of deep ploughing, mulching with gliricidia and compost application was tested for chilli in three consecutive seasons. Deep ploughing showed a significant impact on the growth and yield of chilli only during the 1<sup>st</sup> season. Application of gliricidia mulch at the rate of 5t/ha and compost at the rate of 10t/ha showed positive impact on chilli over the three consecutive seasons in the same site.
- A feasibility study was conducted for big onion mother bulb production during off seasons. The experiment was established in Mahailuppallama (DL1b), Kalpitiya (DL3), Vilachchiya (DL1f), Moragollagama (DL1b), Maho (IL3), Padaviya (DL1e), Muthukandiyā (DL1b) and Weeravila (DL5). Experiments at Vilachchiya, Padaviya, Muthukandiyā and Weeravila were badly affected due to rainfall. Mahailuppallama and Maho areas were suitable for off season cultivation. However, the bulb size was smaller compared to the bulbs harvested in a normal cultivation season. The experiment will be continued.
- An experiment was conducted to calibrate the 'SPAD' meter and Leaf Colour Chart (LCC) for chilli variety MI-green. The recommended rate of N, 150 kg/ha was found to be the optimum Nitrogen rate for chilli. SPAD meter readings greater than 42 have to be maintained at 3-4 weeks after planting and readings of above 56 have to be maintained from 5-12 weeks after planting for variety MI-green. LCC value above 4 has to be maintained throughout the growth stage. The experiment will be continued to confirm the results.
- Three open pollinated maize varieties brought from Indonesia were tested with exotic hybrid Pacific 999 super, local hybrid Sampath and local OPV Ruwan under high planting density (75 x 15 cm) and recommended planting density (60 x 30 cm) with Nitrogen levels of 200 kg/ha and 150 kg/ha. There was a significant yield difference between varieties. Srikandikuning and Sukumaraga (Indonesian varieties) recorded significantly lower yields compared to Pacific but gave equal yields compared to Ruwan and Sampath. Higher yields (> 22%) were obtained under the high density planting with higher fertilizer level compared to the present recommendation.
- An alternative nursery technique was tested for chilli and finger millet using parachute trays and medium sized nursery trays (128 holes/ tray). These were compared with the normal ground nurseries. There was no significant

differences between the ground nurseries and medium sized nurseries for Chilli. There was no significant difference between parachute trays, medium sized trays and the ground nurseries for finger millet. To develop an economical alternative nursery techniques this experiment will be continued.

- Flowering synchronization of maize was studied to overlap tasselling of male line with the silking of female line. Tasselling and silking is influenced by the growing degree days (GDD). There was a 7 days gap between male line planting to female line planting at the experimental site. Since environmental stress conditions may effect tasselling and silking, the study needs to be repeated at multi locations to arrive at a conclusion.
- An experiment was initiated with the objective of increasing onion true seed production by seed treatment with  $KNO_3$ . Bulbs dipped in 10%  $KNO_3$  level gave significant seed yield increment. The trial will be continued.
- A study was initiated to screen mungbean, genotypes as affected by soil moisture regimes during the Yala season in the low country dry zone of Sri Lanka. Mungbean variety, MIMB 901 was identified as a drought tolerant genotype, Ari was identified as a moderately drought tolerant genotype and MI 6 was identified as drought susceptible genotype. The study will be repeated to confirm the results.
- Variety screening of rice was performed for aerobic rice with raised beds. Bg 10-2907 gave the highest yield of 3.17 t/ha.

The highest pollen fertility (100% fertile) was recorded in Ar 08-513.

- Impact of canopy level temperature on pollen sterility of rice, soya and maize were studied under ambient conditions. Pollens were partially sterilized (80%) in variety At 06-631 at 37.8 °C of canopy level temperature with 45% RH at heading. During the early planting, soya variety MISB 1 and maize line CML 348 recorded highest pollen fertility.
- NCRVT program was conducted with the collaboration of RRDI, Batalagoda.

## **CROP PROTECTION**

### **Plant Pathology**

- Sheath blight is a major disease of Maize cultivation in Sri Lanka. It is important to develop a variety screening technique for sheath blight of maize under Sri Lankan conditions. Among the techniques used, inserting sclerotia to sheath showed better results by showing symptoms within 04 days and 100% disease incidence within 11 days. The experiment will be continued.
- Forty two (42) Mungbean germplasm were screened for the MYMV disease. Out of 42 germplasm tested, 25 were highly susceptible, 5 were susceptible, 3 were moderately susceptible, 2 were moderately resistant and 7 were resistant for the MYMV. Experiment will be continued.
- Twenty six (26) blackgram germplasm were screened for the yellow mosaic virus (YMV). Out of 26 germplasm tested, 2 were highly susceptible, 12 were susceptible, 2 were moderately susceptible, 4 were moderately resistant

and 6 were resistant for the YMV. Experiment will be continued.

- Two cowpea lines were screened for anthracnose and powdery mildew with the check varieties. IT 98k-205-8 was susceptible for anthracnose and resistant for powdery mildew disease. IT 97k-499-39 was moderately resistant for anthracnose and resistant for powdery mildew. Experiment will be continued.
- Two soybean lines were tested for soybean mosaic virus with the check varieties. The two new lines showed resistance for soya bean mosaic virus under prevailing weather conditions.
- New fungicide azoxystrobin 250g/l SC showed an effective control of downey mildew of grapes. The study should be repeated in pilot scale for the confirmation of the results.
- A study was conducted to identify the effect of different N levels on occurrence of diseases in chilli. Results showed present departmental recommended N level was the optimum N level (150 kg of N/ha) to reduce disease severity in chilli cultivation. The disease incidence increased with the increasing levels of N.
- A study was conducted to identify an effective type of Nitrogen fertilizer to manage the diseases in chilli cultivation. Three different types of fertilizers were used (Calcium nitrate, Albert's solution and Ammonium Sulphate) with department recommended fertilizer. Lower incidence of diseases were recorded in Calcium nitrate applied plots compared to other treatments.
- Anthracnose and purple blotch are the major diseases in big onion cultivation.

Thirteen (13) onion lines were evaluated for anthracnose and purple blotch. There were no varieties found to be resistant for anthracnose and purple blotch diseases.

- Yellow mosaic virus is the major constraint in okra cultivation in Sri Lanka. Thirteen (13) okra exotic varieties/ lines were evaluated for yellow mosaic virus. One exotic variety showed resistance for virus disease.
- Five (05) exotic onion varieties/ lines were evaluated for anthracnose and purple blotch during off season. One variety was identified as moderately resistant for purple blotch.
- Seven Kochchi/ Nai miris accessions were evaluated for leaf curl virus. One accession was identified to be resistant for the virus disease.
- An experiment was conducted to screen different fungicides for anthracnose in big onion. Among the tested fungicides, Azoxystrobin 250g/l SC was found to be effective in controlling anthracnose in big onion. Experiment will be repeated.

## Entomology

- An experiment was conducted to study the relationship between different levels/ sources of nitrogen fertilizer and leaf curl damage. The severity of leaf curl damage was low in calcium nitrate applied plots and liquid fertilizer applied plots compared to other treatments. Dry chilli yield was significantly higher in calcium nitrate applied plots.
- Twenty (20) onion lines were screened for pest damages along with local recommended variety, Dambulla

Selection. All the varieties/ lines were damaged by thrips. Onion caterpillar damage was not observed during the season.

- The method available for termite control is soil barrier treatment using large amounts of environmentally persistent chemicals. The Exterra baiting system was tested and recommended as an effective method in controlling termites.
- Laboratory studies were conducted to determine the susceptibility/ resistance of ten mungbean varieties for bruchid damage. Five varieties (EOUL, J41, DAHYEON, SOHYEON, JANGAHU) received from Korea and 04 varieties received from AVRDC were evaluated along with one locally recommended variety, MI-6. Three mungbean lines (MIMB 933, MIMB 934, MIMB 940) were identified as resistant for bruchid damage.
- Ten (10) exotic maize varieties were screened for insect pest damages with the local hybrid Sampath. All the exotic hybrids were damaged by stem borer. None of the hybrids were damaged by aphids during the season.
- Three new pests, bulb mite (*Rhizoglyphus spp.*), flower chafer beetle (*Oxycetonia versicolor*) and Tuber moth (*Phthorhmaea operculella*) were identified in onion cultivation.

### Weed Management

- An experiment was conducted to test weed control efficacy of Halosulfuron-methyl 75% WG and three formulations of Nicosulfuron on maize. Results revealed that three different formulations of

Nicosulfuron i.e. Nicosulfuron 240% SL, Nicosulfuron 4% SC and Nicosulfuron 75% WDG can be used successfully to control weeds in maize at the rates of 200ml/ha, 1250ml/ha, 50g/ha respectively as post emergent herbicides. The Halosulfuron-methyl 75% WG can be used to control sedges very effectively as a post-emergence herbicide at the rate of 80g/ha.

- Weed control efficacy of Oxyfluorfen 480 g/l SC on onion was studied. It was observed that the new formulation showed much better control of weeds on onion than existing recommended formulation of oxyfluorfen 240 g/l EC. It can be used as a pre-emergence herbicide at the rate of 300ml/ha.

### SOIL FERTILITY

- Maize is one of the crops that higher level of fertilizer was applied. Therefore, a need based nitrogen fertilizer management strategy may improve nitrogen fertilizer efficiency of the crop. An experiment was initiated with the use of Leaf Colour Charts (LCC) showed that the LCC can be employed to determine the nitrogen requirement of maize, reducing N losses.
- Urea is the most frequently used nitrogen fertilizer in onion cultivation. However, fertilizer use efficiency of Urea is low. An experiment was conducted to compare the fertilizer use efficiency of Urea and Ammonium Sulphate for onion. Ammonium Sulphate showed a higher efficiency compared to that of Urea. The experiment will be repeated to confirm the results.

- A series of repeated field experiments were planned to confirm the suitability of locally produced Eppawala Single Super Phosphate (ESSP) as a substitute for Triple Super Phosphate (TSP) for maize. The experiments conducted did not show any significant effect.

## WATER MANAGEMENT

- There is no irrigation recommendation for the hybrid maize grown in Sri Lanka. Therefore, a field experiment was conducted to quantify the different irrigation requirement at different growth stages for maize grown in Reddish Brown Earth (RBE) Soil. The five different irrigation water (IW)/ cumulative pan evaporation (CPE) ratios were selected and applied at different growth stages (1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> month period) of hybrid maize (Var. Pacific 999 super). The highest grain yield (9.3 t/ha) was recorded with the combination of 0.85, 1.15, 1.15 ratios at three stages, respectively. It was observed that water restriction during the second month is more critical on maize yield compared to that of the first and the third month of the growth cycle. Hence, the best combination of IW/ CPE ratio would be 0.7, 1.15, 1.15 at three stages, for the hybrid maize grown in RBE soil.
- Presence of hard seeds is a major problem in mung bean. Past experience with Harsha variety showed that soil moisture status influenced the level of hard seededness in mungbean. Hence, study was under taken to find out the critical moisture level for the minimum hard seed formation in different varieties.

Hard seededness was lowest in MI 6. In variety MI 6, hard seededness was not influenced by soil moisture variation.

- Department of Agriculture does not have a proven fertigation recommendation for chilli. The study conducted in Yala 2013 revealed that the fertigation with each irrigation event could be used to increase green chilli yield by around 22 % and water use efficiency by around 25 % compared to the manual application of fertilizer in RBE soil. The study will be repeated to confirm the results.
- Layout of the sprinkler system is very important to increase water use efficiency (WUE) and reduce cost of production. A study was initiated in 2013 to evaluate different layouts of the sprinkler irrigation system on growth and yield performance of onion in RBE soil. The results showed that the overlapping percentage of 40% could be applied in the layout of sprinkler irrigation system in order to reduce equipment cost as well as water consumption of onion cultivation in RBE soil. The study will be repeated to confirm the results.
- Soil conservation bunds are the most practicable way of upland soil conservation in the dry zone. However, there are few draw backs in this system. A long term study was initiated to evaluate different multifunctional soil conservation bund systems for rainfed uplands with supplementary irrigation facility in the dry zone. The experiment will be continued.

## BIOTECHNOLOGY

- Identification and confirmation of the sources (lines/varieties) with resistance/ tolerance for Chilli leaf curl virus.
  - Ten (10) local chilli accessions were field screened and two (02) accessions were morphologically identified as field tolerant for chilli leaf curl virus. Studies for conformation are progressing with molecular techniques.
- Incorporation of disease resistant characters through Wide Hybridization of chilli programme was initiated
  - Embryo rescue technique was developed for chilli.
- Development of a QPM maize lines/ variety using molecular markers
  - F1 population selfed to segregate the lines and first back cross was successfully completed.
- Micro propagation of important grape varieties through Seed Culture

Mass production of the grapes through seed cultures, under *in-vitro* conditions was initiated and culture initiation condition is in progress.

- Development of a new big onion line from Mutated Calli  
Different protocols are being tested for callus initiation.
- Identified sequence portions for developing transgenic resistance for chilli leaf curl virus

## SEED PRODUCTION

### Breeder and Certified/ Commercial

#### Seed Production

Following quantities of breeder and certified/ commercial seeds were produced and supplied to SPMDC and other relevant organizations by FCRDI (Table 1.1.2)

**Table 1.1.2. Quantities of breeder and certified/ commercial seeds produced during 2013**

Crop	Variety	Breeder seed production (kg)	Certified/ commercial seed production (kg)
Maize	Ruwan	39.0	-
	Bhadra	39.0	-
Finger millet	Rawana	29.0	-
	Oshada	29.0	-
Chilli	MI Green	3.5	52.0
	Galkiriyagama Selection	2.0	23.0
	MI 2	3.5	35.0
	MICH 3	5.00	-
Mung bean	Ari	27.0	33.0
	MI 5	31.5	21.0
	MI 6	49.0	14.0
Big onion	Dambulla Selection	True seeds 8.5	6.5
Black gram	MI 1	34.0	-
	Anuradha	38.0	79.0

Crop	Variety	Breeder seed production (kg)	Certified/ commercial seed production (kg)
Soy bean	Pb 01	175.0	55.0
	MISB 01	80.0	70.0
Cowpea	Dhawala	5.5	20
	MICP 01	57.0	-
	MI 35	10.0	46
	Waruni	46.0	-
	Bombay	24.6	-
Okra	Haritha	-	-
	MI 7	5.8	-
Bitter gourd	MC 43	7.0	-
Tomato	KC1	0.25	-
Snake gourd	MI Short	1.9	-
Drumstick	Dwarf variety	-	8.0

## TECHNOLOGY DISSEMINATION

- FCRDI scientists participated at various programmes as resource personnel,
  - Over 100 training programmes on OFC production were conducted for officers, farmers and for school, university and technical college students. Total number of participants were over 3000.
  - Six plant clinics were conducted
  - Participated at one national exhibition
  - Participated at Govi Sathiya
  - Over 250 field visits were made with extension staff
- Technical advices were provided for over 600 clients who visited the institute and over the telephone.
- About 14,000 leaflets on technical matters were distributed.
- Planting materials issued free for farmers and other institutes.  
Seed material: 55 kg (Chilli, Big onion, Mung bean, Black gram, Maize, Sorghum,

Cowpea, Soy bean, Finger millet, Ground nut, Sunflower, Okra, Tomato, Bitter gourd, Meneri, Foxtail millet, Drumstick)

- Seven university students completed their in-plant training at the institute. Five undergraduate students completed the final year research project at the institute.

## TV/ Radio Programmes

- Seven radio programmes and three TV programmes were broadcasted with the participation of FCRDI scientists during 2013.

## Newspaper Articles

- Six news paper articles were published with the participation of FCRDI scientists during 2013.

## DEVELOPMENT PROJECTS

Infrastructure Development to Support the Crop Improvement Programme of

Development of Hybrids and OPV's of Chilli, Maize and Onion

Following activities were planned and initiated under the project.

- Construction of an environmentally controlled large scale plant house for conducting experiment under controlled environment conditions
- Establishment of a rainout shelter for drought screening of varieties
- Construction of a rain shelter for conducting research.
- Construction of a thermo gradient chamber.
- Strengthening of irrigation facilities by rehabilitating/ upgrading the existing surface irrigation systems and introducing micro irrigation systems.
- Upgrading of existing laboratories, plant houses and storage facilities.
- Establishment of 02 large scale cold rooms.
- Acquisition of field machinery for appropriate mechanization of field activities
- Acquisition of laboratory equipment.
- Strengthening of the surrounding fence.

## PLAN FOR 2014

### Research

- Crop improvement and variety development of other field crops
- Studies on climate change effects of other field crops
- Development of new pest and disease management strategies for other field crops

- Enhancing water use efficiency and nutrient use efficiency for other field crops

### Breeder Seed Production

- Breeder seed production of recommended other field crop varieties and tomato, okra and bitter gourd.
- Breeder mother bulbs and seed production of recommended variety of onion (Dambulla Selection)

## STAFF LIST

Designation	No.
Director	01
Additional Director	01
Deputy Diirector (Research)	01
Research Officer	25
Agricultural Officer	01
Agriculture Economist	01
Programme Assistant (Agriculture)	03
Research Assistant	19
Agricultural Instructor	05
Research Sub Assistant	09
Technical Assistant	02
Public Management Assistants	
Service	14
Farm Cleaner	01
Office Assistant (KKS)	02
Driver	08
Budder	01
Storeman	02
Circuit Bungalow Keeper	01
Tractor Operator	04
Watcher	30
Labourer (Permanent)	119
Labourer (Contract)	204
<b>Total</b>	<b>454</b>

## .1.1 GRAIN LEGUMES AND OIL SEED CROPS RESEARCH AND DEVELOPMENT CENTRE (GLORDC) - ANGUNAKOLAPELESSA

Grain Legumes and Oil Seed Crops Research and Development Centre is the main agriculture research centre located in Southern Dry Zone. It is mainly focusing on the research and development programme of grain legumes, oil seed crops and regionally important vegetable and fruit crops. Transfer of technology to enhance agricultural productivity along with its satellite station at Weerawila is another mandate of the Centre. All the research programs are planned based on

both national and regional needs in the thematic areas of crop improvement, agronomy, plant protection, soil and water management.

In addition, the centre engage in breeder seeds and basic planting materials production, providing recommendations on site specific fertilizer application and dissemination of technical information to field officers, farmers and other interested people.

### BUDGET

**Table 1.1.1.1: Annual budget – 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	7,959,500	6,383,223	80
Recurrent	22,671,600	20,945,365	92
<b>Projects (NARP)</b>			
• Development of medium duration, high yielding large seeded groundnut varieties	268,700	264,700	99
• Adaptability testing of selected mustard lines	562,400	560,525	100
• Development of high yielding stem and root rot disease tolerant, white seeded sesame varieties	410,500	404,500	99
• Improvement of drought tolerant cowpea varieties	538,000	532,335	99
• Development of high yielding, short age mung bean variety suitable for catch cropping under paddy fields	350,800	350,800	100

<b>Vote</b>	<b>Allocation (Rs.)</b>	<b>Expenditure (Rs.)</b>	<b>Expenditure %</b>
• Development of efficient water management packages for cowpea and mungbean	840,000	792,976	94
• Identification of virus diseases in cowpea cultivation and develop a control package	492,500	492,000	100
• Study the effect of weeds on yield of groundnut and determine the critical crop – weed competitive period for groundnut	196,100	192,453	98
• Germplasm collection, conservation and evaluation of grapes to develop seedless grape varieties	1,317,400	1,265,225	96
• 100 million project	21,505,000	12,597,623	59
<b>Total</b>	<b>57,112,500</b>	<b>44,681,725</b>	<b>78</b>

## PROGRESS

### RESEARCH AGRONOMY

- Successfully completed a survey to identify the characteristics of the rainfed Agriculture System in Southern Dry Zone (DL<sub>1b</sub>, DL<sub>5</sub>). Cultivation of OFCs is mostly limited to small scale and cowpea and groundnut as the most popular OFC crops. Farmers mostly prefer crops such as Banana and Coconut. Though majority were aware of climate change, the adoption of soil and moisture conservation measures were poor. Farmers are willing to use new technologies, however adoption is minimal in traditional rainfed systems.
- Rhizobia inoculation on Mungbean in DL<sub>1b</sub> agroecological zone showed that significantly higher number of nodules with Rhizobium+DOA recommendation

of PK fertilizer though the yield was not significantly different.

- OFCs such as Black gram, Meneri and vegetable Soybean performed well in 3<sup>rd</sup> season (Planting just after Yala season). However these crops took more than 60 days to mature.

### NATIONAL COORDINATED VARIETY TESTING (NCVT)

#### Cowpea

- Four new entries were evaluated with standard checks of MICP 1, Waruni, and Bombay.

#### Mung bean

- Five new entries were evaluated with standard checks, MI5 and MI6.

## Maize

- Three OPV entries were evaluated with standard check, Ruwan.
- Fourteen entries of CYMMYT, India International Hybrids were evaluated with promising Hybrids NK 40 and Pacific 984.
- Multiplied promising Maize inbred lines of CML 451, and CML 171.

## CROP IMPROVEMENT

### Oil Crops

#### Ground nut

- Promising medium duration, medium size groundnut varieties (ICGV 87187, ICGV 86590, and ICGV 01276) were developed and submitted for the varietal release committee for official release.
- Promising 04 large seeded, 4 months age (ICGV 05200, ICGV 06189, ICGV 06216, ICGV 05198) , 02 large seeded, 3.5 months age (ICGV 06214, ICGV 06233) and 3 medium size, 3.5 months age (ICGV 00068, ICGV 04195, ICGV 00073) groundnut lines were identified for National Coordinated Varietal trials.

#### Mustard

- 03 promising mustard lines were tested in farmers fields and C 241, Buttala selection were identified for nominating to varietal release committee.

#### Sesame

- Promising white (ANKWS22 and ANKWS 38) and black seeded (ANKBS9) sesame lines were identified

for further evaluation in National Coordinated Varietal Trials.

- Thirty accessions were evaluated and six lines were selected for yield testing.

### Soybean

- 14 soybean lines were advanced to yields trials.

### Sunflower

- Two sunflower hybrids (Hyleic 41 and S40) were evaluated under field condition and identified as suitable for cultivation in Sri Lanka. S40 was moderately susceptible for leaf spot disease.

### Grain Legumes

#### Mung bean

- Fourty five accessions were evaluated and six lines were selected for Preliminary yield trials (PYT).
- Hybridization and advancement – Four crosses were made and F1 to F5 generations were advanced.
- Six selected mungbean lines were evaluated in Preliminary yield trials (PYT).
- Selected six mungbean lines were evaluated in Major yield trials (MYT).
- Selected individuals from mutated population (M2) was advanced.

#### Cowpea

- CP105 & CP128 were identified as comparatively drought tolerant cowpea accessions for PYT.
- CVA11 & CVA14 were identified as comparatively high yielding two

promising cowpea lines by varietal adaptability trials for nominating VRC.

### **Horsegram**

- ANK Black & ANK 3 were identified as comparatively high yielding two promising horse gram lines. These will be nominated for Varietal Release Committee.

## **Vegetables**

### **Pumpkin**

- ANKP-0075, ANKP-0069 ANKP-0070 ANKP-0045 and ANKP-0074 have been selected as promising lines.
- 8 inbred lines were produced with 70 % purity.

### **Okra**

- ANKO- 00001, ANKO -00022 and ANKO- 00016 were identified for NCVT.
- 6 hybrid lines were selected for further evaluation.

### **Thumba**

- Hybrid variety development programme was started to achieve high yielding, large fruit size variety.
- 16 crosses were made in the field for further evaluation.
- 64 germplasms were maintained as *ex-situ* conservation.
- Mother plant stocks of thumba varieties Visal and Keshara were maintained in the field.

### **Big Onion**

- 150 nurseries were established to provide seedlings for farmers. Another 150 nurseries were established for research and development at GLORDC.

### **Ruhunu chilli**

- Ruhunu miris populations with their original characteristics were selected.

## **HORTICULTURE**

### **Wood apple**

- Collected and grafted 64 accessions of wood apple originated from different parts of Sri Lanka.

### **Beli**

- Collected and grafted 15 accessions of Beli fruit originated from different parts of Sri Lanka.

### **Mango**

- Completed the hard pruning and rejuvenation of older mango plantation at GLORDC, Angunukolapalessa.

### **Banana**

- Initiated the evaluation of 9 promising banana accessions of Kolikuttu (2), seeni kesel (4) and Embul banana (3).
- Successfully maintained the mother plant orchard of banana varieties of agra and nadee.

### **Papaya**

- Twelve lines tolerant to Papaya Ring Spot Virus (PRSV) were identified for varietal development programme (Generation 3).

## **Grapes**

- Established a field experiment with four seedless grape accessions and four seeded grape varieties.

## **SOIL SCIENCE**

- Evaluated two local bio fertilizers for nitrogen fixing and phosphorus solubilizing for paddy.

Both bacteria performed better than the zero Nitrogen and phosphorus. However, their contribution was not sufficient to meet 50% of inorganic fertilizer.

- Evaluated two local liquid fertilizers (Golf and SMC express) for paddy.

There was no effect found on paddy yield during the tested season.

- Collected hundred soil samples from the southern Dry Zone and analyzed them for major and micro nutrients.
- Identified salt accumulated areas of the GLORDC and introduced reclamation package for the affected areas.
- Continued soil testing programme.

## **WATER MANAGEMENT**

- Water retention curve for the region was developed and 6 day interval irrigation found to be the best. Fertigation studies revealed that split application of fertilizer with fertigation can double the yield of Chillie.
- During 2012/13 Maha crop water requirement for mungbean was 193.86mm and that for Yala was 239mm. Crop Coefficient varied from 0.5, 1, 1.2, and 0.7 for initial development, mid-season and late season stages.

- Black polythene mulch showed superior performance among other treatments under water stress condition for chillie.

## **FOOD SCIENCE**

### **Mung bean**

- Nutritional status (Crude fat, Moisture & Ash) of 4 released varieties and 7 promising lines of Mung bean was evaluated. Among those varieties, Ari recorded higher content of minerals. Higher fat content was found in Ari, Harsha and MI 06.

### **Groundnut**

- Nutritional status (Crude fat, Moisture & Ash) of 3 released varieties and 3 promising lines in medium size groundnuts were evaluated. Mineral content was significantly different in variety ICGV 01276. Fat content was comparable to all the varieties.

### **Banana**

- Successfully tested methodologies to extract “Embul” banana nectar by mechanical means.

## **PLANT PATHOLOGY**

- Thirteen accessions of mungbean together with MI-5, MI-6 varieties screened under field condition for Mungbean Yellow Mosaic Virus (MYMV) disease. 12 genotypes were identified as resistant (MB4, MB27, MB28, MB34, MB35, MB49, MB52, MB55, MB61, MB66 and MB71)

- Among the eighty accessions of cowpea varieties screened for viruses, 50 highly resistance lines were found; 27 genotypes were identified as resistant. Six were moderately resistant and one entry was found to be moderately susceptible under field condition.
- Application of sprinkler irrigation, cover net and Polythein mulch gave the significantly lowest infected plant percentage for chili leaf curl. The highest disease was recorded with furrow irrigation.

## ENTOMOLOGY

- Field establishment of three weeks aged finger millet seedlings one week prior to the establishment of mungbean as an intercrop, treating mungbean seeds with Thiomethoxam 70% WS, establishment of yellow sticky traps and cultivating marigold as a repellent crop was found to be effective in minimizing Yellow Mosaic Virus infestations in Mungbean.
- Application of Neem seed water extract at the rate of 40g/1l water or Neem oil at the rate of 3ml/1l water found to be effective in preventing field infestations of *Callosobruchus maculatus* in Cowpea.
- Three layer bag made with High Density Poly Ethylene (HDPE) 100 microns and

normal polysac was identified as the optimal hermetic storage structure for Bruchid free legume storage, having the shelf life of six months.

## WEED SCIENCE

- Weed control study for groundnut revealed the critical weed free time period for groundnut which is between 3 and 8 weeks from planting.

## ARS, WEERAWILA (DL<sub>5</sub>)

### Groundnut

- Ten days irrigation interval can be considered as the most cost effective irrigation interval for groundnut

### Big onion and Red onion

- Planting in month of September, October and December is not suitable for big onion as the crop was affected by fungal disease such as anthracnose and bulb rot.

## SEED & PLANTING MATERIAL PRODUCTION

- 750 Thumba plants were produced and disseminated during the year.

**Table 1.1.1.2: Seed production during 2013**

Crop	Variety	Seeds			Planting material	
		Breeder seed (kg)	Commercial seed (kg)	Consumption seed (kg)	No. Produced	No. Issued
Groundnut	Tikiri	60				
	Indi	106				
	Walawa	22	2865	-		
	Tissa	90				
	ANKG 1	22				
Sesame	Uma	3.5		-		
	Malee	1.5	215			
Cowpea		-	70	-		
Mung bean		-	80	-		
Soy bean		-	-	188		
Paddy		-	16138	7488		
Finger millet		-	214	112		
Maize				73 (Seeds)		
				575 (Fresh cobs)		
Mandarin		-	-	-	10,000	1,300
Pomegranate		-	-	-	15,000	10,000
Banana for TC mass propagation		-	-	-	-	2,300

## TECHNOLOGY TRANSFER AND TRAINING

- Conducted radio programmes on
  - Research , development and services of GLORDC.
  - Imported Hybrids of Maize vs Local varieties of Maize in Ruhunu gevaththa
  - Technology dissemination of finger millet cultivation
  - Onion cultivation for farmers in Hambantota District

- Safe handling of Pesticides
- Varieties released by the Department of Agriculture in 2013

### Services provided

- Soil test based fertilizer recommendation - 24 samples analyzed
- Farmer advisory service
- Crop clinics

## Foreign Trainings

- Grain legume, oil crops and irrigation system comprehensive utilization technology for developing countries- China.
- Soil and water management IAEA- Austria.
- Regional Workshop on Micro, Small and Medium Food Processing Enterprises Policy Measure for Asian Region.
- New mutagenesis approaches in crop plants –IAEA-RCA, China.

## PLAN FOR 2014

### Groundnut

- Varietal improvement through conventional and mutation breeding.
- Varietal screening for pests and diseases.
- National coordinated varietal trials of large and medium duration for groundnut and variety adaptability testing trials of groundnut.
- Breeder seeds production of groundnut varieties- Tissa, Indi, Tikiri, Walawa, ANKG1.
- Seed multiplication of promising groundnut lines.

### Sesame

- Varietal screening for yield, pest and disease tolerance.
- Varietal improvement through conventional and mutation breeding.
- Breeder seeds production of sesame- Uma, Malee.

### Mustard

- Seed multiplication of promising mustard lines.

### Soybean

- Hybridization program of soybean.

### Mung bean

- Varietal improvement programme.
- Preliminary yield trial for development of high yielding early maturing mungbean variety (PYT).
- Major yield trial for development of high yielding varieties with high quality seeds with other agronomic characteristics (MYT).
- Development of drought tolerant mungbean variety through induced mutation techniques.
- Seed multiplication of promising lines for NCVT and other research activities.

### Cowpea

- Varietal screening for yield, pest and disease tolerance.
- Development of drought tolerant cowpea varieties through conventional plant breeding techniques.
- Varietal improvement programme.
- NCVT trials of short duration cowpea lines.
- Seed multiplication.

### Agronomy

- Impact of Inoculation on Mung Bean in DL<sub>1b</sub> Agroecological Zone.
- Evaluation of OFC for the Third season cultivation.

## Soil Science

- Plant nutrient response studies of ground nut and big onion.
- Assessment of soil fertility status.

## Water management

- Identification of efficient water management techniques for chilli and mung bean.

## Pathology

- *In-vitro* mutagenesis of banana for Fusarium wilt (*Fusarium oxysporium .sp. cubense (Foc)* resistance/ tolerance.
- Management of virus diseases in cowpea, leaf curl complex of chilli and bulb rot in onion.
- Development of *Fusarium* wilt tolerance in banana.

## Entomology

- Management of major field insect pests of cowpea.
- Introduction of Hermetic storage conditions for legumes and cereals.

## Weed science

- Weed management in groundnut.

## Food science & technology

- Evaluation of nutritional status of Mung bean, Groundnut and banana.
- Determination of best harvesting time for boiling ground nut.

## Vegetables

- NCVT of okra open pollinated lines.
- Selection of YMVV resistant okra lines.

- Yield trial of hybrid okra lines.
- Population improvement of selected pumpkin lines.
- Evaluation of selected hybrid lines.
- Maintenance of available germplasms.
- Production of planting materials.
- Varietal improvement of Okra, Pumpkin, Thumba and Ruhunu miris.

## Fruits

- Evaluation of field gene banks of wood apple and beli fruit.
- Evaluation of banana accessions.
- National coordinated varietal trials.
- Evaluation of selected heen naaran accessions under DL1b condition.
- Evaluation of different grafting methods and nursery conditions for wood apple.
- Study of outer canopy ball pruning and high density planting of mango.

## STAFF LIST

### GLORDC, Angunakolapelessa

Designation	No.
Additional Director	01
Deputy Director	01
Research Officer	14
Programme Assistant	01
Development Officer	03
Farm Manager	01
Research Assistant	10
Agriculture Instructors	05
Research Sub Assistants	05
Administrative Officer	01
Management Assistants	05
K. K. S.	01
Circuit Bungalow Keeper	01
Tractor Operator	02

<b>Designation</b>	<b>No.</b>
Driver	07
Watcher	13
Labourer (Permanent)	40
Labourer (Contract)	156
<b>Total</b>	<b>269</b>

### **ARS, Weerawila**

<b>Designation</b>	<b>No.</b>
Research Officer in-charge	01
Research Assistant	02
Tractor Operator	01
Driver	01
Watcher	03
Laborer (Permanent)	10
Laborer (Contract)	08
<b>Total</b>	<b>26</b>

## 1.1.2 REGIONAL AGRICULTURAL RESEARCH AND DEVELOPMENT CENTRE (RARDC) – ARALAGANWILA

Regional Agricultural Research and Development Center, Aralaganwila comes under the purview of Field Crops Research and Development Institute, is engaged in research and development activities of the field crop sector. In addition it has the mandate to cater the agricultural technological needs, covering rice, vegetable and fruit crops of its commanding area comprising of Mahaweli systems B, C, D & G, Eastern province and

inter-provincial area of Polonnaruwa. Apart from its regional programmes, the center collaborates with the nationally coordinated research and development activities by executing research and development programmes in the disciplines of Agronomy, Entomology, Plant Pathology, Plant Breeding, Soil & Water Management and Horticulture.

### BUDGET

**Table 1.1.2 1: Annual budget – 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Recurrent	11,910,000	9,983,889	84
Capital	7,767,000	5,605,138	72
Projects			
100 million seed production program	7,895,000	3,238,450	41
Papaya breeder's seed program	105,000	-	0
Banana NARP	50,000	45,000	90
Water management NARP	960,000	863,438	90
<b>Total</b>	<b>28,687,000</b>	<b>19,735,916</b>	<b>69</b>

### PROGRESS

#### VARIETAL IMPROVEMENT

##### Rice

Seven lines of 4- 4.5 months, 18 lines of 3.5 months, four lines of 3 months and five lines 2.5 months maturity classes out yielded the check varieties at Aralaganwila in the NCRVT programme.

##### Cluster onion

- 79 accessions of cluster onion were evaluated according to their morphological and quality characters. Nine short duration accessions (< 60 days) and 22 bolting type (> 5% bolting) accessions were selected for Major Yield Trial. NCVTs conducted showed two

promising cluster onion lines (ACA 16 & ACA 66) with high yield and high quality (Avg. 13 t/ha). These two varieties were selected for VAT.

- All the following cluster onion lines were allowed for self pollination to confirm the Male Sterility. All the lines were observed to be fertile under self-pollination. Further confirmations will be done.
- Gametocide for development of hybrid seeds in cluster onion.  
Different concentrations of Gibberalic acid was used as gamocide. Data analysis is in progress.
- Seeds from 13 crossed lines & open pollinated lines (cluster onion) were collected.

## **HORTICULTURAL CROPS**

### **Mango**

- Fifty eight promising mango accessions were maintained and evaluated. Quantitative and qualitative yield data were collected. ACC 116 and 28 showed the highest Brix value of 21.0 while ACC 27 had the largest fruit size (330 g). Data collection is in progress.
- Flowering and shoot development behavior in the varieties of Karathakolomban and Velleikolomban was studied. Flowering started in the 2<sup>nd</sup> week of August and 61% and 30% flowering were observed in Velleikolomban and Karathakolomban respectively.

### **Banana**

Seven Seeni kesel banana accession were evaluated under NCVT programme.

Accessions HCK 143, PGRC1 and MKS produced over 8 kg of bunch weight. Experiment is in progress.

### **Papaya**

Papaya field was established for breeder's seed production of Rathna variety. This field was registered under the Seed Certification Service.

### **NCVT**

#### **Sweet Potato**

Malaysian variety produced a higher yield when compared to other check varieties.

#### **Brinjal**

Four accessions showed higher yields when compared with check varieties.

#### **Bitter Gourd**

Accession T16 showed a high yield of 10.5 mt/ha when compared to other tested accessions.

#### **Cucumber**

Accession H18 showed a significant yield of 27.7 t/ha compared to other accessions.

## **UNDER UTILIZED CROPS**

### **Thibbatu**

Around 60 plants of variety Bindu was maintained as field gene bank.

### **Spine Gourd**

Introduced four new accessions to the existing gene bank of 42 accessions and evaluated for heat tolerance and quality characters. Evaluation is in progress.

Accession received from Bangladesh was crossed with local parent and F1 seeds were obtained. Study will be continued.

## **PLANT PATHOLOGY**

- Fungal bulb rot is a severe threat in red onion cultivation in Sri Lanka. Application of 15 t/ha – 20 t/ha of cow dung at planting or 10 t/ha two weeks before planting were identified as a good method to control fungal bulb rot in cluster onion.
- Suitable onion varieties in terms of disease incidence for different regions were identified. Best varieties identified were Vethalan and ACA 16 for Aralaganwila, TVS for Kilinochchi.
- Effect of the duration of bulb treatment and the effective fungicide to control fungal bulb rot in cluster onion. Research is in progress at Aralaganwila and Thirunelveli.

## **SOIL SCIENCE**

### **Long term application of chemical fertilizer and organic matter *in situ***

The results showed green manure application has favorable effect on soil properties of NCB soil.

### **Long term application of chemical fertilizer and organic matter *ex situ***

Results indicate that the crop residue+green manure has more favorable impact (yield >4.5 t/ha) on rice yield.

### **Role of root architectural traits in water limited environment of Mung bean**

Six cultivars of Mung bean were cultivated in root chambers. Architectural differences of root growth which can impact on soil exploration and water extraction were observed.

### **Genotypic differences of root angle in mung bean**

Genotypic differences in root angle of mung bean was observed. Root angle affects the root occupancy of soil profile and effectiveness of water extraction.

### **Spatial and temporal distribution of macro and micro nutrients in paddy soil of Mahawali system B**

Covering over 100 locations analysis for macro (P,K) and micro (Mg, Zn, Mn, Cu, Fe, Mo) elements were performed. It was found that P, K, Zn were inadequate and Fe was in excess.

## **WATER MANAGEMENT**

- Experiments conducted on effective water management practise for cluster onion showed 3 days irrigation interval can successfully be used for NCB soil.
- Suitable overlapping % of sprinklers tested for red onion and found that 60% overlapping as a good method. Experiment is in progress.

## SEED & PLANTING MATERIAL PRODUCTION

**Table 1.1.2.2: Seed & Planting material production in 2013**

Crop	Variety	Seed/ Material production
Cowpea	Dhawala	85 kg of Breeder seeds
Dragon fruit		25 potted plants distributed
Banana	Seeni & Embul	100 plants for farmers
Spine gourd		487 potted vines distributed
Thibbatu	Bindu	Distributed 120 g of seeds for farmers & 1000 (2 g) seed packets at the 'Govi Sathiya'

## PROJECTS AND OTHER PROGRAMMES

- **Red onion coordination programme in 2013**
- **Supervision of university research students**

One student of the Rajarata University conducted the research for his degree programme.

## Dissemination of Technical Knowledge

### Leaflets

- **Onion:** Disease on red onion in Sinhala and Tamil medium were prepared.

### Field days and Trainings

- **Training programmes:** Conducted training programmes for AOs (Mahaweli), AIs, FAs (Mahaweli), farmers and school children.
- **Crop clinics:** Attended as resource persons and technical solutions were provided to farmer's field problems.
- **Farmer training programmes on red onion were conducted**

### Services

**Soil testing:** Analyzed 820 soil samples and recommendations were given accordingly.

## PLAN FOR 2014

### Varietal Improvement

#### Onion

- Characterization of germplasm and varietal improvement.
- Varietal improvement of cluster onion for pest and disease resistance.
- Development of Cytoplasmic Male Sterility line (CMS) in cluster onion.

#### Spine gourd

- Screening, hybridization, NCVT's and planting material production.

#### Thibbatu

- Breeder seeds production.

## Horticulture

### Mango

- Germplasm evaluation.
- Effect of environmental factors (Temperature) on transformation from vegetative to flowering phases.
- Control and management of mango hoppers.

### Guava

- Rapid multiplication.

### Dragon fruit:

- Vine training and pruning.
- Off seasonal flower induction.

## Plant Pathology

### Cluster onion

- Disease management in cluster onion.
- Technical and social aspects of agrochemical use in agricultural areas.
- Evaluation of pest and disease infestation in red onion cultivation.
- Evaluation of different storage methods.

## Water Management

- Crop suitability mapping for Galwewa series soil (a case study).
- Climate change impacts on Rice and Maize Production in Sri Lanka.
- Evaluation of soil conservation bunds with economically value crops in NCB soil.

## STAFF LIST

Designation	No.
Deputy Director (Research)	01
Research Officer (SLAgS)	05
Research Assistant	06
Agriculture Instructor	01
Acting Administrative Officer	01
State Management Assistant	02
Store Keeper (MA)	01
Research Sub-Assistant	05
Technical Assistant	02
Driver	06
Electrician	01
Watcher	13
Tractor Operator	03
Carpenter	02
Blacksmith	01
Circuit Bungalow Keeper	01
Budder	01
Labourer	30
Labourer (Contract)	50
<b>Total</b>	<b>132</b>

## 1.1.3 REGIONAL AGRICULTURE RESEARCH AND DEVELOPMENT CENTRE (RARDC) - KILINCHCHI

The mandate of the Regional Agriculture Research and Development Centre, Kilinochchi and its satellite stations at Vavuniya, Thirunelvely and Mullaitivu (re-establishing) is to conduct agricultural research and development activities with an emphasis on other field crops while catering to the needs of farmers in the Northern region. The

adaptive research station Mullaitivu is being relocated at Oddusuddan.

RARDC, Kilinochchi comes under the purview of FCRDI, Maha Iluppallama. Multi disciplinary research and development activities were conducted at Regional Agriculture Research and Development Centre, Kilinochchi and its satellite stations at Vavuniya and Thirunelvely.

### BUDGET

The budgetary allocation and expenditure under different votes are presented in Table 1.1.3.1.

**Table 1.1.3.1: Annual budget – 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	854,498	72,238	8
Recurrent	2,953,500	2,336,487	79
<b>Total</b>	<b>4,505,998</b>	<b>2,647,184</b>	<b>59</b>

### PROGRESS

#### CROP IMPROVEMENT

##### NCRVT and VAT

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

#### PLANT PROTECTION

##### Chilli

An experiment was conducted on chilli to manage the thrips population. It was observed

that palmyrah leaves were more suitable as a fencing material to reduce the thrips population and increase the yield of Chilli.

Similarly, bitter gourd performed well as an intercrop in reducing the thrips population of Chilli.

##### Green gram

An experiment was conducted on green gram to manage the pod borer damage by establishing border crop. In this experiment border crop of castor performed well reducing the pod borer infestation in green gram.

## Brinjal

Evaluated efficacy of insecticides against shoots and pod borer (*Leucinodes orbanalis*) at RARDC, Kilinochchi. The spinetoram performed well and showed to be effective in reducing the incidence of shoot and pod borer damage.

## Rice

An observational study was performed to control rice leaf folder by using *Calotrophis* leaves. Results showed the presence of insecticidal properties in *Calotrophis* leaves.

## WEED MANAGEMENT

- An observational study was carried out on pre emergent herbicide. Oxyfluorfen 240 g/l EC (Goal 2XL) performed well for dry seeded rice in Maha season.
- Tiobencarb 400g/l+Propanil 200g/l EC (Satunil) and Pretilachlor 300g/l + Pyribenzoxim 20g/l EC (Solito) showed significant level of control in prominent sedge *Cyperus iria* and showed no phytotoxic effect on Rice.
- Under the National Coordinated Herbicide Screening trial, 23 herbicides were tested to re-evaluate the weed controlling ability for dry seeded rice.

## SOIL AND WATER MANAGEMENT

### Testing of soil samples

Tested 500 soil samples collected from salinity affected areas of five Districts from Northern province. Reports were given to farmers.

## Soil sustainability study for crop diversification under Iranaimadu Command Area

Under this study 103 soil samples were collected and analyzed.

## MAINTENANCE OF THE FRUIT GERMPLASM

Maintained the Germplasm of mango, jack fruit, pomegranate, grape and banana at RARDC, Kilinochchi.

## BASIC SEED PRODUCTION

**Table 1.1.3.2: Production of basic seeds during 2013**

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

## TECHNOLOGY DISSEMINATION

RARDC conducted training programmes, field days & demonstrations on OFC and rice for farmers, university students and school students in Kilinochchi and Mullaitivu districts. Following activities were also conducted.

- Six field demonstrations –Rice, Chilli, Onion, Green gram and Ground nut, weed management.
- 03 field days.
- 64 Crop clinics in Mullaitivu district.
- 02 exhibitions.
- Technical advices provided - 145 clients.
- No. of leaflets distributed - 2,500.

## TV/ Radio Programmes

Six radio programmes were broadcasted through National Service (Tamil) of the Sri Lanka Broadcasting Corporation on adaptable crops, pest control and weed management.

## Newspaper Articles

Three newspaper articles were published on weedy rice management, conservation of mango germplasm and eco friendly pesticides.

## OTHER PROJECTS/ SERVICES

- Project on crop diversification-IIDP
- Hybrid project on chilli
- Going green project –Sewalanka
- Enhancement of productivity of agricultural lands in the Northern province of Sri Lanka through better soil and water management -FAO

## DEVELOPMENT ACTIVITIES

- Circuit bungalow, one over head tank, Drying floor, two Grade IV quarters, Internal fence and two labor quarters of the RARDC, Kilinochchi were reconstructed and rehabilitated under the —EnDRIP project.
- Repaired the Soil laboratory building and basic instruments were installed. A field vehicle was purchased through FAO project. Equipment for Plant Pathology laboratory were received from Sewalanka foundation.

## PLAN FOR 2014

- Evaluation of stem borer resistance in finger millet.
- Efficacy of botanical pesticides against the thrips of chilli and rice leaf folder.
- Study of the weed flora in northern region.
- Population dynamics of major pests in Rice.
- Development of appropriate technology for management of chilli nematodes.
- Varietal improvement of other field crops and vegetables.
- Tissue culture banana production.
- To study the effect of pruning on quality and quantity of tomato seed production.
- To study the performance of rice varieties under aerobic conditions in the Northern region.
- Purification of rice land races / traditional variety.
- Maintenance of germplasm.
- Weed resistancy developed in *Cyperus iria*.
- Production of breeder seeds of tomato (KC 1) , Bitter gourd (TV white) and Snake gourd (TV long).

## STAFF LIST

Designation	No.
Deputy Director (Research)	01
Research Officer	03
Agricultural Instructor	03
Research Assistant	03
Management Assistant	01
Watcher	05
Laborer	36
Driver	03
Tractor Operator	03
<b>Total</b>	<b>61</b>

## 1.2 HORTICULTURAL CROP RESEARCH AND DEVELOPMENT INSTITUTE (HORDI) - GANNORUWA

The Horticultural Crop Research and Development Institute (HORDI) has been assigned with the task of enhancing national horticulture crop production through research and development. Institute is in charge of vegetable crops, mushroom, root and tubers and floriculture. Research programme of the institute gives main emphasize on development of horticultural crop varieties, improved crop management techniques including plant nutrient management and pest & disease management. Institute also focuses on post harvest and food processing methods,

planting material production and home gardening. Mandate of HORDI is to undertake demand-driven research on horticulture crops, which should be productive, eco-friendly, sustainable, economically viable and socially equitable. In addition, institute involves in training of farmers, undergraduate and diploma students as well. Conducting awareness programmes to disseminate new technologies to the farming communities is also another activity undertaken by the institute.

### BUDGET

**Table 1.2.1: Annual budget – 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	57,015,000	26,794,760	47
Recurrent	67,401,816	61,345,379	91
<b>Projects</b>			
National Agricultural Research Plan NARP	11,466,400	10,761,945	94
NARP (Hybrid Seed production for fruit and Vegetables)	4,103,860	3,939,716	96
Increasing seed availability of popular traditional Vegetable	1,878,463	1,527,552	81
Rice Export Project	1,000,000	970,384	97
Korean Project on International Agriculture (Vegetable Cultivation) KOPIA12	3,137,500	2,297,282	73
Korean Project on International Agriculture (Fertilizer management ) FERTILIZER13	2,510,000	2,796,437	111
Integrate Management System for Plant Genetic Resource	1,927,180	1,436,045	75
Tissue Culture	25,000,000	25,000,000	100
NSF	1,632,500	882,208	54
<b>Total</b>	<b>177,072,719</b>	<b>137,751,708</b>	<b>78</b>

## **PROGRESS**

### **PROJECTS**

#### **(NARP) - Hybrid Seed Production of Vegetables**

Development of superior quality hybrid vegetable and fruit varieties, maintenance of parental lines of recommended varieties and production of hybrid seeds are the main activities performed under this program. These activities have been undertaken for vegetables namely tomato, brinjal, luffa, capsicum, cucumber, yard long bean and bitter gourd.

#### **National Agricultural Research Plan (NARP)**

Aims of this project is to develop new varieties of vegetable, fruits and flower crops. In addition to improve the existing seed production technologies of potato and to develop pest and disease management packages, appropriate agronomic and nutrient management packages in order to enhance the productivity of horticultural crops.

#### **Korean Project of International Agriculture (KOPIA)**

##### **Vegetable Cultivation Technology**

To fill the existing gap between the yield potential of the varieties and the yield levels obtained by the farmers the demonstration of advanced technologies of other countries will be useful. It is a means of bridging this gap by disseminating knowledge for both local scientists and farmers.

The KOPIA – Vegetable project focuses on demonstration and verification of improved vegetable production technology and

identification of adaptable Korean vegetable varieties for local cultivation. In addition improving the human resource capacity on vegetable production and technology and strengthening the collaboration between Sri Lanka and Korea in vegetable production research are the other objectives of this project.

##### **Fertilizer Management (KOPIA)**

The KOPIA -Fertilizer management project was undertaken basically to demonstrate the farmers about the economical, safe and environmental friendly fertilizer use. The concept of utilizing the resident nutrients remain in the field and circumvent the unnecessary use of fertilizer inputs are the two major issues to be addressed during the project. Project would emphasize the use of not only key fertilizer elements but also micro elements. Besides project will focus on strengthening the human resource capacity and increasing collaboration between the two countries .

##### **Tissue Culture**

The project of "Quality planting material production of economically important crops through Tissue culture techniques" was started in 2011 to fulfill the increasing demand of planting materials of Horticultural Crops like banana, pineapple, seed potato, strawberry and floricultural crops. Under this project tissue culture laboratories were facilitated and renovated to increase the production by ten times. Other infrastructure facilities including net houses and polytunnels were also developed.

## **VEGETABLE DIVISION**

Vegetable Research division engaged with research and development activities related to vegetable variety development and production. Main focus of the division is to develop improved varieties of vegetables both open pollinated and F1 hybrids through conventional breeding techniques. Below are some of the salient achievements during 2012/2013.

### **Bean varietal development**

One pole bean variety was presented at the VRC. It was released and named as Gannoruwa BIL. Two varieties of Cora Pole and KTB gave high yield during NCVT on 2013.

### **Bittergourd varietal development**

New two F1 hybrids were identified as better quality and evaluation of those varieties were carried out with NCVT and VAT trials.

### **Brinjal varietal development**

A full pledged breeding program has been in operation for brinjal varietal development which is aimed to produce high yielding varieties having resistance/tolerance to bacterial wilt with the desirable fruit qualities. Three promising parental lines were selected and 16 new F1 crosses were made. Two new F1 hybrids of brinjal varieties (EGH 8 and EGH 9) in NCVT were identified as promising.

### **Cucumber varietal development**

One F1 hybrid variety "HORDI White" for island wide cultivation was released by VRC

in 2013. R2, M2 and H21 developed as new breeding lines and selected for stability study.

### **Leafy Vegetables**

A new green amaranthus variety, "HORDI thampala", suitable for island wide cultivation was released by VRC in 2013.

### **Luffa Varietal Development**

One OP variety and one F1 hybrid variety presented at the VRC meeting and OP variety was released. The F1 hybrid variety will be released next year with SCS report. HL F1 and Line TD gave high yield.

### **Yard long bean varietal development**

The research program aims to develop high yielding, collar rot resistant yard long bean varieties with earliness and good quality for island wide/ regional cultivation in Sri Lanka. Two most promising lines, 39-9 and 39-12, which are having high yields, resistant to collar rot disease and good quality, were selected for further testing and at least one variety could be released in 2014. Another locally developed 4 lines were selected for stability studies.

### **Tomato varietal development**

To produce F1 hybrids varieties with better quality and resistance/tolerance to Bacterial wilt, this program has been launched. 33 germplasm were evaluated in 2013 Yala and 89 crosses were made to produce F1 hybrids. 11 varieties imported were tested and 2 varieties found superior.

## Winged bean Varietal Development

In NCVT promising line WBMP gave the second highest yield and it was significantly higher than the yield of check variety SLS 44.

## Seed production of Traditional Vegetable Varieties

Under this project more than 800kg of traditional vegetable (*Tibbatu, Thalana batu, Kekiri, Wattaka, bandakka* etc.) seeds were produced.

## Korean vegetable cultivation project

Korean vegetables such as salad cucumber, white radish, Chinese cabbage and lettuce were evaluated in large scale to study their adaptability under local climatic conditions. Two Chinese cabbage varieties *viz.* CR Yeoreummat and Woori; two cucumber varieties, Gangryoksamchuk and Jangrok heukjinju; 3 white radish varieties, Yeongdong, Supergiljo and Metjinmatdonamu; two lettuce varieties, Cheongchima and Hanbatjeokchima were found to be adaptable under mid country condition.

## FRUITS AND TISSUE CULTURE DIVISION

Fruit and Tissue culture Division undertake research and development work on fruit crops and development of necessary protocols *for in vitro* propagation of fruit crops to increase the productivity and production of these crops. Research effort on fruit crop was mainly focused at development of fruit varieties with better quality and yield having tolerance/resistance to pest and diseases. Division also gives due emphasis on the development of agronomic packages to

increase productivity of fruit crops. Development activities included the production of planting materials, raise the production capacity of research farms through infra structure development. In addition dissemination of technology via various modes was simultaneously undertaken.

## Banana

- Different kolikuttu varieties having different genotypes responded differently and the recommended variety Agra did not respond well for *in vitro* multiplication. Experiments are being continued to increase the multiplication rate of var.Agra.

## Grape

- Grape var.Thompson seedless could be multiplied successfully and produced about 300 plantlets from an explant within six months period.
- Field evaluation is being continued at Kalpitiya and Mahailuppallama.

## Production of planting materials of banana & pineapple

**Table: 1.2.2: Current status of tissue cultured plants**

Crop	Variety	Plants	
		In-vitro	Plant House
Banana	Ambon	15,000	2200
	Kolikuttu	10,000	1250
Pineapple	Mauritius	25,000	6500

## Projects

- Tissue culture planting material production project funded under the DOA

special projects was initiated. Laboratory facilities were expanded to maintain about 4000 culture vessels.

### Extension work

- One day training programs & advisory services – (for 35 persons)
- Lectures – 06 lecture for university & school students.
- Advisory services –58 persons
- Supervised projects – 01 completed (with a student of Open University). – Low cost media for Banana & pineapple multiplication under *in vitro*.
- Supplied exhibits and participated for the Exhibitions at Polonnaruwa and Wariyapola.

## ENTOMOLOGY DIVISION

### Project 1

#### Development of an IPM package to control pest and diseases of citrus crops. (NARP project)

The project started in 2011 and varietal screening, testing of botanicals, insecticides and fungicides to replace old, toxic chemicals with new, environmentally safer chemicals were done.

#### Achievements:

Two insecticides (abamectin & clothianidin) were found effective in controlling sucking pests of citrus. Four miticides were tested during 2012/13 maha season. All four miticides (Nissorun 10%WP, Nissorun 5%EC, Abamectin 3.6EW, Fenpyroximate 5%EC) were identified as equally effective as the current recommendation, Sulphur in

controlling citrus rust mites. The trials will be repeated in 2014 to confirm results.

### Project 2

#### Development of an IPM package to control pest and disease of pumpkin crop with special emphasis to virus diseases. (NARP project)

A yellowing disease of pumpkin was reported to be damaging pumpkin crops grown in the dry zone since 2010. Therefore, this project was started in 2011 to develop an IPM package to control pest and diseases of pumpkin with special emphasis to control yellowing disease of pumpkin crops.

#### Achievements:

An IPM package was developed combining several methods including the reflective polythene mulch and a chemical package. Adaptability of the new IPM package under farmers field conditions in the dry zone was tested in three farmers' fields in Moragollagama and Padeniya and was successful.

### Project 3

#### Identification of a management package for the control of sweet potato weevil (*Cylas formicarius*)

The major insect pest causing a significant yield loss in sweet potato is the sweet potato weevil *Cylas formicarius*. Insecticides were tested for the control of the pest.

#### Achievements:

Thiamethoxam, Clorantraniliprole and a pre mixed combination of Thiamethoxam + Chlorantraniliprole were effective during 2012/13 Maha season.

## Project 4

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

Exotic and local hybrids of luffa varieties were evaluated for their performances against pests and diseases and compared with LA 33 and NAGA varieties .

#### Achievements:

Following varieties were recommended for seed production/ importation LA 33 X TD, NRGH 22, OPEX TROPICAL LUFFA, OPEX 3134, SHALANI, OPEX 3144, ORDINARY

## Project 5

### Screening of low toxic new insecticides for their efficacy against brinjal shoot and pod borer, (*Leucinodes orbonalis*)

Brinjal shoot and pod borer, *Leucinodes orbonalis* is a major pest of brinjal crop. Due to inefficacy of recommended insecticides, new insecticides with low toxic aspects on humans and environment were screened.

#### Achievements:

Accordingly, Flubendiamide 20% WG, 1 g/L, Spinotoram 25% WG, 0.3 g/L and Flubendiamide 24% WG at 0.5 g/L were found as effective in controlling Brinjal shoot and fruit borer, Trial to be repeated before recommending the chemicals.

## DIVISION OF PLANT PATHOLOGY & MUSHROOM RESEARCH

### Screening of exotic hybrids for resistance to bacteria wilt

Twenty seven tomato, 27 capsicum and 7 brinjal hybrids imported from various countries were screened for resistance to

bacteria wilt caused by *Ralstonia solanacearum* using the protocol developed by AVRDC. All varieties showed moderately resistant to bacterial wilt disease and nominated for further testing for adaptability and yield performance.

### Seed health testing of exotic hybrid seed for viruses by ELISA test

Seventy four samples of exotic cucurbit seeds were tested for CGMMV among which only one ridge gourd sample was found positive for the virus and rejected for further evaluation. Tomato (three samples) were tested for TSWV. All samples were found free from the virus.

### Inspection and laboratory testing of seed potato consignments

Seventy three consignments of seed potatoes from different countries such as The Netherlands, USA, Germany and France were inspected and tested for their freeness from quarantine pathogens. Diseases such as netted scab, black scurf, rubbery rot caused by *Geotrichum candidum* and common scab caused by *Streptomyces* spp. were commonly observed on tubers of potato seed lots at permissible level. All seed lots were accepted for cultivation in farmers field as disease incidences do not exceed the permit limits mention in the regulation.

### Disease diagnosis and advisory service for disease management of crops

Disease diagnosis of plants and advisory service for disease management provided by plant pathology division were continued in

year 2013. Over 900 disease affected plant samples including fruit crops, vegetables, tuber crops, condiments, spices, ornamentals and other field crops received from farmers fields and private farms through different sources were clinically tested for diagnosis of fungal, bacterial, phytoplasma and virus diseases and causal agent/s of diseases of plant sample were identified and advises were given concerned persons for management. New phytoplasma diseases were identified in cucurbits and capsicum

### **Natural polymers for pest control and growth promotion of vegetables**

Department of Agriculture, HORDI and Sri Lanka Atomic Energy Authority jointly developed a technology for production of natural polymer compounds which can be used as an alternative to chemical pesticides in controlling pests and induce growth promotion in vegetables. A commercial product namely “Chito Power” was launched at the ISTI on 06<sup>th</sup> September 2013.

### **Development of varietal screening technique for quick detection of anthracnose resistant bean (*Phaseolus vulgaris* L.) varieties**

A serious incidence of anthracnose of bean was observed in many areas of Sri Lanka. Development of an reliable and quick variety screening method to identify anthracnose resistant bean varieties is an important research requirement to minimize crop losses. The pod exudates enhanced conidia differentiation and rate of conidia differentiation of *C. lindermuthianum* in pod exudates of varieties could be used to compare

susceptibility/resistance among the bean germplasms as an *in vitro* test

### **Evaluation of bio-efficacy of new fungicides against powdery mildew (*Erisiphe* spp.) of cucumber**

Eight new fungicides with different formulations were evaluated and compared against the reference fungicides.

### **Retesting bio efficacy of registration expired fungicides against downy mildew of cucurbits and okra**

Seven fungicides which have been previously registered were retested for downy mildew of cucurbits. It was found that test fungicides such as Mancozeb 64% + Metalaxyl 8% WP, Mancozeb 80% WP (3 sources), Captan 50% WP (2 sources) and Maneb 80% (w/w) were still effective to the control of downy mildew of cucurbits. Eight fungicides previously registered for control of powdery mildew including Sulphur 80% WG and Carbendazim 50% WP (2 sources) were retested. All test fungicides were found still effective for the control of powdery mildew in okra.

### **First report of asparagus stem blight caused by *Phomopsis asparagi* and its management through fungicides**

Severe stem blight of asparagus (*Asparagus officinalis*) was found in North Western region of Sri Lanka during 2012/ 2013 Maha season. Based on morphological characteristics, the fungal pathogen causing stem blight of asparagus was identified as *Phomopsis asparagi*.

### **First report of black banded disease of mango caused by *Rhinocladium corticolum* and its management**

Large, dark black, irregular, girdle-like superficially infected patches on the bark of twigs of mango trees were observed in Wariyapola area was identified as black banded disease (black stem disease) caused by *Rhinocladium corticolum* (Perfect state: *Peziotrichum corticolum*) of class Ascomycetes. Disease can effectively managed by treating the affected portion of stems with copper oxychloride suspension (20-30g/1l of water) after removal of superficial fungal growth by wet gunny rubbing.

### **Molecular detection and characterization of begomoviruses associated with cucurbitaceous vegetables in Sri Lanka**

Cucurbits are popular vegetables grown in various agro ecological zones of Sri Lanka. Viral diseases are the major cause for the reduction of yield and fruit quality of cucurbits. Several viruses have previously been detected through ELISA on cucurbit cultivation in Sri Lanka. Further, a disease conditions in bitter gourd showing severe leaf curl symptoms were found to be transmitted by whiteflies. A PCR assay using universal (degenerate) primers, specific for begomoviruses, revealed the association of begomoviruses in infected bitter gourd, ridge gourd, pumpkin, cucumber and snake gourd plants showing virus like symptoms This is the first report of association of begomoviruses in cucurbits in Sri Lanka. The sequence comparison and phylogenetic analysis of the coat protein gene of Begamo-Bitter Gourd-Sri

Lanka Virus (Begamo-Bitter Gourd-SL Virus) showed 97% nucleotide identity with *Tomato Leaf Curl New Delhi Virus -Bitter gourd (ToLCNDV-BG)* indicating that it is a variant of *ToLCNDV*.

### **Molecular detection and symptomatology of the phytoplasma associated with horticultural crops in Sri Lanka**

During horticultural crops field surveys, brinjal, papaya, capsicum and chilli plants with symptoms referable to phytoplasma presence were observed. The amplification with phytoplasma primers proves that the little leaf disease associated with brinjal, die back disease associated with papaya and Chilli / capsicum rosette disease are caused putatively by phytoplasma. This is the first record of phytoplasma associated with rosette disease of chilli in Sri Lanka.

### **Molecular detection of *Spongospora subterranea* f.sp. *subterranea* causing powdery scab of potato and development of rapid molecular detection method for potato seed health testing**

Powdery scab caused by fungal pathogen is an important quarantine disease of seed potato in Sri Lanka. It has been reported from several locations of potato growing areas. Growing of healthy planting material in pathogen free substrate / soil is an important prerequisite for management of the disease. The rapid and reliable seed health testing procedures are required since visual observations, microscopic observations and serological techniques are not

always sensitive enough to detect the pathogen. The molecular diagnostic method developed through this study can routinely be used for seed health testing of seed potatoes for rapid and reliable detection of *Spongospora subterranea* f.sp. *subterranean* causing powdery scab of potato. DNA from infected tubers, root galls and infected substrate gave consistent amplification of 434 bp while no amplification obtained from respective negative controls.

### **Technology for cultivation of indigenous mushroom variety**

Fruiting bodies of indigenous mushroom variety obtain from soil and saw dust mixture at Kandy, Kaliyalpitiya was identified as edible and *Boletus* spp. Mother and commercial spawns were obtained successfully in paddy seeds within 13 days. Mycelium of indigenous mushroom were successfully grown in DOA recommended compost bags within 35 days at 26-28 °C. Small and many pinheads were formed within 10 days after bags were opened.

### **Use of cropping room for incubation of growing bags**

To minimize land use for mushroom cultivation and to obtain continuous yield while controlling mites attack, two cropping system can be used. This method save the man power, provide continuous yield and easy control of mite attack.

## **AGRICULTURAL CHEMISTRY DIVISION**

Main functions of the division of Agricultural Chemistry are conducting research on soil

fertility, plant nutrient management and organic farming. In addition, it provides advices on the soil test based fertilizer application to farmers and also engage in analysis of samples of soil, plant, water, inorganic fertilizer and manures. Training programmes of soil, fertilizers, and their management and organic farming are also being conducted by the division.

### **Nutrient Management of Organic Vegetable Crops**

The effect of split application of organic nutrient sources for growth and yield of vegetable crops under organic farming revealed that split application of manure is capable of producing similar yields compared to that of single application. Thus by adopting split application, rate of manure addition can be lowered.

#### **○ Continuous Application of compost**

Combined use of compost + NPK fertilizer gave higher total yield of Bean and Cabbage (28.5/ha) compared to compost alone (16/ha) application. After 13 years of continuous application of inorganic fertilizer alone produced the lowest yield (8.4t/ha). Integrated use of organic manure with inorganic fertilizer not only supply nutrients but also improve the soil condition.

#### **○ Use of Bio Char on Vegetable Production**

The effect of conjoint use of biochar with organic manure on vegetable crops under

organic farming showed that about 14% yield increase could be obtained by the application of poultry manure with burnt rice husk as opposed to the application of cattle manure with burnt rice husk. Application of burnt rice husk showed better performance compared to the application of burnt coconut husk with the same manures. This experiment will be continued for several seasons.

Application of recommended inorganic fertilizer with burnt Gliricedia increased the tomato yield by 30% compared to the application of burnt rice husk. Results also showed that 41% yield increase was obtained when cattle manure applied with burnt rice husk and inorganic fertilizer treatment opposed to the inorganic fertilizer combined with burnt rice husk.

### **Potassium management for banana under annual planting system in the wet zone**

Responses of addition of potassium fertilizer for banana was tested for determine the best sequential application rates of potassium on fruit quality and to monitor the soil K status. Preliminary results showed that banana productivity in the wet zone could be raised by increasing the rate of potassium application. Study is in Progress.

### **Effect of Nano – N fertilizer on vegetable production**

Effectiveness of Nano – Nitrogen fertilizer on Tomato showed that 75% Nano – N (3 splits) was capable of producing similar yield as

100% inorganic fertilizer. Reduction of Nano-N to the tune of 50% recommended rate however markedly reduced yields. This study will be continued further.

### **Micronutrient Response study on Vegetables**

Supply of micronutrients and high rate of inorganic fertilizers on vegetable yields and their nutrient uptakes were tested for Capsicum, Potato and Pumpkin in three agro climatic zones. There was no marked variation due to the addition of organic manure for capsicum and potato. However, pumpkin gave higher yield with the application of organic manure. There was no significant yield increase observed due to the application of micro and secondary nutrients for capsicum and pumpkin. However, potato showed response to secondary nutrients, despite nutrient contents in leaves of the all three crops were within the sufficiency range.

### **Effect of different fertilizer practices on vegetables**

Effectiveness of different fertilizer practices on vegetables was tested under KOPIA project. Korean fertilizer recommendation and Department of Agriculture fertilizer recommendation for tomato were tested in farmer field with the farmer practices. Although, fertilizer addition was high in Korean recommendation there was no improvement in yield. Similar yields were obtained in the DOA recommendation (20.7t/ha) and farmer practice (21.2t/ha) though farmers used higher rates of fertilizer.

### **Nutrient removal by vegetable crops**

This study was conducted to assess the nutrient requirement of vegetable crops. Nutrient removal of six varieties of brinjal, six varieties of tomato, fifteen varieties of bitter gourd, eight varieties of cucumber and five varieties of capsicum were determined. Available results showed that removal of K is high in tomato and brinjal followed by N for both crops. Removal of Ca is small compared to the P in brinjal while removal of Ca is higher in Tomato. Study is in progress.

### **Study on Trace metal status of TSP and MOP fertilizers used in Sri Lanka**

Trace metal contents (Fe, Cu, Mn, Zn, Cd, Cr, Pb and As) in phosphate and potassium fertilizers imported from different countries were determined. Results showed that phosphate fertilizers contained appreciable amounts of trace metals such as Fe, Cu, Mn, Zn, Cd, Pb, As and Cr. Ranges of the hazardous elements of Pb, Cd, Cr and As in TSP were varied from 16.4 - 98.6 ppm, 1.6-18.1ppm, 31-406.2 ppm, and 0.28-10.2 ppm respectively. However, MOP contained much lower levels (Pb-18.8-41.6ppm, Cd-0.14-1.68ppm, Cr-2.2-20.8ppm, As-0.028-0.105 ppm) compared to the TSP fertilizers. This study will be continued further.

### **Soil fertility evaluation programme in different cropping systems in Sri Lanka**

This study was conducted to assess the soil fertility parameters associated with different cropping systems at selected ASC division covering all the districts of Sri Lanka. Sample

collection and analysis of the major nutrients were completed and analysis for secondary and micronutrients of Matale, Kegalle and Kandy district were completed. Sample analysis of other districts are progressing.

### **Soil Microbiology**

#### **Isolation of Nitrogen fixing microbial consortia associated with vegetable crops**

Study was conducted to isolate Nitrogen fixing bacteria and efficacy of those bacteria.

Five different bacteria consortia were isolated and tested on capsicum. Results showed positive effects of isolated consortia on capsicum growth. This study will be continued for other vegetables.

#### **Microbial diversity of capsicum rhizosphere under three management condition**

Microbial diversity was assessed with the application of chemical and organic fertilizer. Plant growth was relatively low in recommended compost treatment and no fertilizer treatment. However, microbial diversity was greater in no fertilizer treatment and compost alone treatment. This study will be continued.

## ROOT & TUBER CROPS, FLORICULTURE AND HOME GARDEN DIVISION

### ROOT & TUBER CROPS

#### Sweet potato

- The selected variety “Malaysian” gave high yields (25-30 t/ha) with good quality, attractive red skin colour, white flesh and short age.
- Out of the eleven salt tolerant CIP lines, namely 199076-1, 199062-1, 440262-1 and 440183 had given high yields in varietal screening trial. These lines will be evaluated in replicated yield trial in saline areas to select the promising lines suitable for saline areas.

#### Cassava

A new variety “Polpithigama” gave high yields with good qualities (yellow flesh).

#### Planting material production and distribution

More than 45,000 basic planting material of all the recommended varieties of root and tuber crops were distributed among different targeted beneficiaries on request throughout the country. Germplasms of all the root and tuber crops were maintained for future use.

## HOME GARDEN AND FLORICULTURE

- Collection, maintenance and improvement of endemic indigenous flora having potential ornamental values were done. Two new wild ornamentals and 4

exotic Gerbera hybrids were added to the collection.

- Collection, Maintenance and evaluation of under utilized crop varieties suitable for home gardening.

Underutilized crop varieties highly adaptable for home garden situations such as chilies, okra, winged beans, leafy vegetables, Tube leeks, egg plants, sweet potatoes, yams and several fruit crops were maintained and tested under home garden situation during the season.

Six new crops were introduced to home garden crop collection as three chillie varieties, Katu nethi thalanabatu variety, Thulsi herb and one winged bean variety.

- A research was conducted to evaluate two samples of salad cucumber in protected houses to solve farmer problem.

### Root & Tuber crops, Home garden and Floriculture- Projects

#### Integrated management system of plant genetic resources Project

Under the project of Integrated management systems of plant genetic resources, about forty *Doiscorea* accessions (belonging to *Dioscorea alata*, *Dioscorea esculenta*, *Dioscorea bulbifera*, *Dioscorea rotundata* and *Diocorea oppositifolia*) were collected so far after exploration in several parts of the country. All these accessions were established at Horticultural Crops Research and Development Institute, Gannoruwa and Agricultural Research Station, Thelijjawila for multiplication and conservation. And also these accessions were established in farmer field for multiplication and conservation. To identify these accessions and to avoid

duplications characterization identification of morphological traits has been conducted. Yams could be popularized, with the identification of high yielding shallow types which have satisfactory culinary qualities.

### **Integrated management systems of plant genetic resources**

Under this project ten crop varieties suitable for home gardens were collected. These accessions were established in home garden for multiplication and conservation. Characterization of collected accessions is continued during this year.

### **CO<sub>2</sub> Enrichment project**

A hybrid tomato variety “Ceres” was tested in this project. CO<sub>2</sub> enriched crop gave high yields than the control ( ambient CO<sub>2</sub>)

### **Evaluation of Cherry tomato varieties for poly tunnel conditions in Sri Lanka**

Four cherry tomato varieties were evaluated under poly tunnel in HORDI, and it will be continued in year 2014.

### **Increasing seed availability of traditional vegetable varieties project**

Seven traditional vegetable varieties ( Ethdala bandakka, Gewathu bandakka, Capsicum variety, Halmessan dambala, Rathu thampala, Alanga etc.) were multiplied and characterized.

## **EXTENSION, ECONOMICS AND DATA MANAGEMENT DIVISION**

This division is responsible for dissemination/coordinating of technology transfer of Horticultural crops and assisting to prepare project reports, financial aspects and data management of HORDI.

### **Training Programmes**

During this year this division conducted awareness and technology transfer programmes for the universities, institutes, schools, farmer and farmer organization.

**Table 1.2.3: Awareness programmes and Technology Transfer Conducted during 2013**

<b>Category</b>	<b>No. of participants</b>
<b>Universities</b>	
Eastern University	36
University of Jaffna	47
Open University- Department of Botany	46
Uva Wellassa University-Department of Export Agriculture	37
Rajarata University- Faculty of Applied Science	40
Wayamba University	41
University of Colombo- Department of Geography	34
University of Colombo- Department of Indigenous Medicine	150
University of Peradeniya- Department of Botany	36

Category	No. of participants
Jayawardanapura University- Department of Social Statistics	30
School of Agriculture - Vaunia and Pelwehera	73
Advanced Technological Institute- Naiwala	42
<b>Organizations and Societies</b>	
International programme Agri Animal 2013- Conference Centre, SLFI, Colombo	11
Visit Lanka PVT ltd -France Sri Lanka National Federation of the visually Handicapped- Kandy	42
Training of trainers- Hadabima Authority of Sri Lanka	30
Agri Camp Kilinochchi- 3 day programme	05
Training of Farmers and entrepreneurs	200
Training of School Teachers	349
Training of Farmers and entrepreneurs	166
Number of Schools attended	143
Number of School Children attended	7250

- During the training programmes following topics were covered by respective resource persons
  - Design of field experiments; Nursery bed preparation; Common pest and diseases of horticultural crops; Home garden Management; Identification of diseases; Tissue culture Techniques; Mushroom cultivation; Post harvest and food technology; Organic farming
- Organized two weeks In-service training programmes on Horticultural crops for newly recruited Research Assistants during the period of 2013/06/17 to 2013/06/26 and 2013/07/08 to 2013/07/19 at HORDI. Each batch included 40 Research Assistants
- Practical training of technology transfer and preparation of technical bulletins was given to two students for six months periods assigned by Vocational training authority of Sri Lanka

### Technology Dissemination Activities

- Provided fifty five (55) written answers for problem related to Horticultural crops
- Provided technical advices for 62 telephone inquiries.
- Technical information provided 138 visitors from extension division.
- Assistants were given to Island wide exhibitions conducted by various organizations by providing posters and technical informations.

### Technical Bulletins

- Prepare four new technical leaflets; Miti Murunga (*Moringa oleifera*), Bee Keeping, Papaya Seed Production and ways and means of Promoting of vegetable consumption.
- 4337 numbers of technical bulletins and 07 technical bulletins bundles (No 1-131 leaflets) were sold.

### Media Programs

- A video programme of “Promotion of vegetable consumption” was conducted at home garden by Dr Pabilis Silva of Mount Lavenia Hotel. This will be telecasted.

- Radio Programs - SLBC-02.
  - Utilization and value addition of fruits and vegetables grown in home garden.
  - Increase of home garden production by introducing mini poly tunnels in home garden.

### **Database Management Division**

- This division assisted to prepare and provide data informations on following disciplines.
- Recording financial transactions in an accurate and timely manner.
- Preparing all required components of the annual financial statement of HORDI
- Preparing and issuing all other external and internal accounting reports
- Distributing and controlling funds and resources for the purpose intended and within legal and management limitations.
- Assist the preparation of the HORDI budget estimates
- Preparing monthly, yearly summaries of project and normal votes (NARP, Hybrid, KOPIA, NSF etc.)
- Handling Databases of HORDI
  - NASTEC
  - COSTI
  - INFORM
  - Revenue Reports
  - Human Resources Database

### **Agriculture Museum**

- The agriculture museum opens during 8.30 am to 4.15 pm on every office days and government holydays on request. The display exhibits include traditional

agriculture equipments & tools and models of traditional storage structures.

- 34786 school children, 2521 teachers, 2860 farmers, 913 public servants, 673 university students, 19 foreigners and 3188 interested individuals were visited during 2013.
- 2145 numbers of “Kamath Bashawa” leaflets were sold
- Technical advice was given by answering 208 telephone calls.

### **CENTRAL LIBRARY**

Main Agriculture Library of the Department of Agriculture, Sri Lanka possess an collection of old and new publications of several local and foreign journals, books and a literature retrieval facility with CD- ROM. and CAB

- More than 251 foreign periodicals received throughout the year as complimentary copies and on exchange basis. In addition Library paid 5750 Sterling Pounds as annual subscription to Commonwealth Agricultural Bureau International (CABI).
- More than 1000 users visited the library to acquire information. About 850 books were circulated among library members through regular reader services and Inter Library Loan Schemes..
- Over 60 retrospective searches were made as the request of the Research Officers. About 42 searches were done through the assistance of CARP. User seminar was held for the research officers of the Department of Agriculture.
- About 200 Research Officers obtained information using Internet facilities. AGRIS CD-ROM System also helpful them to get current information and we

have succeed to update WEBAGRIS database with the latest Sri Lankan agricultural information of Annals of the Sri Lankan Department of Agriculture Journal and Tropical Agriculturist Journal articles. In addition, we were able to exported agricultural data to National Agricultural Bibliography of 2012

- AGRINET Content Pages Service (SDCP) was continued and more than 150 Content Pages were distributed among department users.

The Central Library distributed the Tropical Agriculturists Journal to local and foreign institutions during 2012 (Vol. 160) and provided inputs as more than 1000 articles and 3200 books to the PURNA.

## DEVELOPMENT & TECHNOLOGY TRANSFER ACTIVITIES

### VEGETABLE DIVISION

#### Breeder seed production

**Table 1.2.4: Breeder seed production during 2013**

Crop	Variety	Quantity (kg)	Officer Responsible
Vegetable cowpea	Sena	28.4	P. Malathy
Yard Long bean	Hawari mae	18	P. Malathy
	Bush Polon	5.6	
Radish	Beeralu	2.2	P. Malathy
Brinjal	Padagoda	3.5	Dr. Hemal Fonseka
	HS2(Parent)	670g	Dr. Hemal Fonseka
	5132 (Parent)	250g	Dr. Hemal Fonseka
	8104 (parent)	13	Dr. Hemal Fonseka
Capsicum	Bullnose (at the request of PADA Matale)	750g	Dr. Hemal Fonseka
Tomato	Thilina	736g	Dr. Hemal Fonseka
	HT2123	557g	Dr. Hemal Fonseka
Cucumber	Champion	980g	Nirmala Pararajasingham
	Kalpitiya white	1.3	Nirmala Pararajasingham
Bitter gourd	Matale Green	7	Nirmala Pararajasingham
Luffa	LA 33	2.8kg	Dr. H. Ariyaratna
Bean	Gannoruwa Green	40.85kg	Dr. H. Ariyaratna
Winged bean	Krishna	32kg	Dr. H. Ariyaratna
	SLS 44	4.25kg	
Leafy Vegetables	Gotukola, Mukunuwenna, Kankung, Minchi and korean Gotukola	1058kg of Planting Materials	

## **FRUITS AND TISSUE CULTURE**

### **DIVISION**

- One day training programs & advisory services – (for 35 persons)
- Lectures – 06 lecture for university & school students.
- Advisory services –58 persons
- Supervised projects – 01 completed (with a student of Open University). – Low cost media for Banana & pineapple multiplication under invitro.
- Supplied exhibits and participated for the Exhibitions at Polonnaruwa and Wariyapola.

## **ENTOMOLOGY DIVISION**

### **Advisory work**

- 110 samples brought by the farmers to the laboratory were examined and 50 pest problems inquired over the phone for pest damages were answered and advised on control measures.
- 186 personal were visited the bee garden and were advised on bee keeping.
- 20 field visits were made to investigate field problems of farmers and advised on control measures
- Participated in 34 training programmes as Resource persons.
- Participated in 50 field visits for exotic variety evaluation purpose.

## **PLANT PATHOLOGY & MUSHROOM DIVISION**

### **Training Activities**

- 1324 personnel were trained on oyster mushroom cultivation and 113

certificates were issued for registration as small scale mushroom produces.

- 23 persons were trained on paddy straw mushroom cultivation while 88 persons were trained on mushroom spawn production.
- Advices given to 71 farmers by post, 612 through telephone and 443 farmers visited to HORDI
- Disseminated mushroom cultivation technologies for 24 G.C.E. (AL) students on their “Kewala project”.
- 03 university students from Jaffna were trained on mushroom cultivation and spawn production.
- Assisted to an Agriculture Diploma student from Open University and Ampara Agricultural College for their project.
- Practical training workshops for governmental and non-governmental organizations were conducted on mushroom cultivation and spawn production. Under this endeavor, 43 persons directed from AgEDIS, 309 officials from DOA, 95 persons directed from IFAD (Gampola and Kegalle), 56 persons from Vidatha Center, Bandaragama, 58 persons from Wedatha Center, Panadura, 24 persons from MASL and 199 persons under Divinagama programme were trained.

### **Distribution of planting materials**

72 mother spawn, 46 commercial spawn of paddy straw mushroom and 07 packet of oyster mushroom spawns were distributed among farmers to strengthening cultivation of paddy straw mushroom and oyster mushroom.

## Other activities

### Foreign training / Workshop attended during 2013

- Ms W.A.G. Weeraratne/ RO - Counterpart training programme on " plant diseases in Japan under JICA from 29th Sep to 12th Oct. 2013.
- Dr. W.A.R.T. Wickramaarachchi/ RO - Training on standardization of protocols for selection of somaclonal variants resistant to *Fusarium oxysporum* f.sp. *ubense* at Taiwan Banana Research Institute, Taiwan from 20-25 October, 2013.
- Ms A.M.K.I. Eriyagama / RO - Training course on breeding and cultivation method of mushrooms organized by the Korea Project on International Agriculture (KOPIA) of Rural Administration (RDA), Republic of Korea from 26th Aug to 13th Sep, 2013.

## AGRICULTURAL CHEMISTRY DIVISION

### Analytical Services

During the year 2013, 87 soil samples under soil testing programme, 24 water samples from different client groups, 28 plant samples from farmers and 84 compost samples were analysed and reports were submitted. It was noted that number of plant samples with various problems in micronutrients and other problems received for analysis was increased during the year 2013 as opposed to last year. The revenue collected from soil and compost analysis during the year from these analytical services amounts to be Rs. 73,905.00.

## Student's projects

Two undergraduate students from the University of Rajarata and one undergraduate student from Open University have completed their final year projects.

## ROOT AND TUBER CROP RESEARCH DIVISION

- Four training programmes were conducted on different aspects of " Root and Tuber crops cultivation" on 23<sup>rd</sup> April 2013 for Agricultural Instructors at ISTI, Maha Illuppallama, to newly recruited Research Assistants on 28<sup>th</sup> June 2013 and 19<sup>th</sup> July 2013 at HORDI, Gannoruwa, to Agricultural Instructors from Matale District on 12<sup>th</sup> November 2013 at ISTI, Gannoruwa, to farmers on "Kiriala cultivation for export market" on 24<sup>th</sup> September 2013 at Udapalatha Gampola, Divisional Secretariat and for teachers from Nikawaretiya Educational Zone on "Producing quality planting material on root and tuber crops" on 11<sup>th</sup> October 2013 at HORDI, Gannoruwa. Technical bulletins were also distributed among all participants (About 200 from all the programmes). Four students from National Youth Services Council of Sri Lanka was trained on Root and Tuber crops cultivation
- Home Garden  
Forty training workshops on designing and development of home gardens were conducted. 944 participants of different organizations and requested individuals were trained and technical bulletins on home gardening were provided. 448 seed packets with 7 varieties and 217 plants

were distributed. Two trainings under poly tunnel vegetable cultivation were conducted for 18 participants.

- One television programme on home gardening and one radio programme on nursery management were conducted during the year 2013.
- Other communication related activities including inspection of farmer fields and advice on better cultural practices, replying farmer inquiries by letter or over the telephone etc were conducted (beneficiaries 250).

## MEDIA PROGRAMMES

### Radio Programme

- Correct Fertilizer Usage – Kandurata Sevaya

## PLAN FOR 2014

### Vegetable Division

- Development of Hybrid varieties in Brinjal, tomato, capsicum, bittergourd and luffa
- Development of open pollinated varieties of beans, yard long bean, winged bean etc.
- Seed production of traditional vegetables
- Breeder seed production of tomato, brinjal, yard long bean, luffa, bitter gourd and winged bean
- Seed production of parental lines of already released F1 Hybrid varieties. Only in the coming year.
- Strategic and basic research to enhance the efficiency of hybrid seed production and to development of appropriate management package.

### Entomology Division

- Screening of insecticides against Banana weevils.
- Investigations on the relationship of the usage of Agricultural inputs (pesticides, fertilizer etc.), to drinking water and food quality with Chronic Kidney disease of unknown etiology (CKDU).
- Study on population dynamics of virus vectors in cucurbits with relation to recent climatic conditions, Aphids, white flies, planthoppers & thrips in luffa/ snakegourd/ bittergourd.
- Observational study on identification and management of root knot nematodes in vegetables.
- Development of a technique for augmentation of the parasitoid, *Trathala flavoobitalis*, for the management of brinjal shoot & fruit borer.
- Screening of alternative insecticides to replace Carbaryl to control Gall fly, *Lasioptera falcata* and Paddle legged bug, *Leptoglossus* spp. in Cucurbit crops.
- Screening of alternative insecticides to replace Carbaryl to control Aulacophora beetle in Cucurbit crops .
- Field evaluation of botanicals against cabbage pests in organic farming fields and home gardens.
- Survey on the distribution of the population and post release efficiency of the parasitoid, *Acerophagus papayae* in controlling papaya mealy bugs.
- Toxicity levels of selected insecticides to common vegetable pests, their natural enemies and pollinators: Designing efficient and ecosystem friendly usage strategies for the management of major pests of vegetables in Sri Lanka.

- Survey on the post release efficiency of the papaya mealybug parasitoid, *Acerophagus papayae*.

### **Agricultural Chemistry Division**

- Nutrient management in organic farming.
- Potassium management in Banana.
- Fertilizer management in Pineapple.
- Soil Fertility evaluation programme in different cropping systems in Sri Lanka.
- The effect of Nano fertilizer on vegetable yield.
- Nutrient removal by vegetable crops.
- Micronutrient response study for vegetable crops.
- Demonstration of soil test based fertilizer recommendation.
- Residual effect of Phosphorous in different soils.
- Study on the Cd contents in rice grown in Sri Lanka.
- Bioavailability of fertilizer originated Cd by vegetables.
- Trace metal contents in soil and vegetables collected from mid country intermediate zone in Sri Lanka.
- Trace metals contents in different fertilizer materials.
- Identification and isolation of PGPR for tomato.
- Isolation of N fixer consortium and its efficacy as a N supplement source for vegetables.
- Preparation of P enriched compost using *Bacillus megatherium*.
- Identification of the beneficial microbial consortia in *Capsicum rhysozphe*.

### **Plant Pathology & Mushroom Division**

- Screening of exotic hybrids/ breeding lines of vegetables for bacterial wilt.
- Screening of exotic hybrids of vegetables for seed borne viruses.
- Screening of exotic hybrids of vegetables for major diseases under field condition.
- Development of IPM package by application of *Trichoderma* formulations and neem seed water extract (NSWE) for capsicum and Mukunuwanna under organic agriculture.
- Development of IPM package by using *Trichoderma* rich compost, natural polymers and neem seed water extract (NSWE) for gherkin and bell pepper in poly tunnel.
- Development of IPM package by using *Trichoderma* rich compost, natural polymers and neem seed water extract for tomato and chilli in the field conditions.
- Detection of seed-borne bacteria diseases in tomato, and water Melon.
- Studies on stem canker of capsicum caused by *Erwinia* sp.
- Disease diagnosis and advisory service
- Management of pest and diseases of grapes and increase the fruit size of seedless grape varieties.
- Development of an IPM package to control pest and diseases of citrus crops.
- Development of an IPM package to control virus diseases of pumpkin crop.
- Evaluation and formulation of fungicides against early and late blight.
- Evaluation and formulation of fungicides against downy mildew of cucurbits.
- Re-testing of Registration Expired Fungicides.

- Molecular detection, characterization and management of major tomato viruses.
- Molecular detection, characterization and management of major capsicum viruses.
- Molecular detection and characterization of phytoplasmal diseases of horticultural crops and their management through resistant varieties.
- Identification of molecular markers tightly linked with resistant traits of vegetables.
- Development of sensitive molecular detection method for indexing of banana suckers for freedom from *Fusarium oxysporum cubense* causing Panama wilt.
- Diversity of *Colletotrichum* spp causing anthracnose in capsicum and chili and their cross infectivity.
- Substrate improvement of *Pleurotus ostreatus* to yield enhancement.
- Applicability of Korean technologies for
  - Ganoderma mushroom
  - Shitake mushroom cultivation
- Development of high yielding good quality new mushroom variety using mushroom breeding technologies.
- Survey and collection of indigenous wild mushroom varieties.
- Protocol development for milky mushroom cultivation.
- Varietal evaluation of high dry matter content and high salt tolerant CIP lines of Sweet potato.
- A trial on time of harvesting in selected sweet potato variety.
- Basic planting material production of recommended sweet potato, cassava, kirela, *Colocasia*, *Dioscorea* and inula varieties for distribution among different clients.
- Germplasm maintenance of all the root and tuber crops.
- Dissemination of root & tuber crops of new improved varieties and production packages by establishing demonstration blocks, nucleus units, conducting training programmes etc.
- Maintenance of Model Home garden at HORDI.
- Collection, maintenance and evaluation of under utilized crop varieties adaptable for home gardening.
- Training workshops on designing and development of home gardens.
- Improvement of endemic and indigenous flora having potential ornamental values as novel product.
- CO<sub>2</sub> enrichment project with Tomato hybrid variety.
- Intercropping of tuber leeks with 2 tomato varieties.
- Evaluation of cherry tomato varieties for poly tunnel conditions in Sri Lanka.
- Evaluation of growth and vigor of tomato using Salicylic Acid.
- Comparison of rooted stem cuttings of thibbatu.
- Comparison of seedlings and stem cuttings of thibbatu.

## **Root & Tuber Crops Research**

### **Division**

- Continuation of varietal development programmes in sweet potato and manioc.
- A NCVT programme in selected varieties of Cassava in five locations.
- A VAT programme in selected varieties of sweet potato in four locations.

- Multiplication study of Kiriala variety Isuru.
- Collection, conservation, characterization and evaluation of Dioscorea accessions under the project on “Integrated management systems of plant genetic resources”.
- Collection, conservation, characterization and evaluation of under utilized crop varieties adaptable for home gardening under the project titled “Integrated management systems of plant genetic resources” .

### **Extension, Economics & Data Management Division**

- Assist to prepare technical bulletins on request.
- Translation of technical bulletins to English.
- Assist in Seed production programme.
- Establishment of small scale polytunnel in home garden to increase productivity.
- Organize two weeks In-service training programme on Horticultural crop for newly recruited Research Assistants- 3<sup>rd</sup> batch.
- Provide technical assistant for individuals, higher education institutes by consultation with HORDI resource persons.
- Responsibilities of data management to be continued.

### **STAFF LIST**

<b>Designation</b>	<b>No.</b>
Director (Actg.)	01
Additional Director (Actg.)	02
Research Officer	19
Agriculture Officer	01
Administrative Officer	02
Senior Librarian	02
Programme Assistant (Agri)	08
Public Management Assistant	13
Farm Clerk	03
Agriculture Instructor	30
Research Assistant	21
Research Sub Assistant	10
Development Officer	05
KKS	01
Driver	08
Store man	01
Mechanist	01
Machine Operator	01
Carpenter	01
Welder	01
Electrician	01
Lawn Mover Operator/Grass Cutter	01
Land Mover Operator/Tractor	02
Water Pump Operator	02
Bee Demonstrator	01
Budder	03
Circuit Bungalow Keeper	01
Watcher	24
Sanitary Labourer	01
Unskilled Labourer	85
<b>Total</b>	<b>252</b>

## 1.2.1 FOOD RESEARCH UNIT (FRU) – GANNORUWA

The Food Research Unit functions under the administration of Horticultural Crop Research and Development Institute (HORDI). The major tasks undertaken by this unit include research on post harvest technology, product development and quality evaluation of samples derived from crop improvement programmes and conducting technology transfer activities. The FRU also has collaborative programmes with the other crop research institutes of the

DOA, the provincial agricultural system, other government and non-government organizations and the private sector on technology development transfer and use of food machineries. In addition, the unit provides the necessary facilities and guidance for undergraduate and post-graduate students to conduct their research on diverse aspects of postharvest and processing technologies.

### BUDGET

The annual allocation and expenditure under different votes are given in Table 1.2.1.1

**Table 1.2.1.1. Annual budget – 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	850,000	380,017	45
Recurrent	2,183,600	208,3105	95
Project 1 - Production of postharvest handling manual for Tomato	955,000	374,693	39
Project 2 – Improving income of rural farmers through food processing training	7,459,800	1,478,686	20
<b>Total</b>	<b>11,448,400</b>	<b>4,316,501</b>	<b>38</b>

### PROGRESS

#### Achievements

- Double the DOA recommendation of Potassium application as soil treatment reduced the anthracnose and stem end rot of mango and anthracnose of ‘Embul’ banana. Similarly the same treatment showed minimum postharvest diseases of Papaya.
- Double the Department of Agriculture recommendation of Pottasium application as soil treatment improved the quality of Passion fruit, by increasing TSS/ Brix value and reducing acidity.
- Double the Department of Agriculture recommendation of Pottasium application as soil treatment reduced the internal browning of Pineapple during simulated sea freight at 12 °C.
- Chemical pretreatment of 0.5% Acetic Acid and 1% Citric Acid at green yellow

stage of Carambola is suitable for minimal processing. 'Peak fresh' packaging material could be introduced for minimal processing of fruits & vegetables.

### **Findings & Product Development**

- Corn Kurakkan, and Soy flour mixture to produced high nutritious local foods such as rotti and pittu. The product was rich in Vitamin A, Calcium, Iron and Protein.
- Produced a Gel using 'Kekiri' which is similar to Apricot gel is used in bakery and cake industry.
- Developed a product for Tom EJC mango.
- Toffee, RTS, Chutney, Jam, Pittu, Rotti, Kongi were produced with Calabash guard.
- Dargon fruit jam, RTS and Cordial were produced.
- Bael toffee and chutney were produced.

### **Development Activities**

- Project on "Improving farmer income through establishment of a training centre" funded by Korean Government was initiated. A small scale training centre was established at the premises of Food Research Unit. The food processing trainings were conducted at the training centre for small and medium scale processors and farmers.
- Plastic crates (about 339 no's), Cardboard boxes (600 no's), Refractometers (05 no's) and Juice dispenser (01 no.) were distributed among processors with 50% subsidies. Training programs were conducted for the whole sellers, transporters, collectors, retailers to reduce

the post harvest losses of fruits and vegetables.

- Post harvest handling manual for tomato was printed and distributed under the project; "Production of postharvest manual for Tomato".
- Awareness programs were conducted by multimedia presentations and practical sessions to introduce the sector of food processing and post harvest technology and Posters and Leaflets were distributed.
- Roofing work of the auditorium and floor tiling of microbiology laboratory were completed successfully.
- Training of University students – 7 students from Universities of Ruhuna, Peradeniya, and Sri Jayawardanapura and 02 M.Sc. students were completed their 3-4 months research projects at FRU.
- Trained seven Diploma students – 3 students from HARDI Technical College and 06 from Kandy technical college were successfully completed their 03 – 06 months Industrial training period.
- Actively participated for the 'Deyata Kirula', 'Govi Sathiya', Palathuru Dekma', Business Clinic; conducted by the ministry of Youth Affairs and Skills Development, work shop on youth agriculture entrepreneurship development; conducted by the District secretariat, Kegalle, GAP program for Mahaweli Authority and other exhibitions at schools, and other government bodies. Successfully exhibited and aware the people on post harvest technology and food processing sector.

## Technology Transfer

- FRU continues to provide laboratory analytical facilities. During the year several samples of ready-to-serve beverage, chutneys, cordials, jams, dehydrated vegetables, pastes, bites, french-fries, milk products and soya products received from private sector were analysed to ensure quality of products.
- Reports were issued for three hundred thirty samples of vegetables, thirty nine samples of fruits, eighteen samples of sweet potato for breeders. 60 no's of spice powders 18 no's flours, 75 no's processed foods of fruits, vegetables, 7 no's milk products, 12 no's bites, 7 no's soya products, 6 no's treacle & bee honey samples & 32 no's training certificates for food processing programs were issued.
- AGEDIS sponsored training – 02 training programs were conducted with private sector participation on fruits and vegetable processing and rice based products.
- Training programs on post harvest technology of fruits and vegetables and Processing were conducted for Private Sector organizations, Vidatha centres, Agriculture Ministry, Chamber of Commerce, Department of Industries, Teacher training institutes, Schools, Agriculture instructors, Diploma students, University students.
- 10 (310 individuals) programs of pre and post harvest technology, 14 (375 individuals) packaging programs 11 (25 individuals) training programs on rice based products, 131 (1125 individuals) on processing of fruits and vegetables, 37 programs of milk based products, 1 program of candies, 22 bites & pastes, 25

Soya bean based food products, 03 bakery products and were conducted at the FRU premises and other institutions. Also conducted the trainings for other institutions; 125 students of agriculture schools were trained on post harvest technology and food processing. Four university student (39 no's) groups were trained on post harvest technology, quality analysis and food processing methods. Three no.s Vidatha programs were also conducted on food processing. 14 group (445 individuals) school teachers and instructors (Agriculture and Home science sections) were trained on post harvest technology and food processing areas.

## PLAN FOR 2014

- Development of preserved mango products using Tom EJC variety.
- Preparation of Dragon fruit products
- Development of Corn, Kurakkan and Soya flour mixture for local food preparation.
- Product development using Calabash guard.
- Product Development of Green chili (Canning, Green chili paste, Sauce, powder, 'Kimchi' fermented product)
- Introduction of Cassava (*Manihot esculenta*) flour as a substitute for corn starch in food processing
- Identification of suitable Cassava (*Manihot esculenta*) variety for biscuits production.
- Production of pumpkin based nutritious drinks and cookies
- Development of soya based food products.
- Product development of cow's milk incorporating soya milk.

## STAFF LIST

<b>Designation</b>	<b>No.</b>
Head	01
Research Officer	02
Agriculture Instructor	03
Research Assistant	02
Programme Assistant	01
Development Officer	01
Public Management Assistant	02
Laboratory Sub Assistant	03
Driver	02
Electrician	01
Machine Operator	01
Labourer	03
Labourer (Contract)	09
Watcher	02
<b>Total</b>	<b>33</b>

## 1.2.2 REGIONAL AGRICULTURAL RESEARCH AND DEVELOPMENT CENTRE (RARDC) – BANDARAWELA

RARDC, Bandarawela, located in the Up Country Intermediate Zone 1400 m above mean sea level, is the main centre responsible for development of appropriate technologies to enhance the yield and quality of agricultural commodities cultivated in the Uva region and Balangoda segment of Sabaragamuwa province. Its mandate area covers agro ecological regions of IU<sub>2</sub>, IM<sub>2</sub>, IM<sub>3</sub>, WM<sub>3</sub>, IL<sub>2</sub>

and WM<sub>3</sub>. The centre functions under the purview of HORDI, Gannoruwa and it has one satellite station at Rahangala. Other than the research activities, the centre involves in many technology transfer programmes and agricultural development programmes including production and distribution of quality planting materials of potato, fruit and flower crops.

### BUDGET

The annual allocation and expenditure under different votes are as follows;

**Table 1.2.2.1: Annual budget -2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Recurrent	11,743,573	11,250,053	96
Capital	28,183,000	2,557,849	09
<b>Projects – RARDC, Bandarawela</b>			
NARP beans	400,000	393,639	98
NARP potato	533,900	464,541	87
NARP citrus	175,000	149,187	85
NARP banana	50,000	51,912	104
NARP citrus IPM	50,000	49,645	99
Hybrid Tomato	150,000	149,356	100
KOPIA vegetables	200,000	194,181	97
KOPIA soil	446,800	293,033	66
Fruit village development	500,000	431,746	86
Tissue culture	9,500,000	3,560,341	37
NARP Floriculture	1,227,100	1,214,855	99
<b>Projects – ARS, Rahangala</b>			
Fruit village development	500,000	498,532	99
NARP citrus	100,000	92,614	93
NARP beans	200,000	195,658	98
<b>Total</b>	<b>53,959,373</b>	<b>21,547,142</b>	<b>40</b>

## PROGRESS

### CROP IMPROVEMENT

- Fifteen promising pole bean lines were evaluated in advanced yield trials and five superior lines were selected for NCVT.
- Well performed two radish (Supergiljo, Meotjinmatdongum), two cabbage (Woori, Yeroeummat) and two lettuce (Cheongchima, Hanbatjeokchima) varieties of Korean origin were selected for large scale demonstrations at farmer fields.
- Ninety three local brinjal accessions were collected for variety improvement programme of brinjal
- A fruit orchard of thirty one cultivars of underutilized fruits viz; Cherrymoya, Welianoda, Sapodilla, Masan, Nelli, Rose apple, Velvet tamarind, Carambola, etc; was established.
- New carrot line RGC 1301 was established in seed multiplication plots to carry out yield trials with exotic variety New Kuroda at ARS, Rahangala.

### AGRONOMY

- Experimental results revealed that 65-70 days after sowing is the most suitable time for harvesting of Lanka carrot.
- Appropriate mini tuber sizes of potato in open field and poly tunnels for seed production were identified as 5-20 mm (diameter). Grading of mini tubers prior to planting and managing of sand nurseries can be recommended to obtain an even cultivation and to make cultural practices easy.

- A suitable organic foliar fertilizer for cabbage cultivation under organic farming was identified.

### PLANT PROTECTION

- Fungicide Fluazinam (500 g/L SC) imported from a new source has been recommended to control late blight on Potato and Tomato.
- Spray application of Tebuconazole (250 g/L EC) 2-3 weeks before onset of rain will check the development of pink stem disease in citrus.
- Laboratory tests revealed that Kasugamycin (20 g/L EC) have the ability to suppress the development of bacterium *Xanthomonas campestris* (black rot pathogen in cabbage).
- Fluazinam (500 g/L SC) can be used to suppress the development of club root disease in cabbage (preliminary tests).
- Application of Pyraclostrobin or Tebuconazole followed by repeated application of Chlorothalonil was good to reduce bean diseases and it also reduces the development of fungicide resistance.
- Fungicide, Flutrifol (0.5 ml/L) effectively controls Anthracnose, Angular leaf spot and Rust diseases in pole bean.
- Registered expired fungicides (Chlorothalonil, Mancozeb and Propineb) were re-tested and they showed good performances against late blight in tomato.
- Lowest whitefly population was recorded in pole bean crops established in February while it was highest in plants established in May. Highest average field population was recorded in August.
- Initial studies revealed that there is a possibility of arising resistant mite

populations to most of the registered miticides.

- Reflective mulches successfully reduced aphid population on tomato and produce higher yield, more flower bunches and high TSS in fruits.
- Lufenuron 5% EC and Acetamiprid 200 SP has been recommended to control Diamond Backmoth in cabbage and whiteflies and thrips in pole bean, respectively.

## HORTICULTURE

- Experimental results revealed that rough lemon stem cutting can be used to raise budded plants of Bibile sweet orange.
- Three Japanese mandarin varieties were released for commercial cultivation in year 2013.

## TISSUE CULTURE

- *In-vitro* rooting and culture establishment of pear was successfully completed. Further studies are carrying out to initiate rooting.
- An experiment was conducted to introduce an appropriate protocol for *in-vitro* propagation of Gerbera through different explants. Successful culture establishment were done through shoot tips.
- Application of 6 ppm of BAP increased *in-vivo* sucker production of Gerbera.

## FLORICULTURE

- Density of 11 plants/m<sup>2</sup> (30x30 cm) is suitable for high quality cut rose production.
- Leaf removal has no significant effect on flower production and quality of gerbera.

- Flowering of Chrysanthemum can be regulated by day length manipulation. Trials have been continued to find out the suitable time period for artificial lighting.
- Gibberelic Acid significantly effect on flower production of Chrysanthemum.

## SOIL SCIENCE

- N, P, and K showed significant effect on number of tubers/plant, tuber weight, tuber quality and other seed quality parameters in seed production of potato.
- Proper fertilizer management strategies for G<sub>0</sub> seed potato production in soil and soil less media in protected conditions were identified.
- New fertilizer management strategies (alternative for Albert's solution) to minimize production cost were developed for green house crops.
- A simplified structure was introduced for pre-basic seed production of potato.

## SERVICES

### Breeder seed production

- DOA-SCS certified breeder seeds of pole bean varieties, Bandarawela Green (100 Kg), Keppetipola nil (52.5 Kg), Balangoda Nil (150 Kg) and bush bean variety Wade (3.7 Kg); and parental seed materials of tomato variety Bathiya (P3-HT 2123:1007g and P4-Thilina:508g) were produced.

### Planting material production

- 4400 sweet orange (Bibile sweet, Arogya and Sisila), 2100 mandarin (Indu and Madu), 500 Rahangala mandarin, 300 Japanese orange, 100 of each Carombola and Guava, 80 Avocado, 50 pomegranate,

1897 strawberry, 935 gerbera, 99 anthurium and 21 chrysanthemum plants were produced at RARDC, Bandarawela.

- A 6000 Bibile sweet and 1100 Rahangala jamanaran grafted plants were produced at ARS, Rahangala

### **Soil test based fertilizer recommendation programme**

Soil test based fertilizer recommendations were given for 197 farmer samples and 502 research fields samples.

## **TECHNOLOGY TRANSFER**

### **ACTIVITIES**

- RARDC officers participated for 04 PTWG meetings and several technical trainings (pre-seasonal) held in Uva and Sabaragamuwa provinces.
- Training programmes were conducted for more than 3000 personnel belong in farming communities, universities, schools and other government organizations on various agricultural activities and safe use of pesticides, proper fertilizer management and risk of misuse of fertilizers on health and environment.
- Advices on pest and diseases management were provided to farmers who cultivate vegetables, fruits, flower crops and potato.

## **PLAN FOR 2014**

### **Vegetables**

- Development of new vegetable varieties (Pole and Bush bean, Brinjal, Capsicum, Carrot and Potato).

- Evaluation of exotic vegetable varieties (Radish, Chinese cabbage, Lettuce, Tomato and Bell pepper).
- Breeder seed production (Pole bean- Bandarewela Green, Keppetipola Nil, Balangoda Nil; Bush bean- Wade and Lanka carrot).
- Parental seed production of tomato variety Bathiya.
- Technology development to reduce post harvest losses of bell pepper and tomato.
- Fertilizer and spacing trials of new carrot line RGC 1301.

### **Potato**

- Development of new storage and dormancy braking technologies for seed potato.
- Identification of new planting materials and production systems (Nutrient film techniques).

### **Horticulture**

- Evaluation of tree training systems to enhance yield and fruit quality of Apple.
- Effect of rootstocks on fruit quality of Citrus.
- Evaluation of Peach, Apple and Nectarine varieties for UCIZ.

### **Plant Protection**

- Screening fungicides and insecticides for diseases and insect pests of vegetables, fruits, potato and flower crops.
- Management of root rot disease in bean.
- Effect of plant spacing on diseases severity and yield of capsicum.
- Chrysanthemum cultivar evaluation to white rust (*Puccinia horiana*) disease.

- Preliminary validation of some late blight disease forecasting models.
- Development of a fungicide spraying schedule for leaf diseases of bean.
- Assessing the effect of applying organic extracts on micro-flora and leaf diseases of cabbage.
- Evaluation of natural repellents against potato tuber moth (*Phthorimaea operculella* zeller) in small scale stores
- Survey on root-knot nematodes (*Meloidogyne graminicola*) infection in paddy cultivation in selected AI regions in Badulla district
- Study on effect of soil amendments to control root nematodes (*Meloidogyne* spp.) in guava
- Evaluation of efficacy of available miticides on vegetables cultivated under open-field and protected environments.
- Population dynamic study of whitefly (*Bemisia tabaci*) on pole bean.
- IPM demonstration on citrus pest and diseases.
- Screening of rose cultivars in open field against mites (*Tetranyches urticae*).
- Evaluation of insecticide application methods to control scale insects in rose.
- Control of bacterial wilt in potato and bell pepper grown in poly-tunnels at ARS, Rahangala

### Floriculture

- Identification of suitable pruning and training systems; and effective mulching materials for Roses.
- Evaluation of different pulsing treatments to enhance vase life of Roses, Gerbera and Chrysanthemum.

### Tissue culture

- Development of new Gerbera lines through seed culture and polyploidy mutation.
- Study the somaclonal variations in *Lysianthus*.
- Study on cost effective alternatives to MS medium in *in-vitro* potato culture.

### Soil Science

- Identification of fertilizer needs in planting material production of Citrus.
- Development of N, P, K recommendation for seed potato production.
- Development of nutrient management package for G<sub>0</sub> production in poly-tunnels.
- Development of a totally soluble nutrient mixture for hydroponics and aeroponics.
- Testing of different fertilizing practices and tea waste compost on up country vegetables.
- Rapid method for estimation of soil lime requirement in UCIZ
- Selection of best green manures to improve soil fertility in marginal lands in UCIZ.

### STAFF LIST

Designation	No.
Deputy Director (Research)	01
Research Officer	13
Economist's Assistant	01
Programme Assistant	06
Development Officer	02
Research Assistant	09
Agriculture Instructor	03
Research Sub Assistant	02
Administrative Officer	01

<b>Designation</b>	<b>No.</b>
Public Management Assistant	09
KKS	02
Drivers	04
Tractor Operators	02
Painter	00
Budder	01
Mason	01
Carpenter	01
Watchers	10
Circuit Bungalow Keeper	01
Permanent Labourer	26
Contract Labourer	63
<b>Total</b>	<b>158</b>

### 1.2.3 REGIONAL AGRICULTURAL RESEARCH AND DEVELOPMENT CENTRE (RARDC) – MAKANDURA

Regional Agricultural Research and Development Center (RARDC) Makandura has been mandated for developing and integrating technologies for coconut based cropping system to sustain crop productivity in the coconut lands. It belongs to the IL<sub>1a</sub> agro ecological zone with about 1960mm of average annual rain fall and maximum average annual temperature is about 31.7°C and minimum average annual temperature is about 23°C. Soil type of this area is red yellow podisolic consist with alluvial soil as a top layer.

RARDC, Makandura and its adaptive research stations of Tabbowa, Iginimitiya and Wariyapola cater to the research needs of the Kurunegala, Puttalam and Gampaha districts.

RARDC Makandura is vested with the responsibility of technology development concerning mandate fruits, vegetables, root and tuber crops, floriculture, Mushroom and compost production. The research programme focuses on improving the crop varieties, development of propagation methods, development of appropriate agronomical technologies, increase availability of fruit and vegetable, enhancement of soil nutrition, solving of problems related to plant protection and soil, ensuring better plant health with fewer dependants on chemicals and enhancement of production.

### BUDGET

The budgetary allocations and expenditure under different votes are presented in the Table 1.2.3.1.

**Table 1.2.3.1: Annual budget – 2013**

<b>Vote</b>	<b>Allocation (Rs.)</b>	<b>Expenditure (Rs.)</b>	<b>Expenditure %</b>
Capital	6,391,320	6,042,369	95
Recurrent	3,126,400	1,574,164	50
NARP - Development of Local Pumpkin	889,800	880,000	99
NARP - Anthurium	1,300,000	1,290,000	99
NARP - Banana	50,000	49,690	99
NARP - Pineapple	216,500	128,377	59
Tissue culture Project	1,760,000	1,550,000	88
Fruit village development-Pomegranate	600,000	534,000	89
Fruit village development -Pineapple	3,000,000	2,800,000	93
Hybrid Vegetable Varietal Development	275,000	249,981	91
Increasing the Availability of Popular Traditional Vegetable Varieties	131,000	130,850	100
Mushroom - KOPIA project	1,400,000	522,105	37
Production of compost and promotion of usage	4,470,000	4,330,058	97
<b>Total</b>	<b>23,610,020</b>	<b>20,081,594</b>	<b>85</b>

## PROGRESS

### Fruit Breeding & Tissue Culture

- Pineapple Hybridization Program - Hybrid pineapple lines were backcrossed with Mauritius pineapple. Further advancement will be done.
- Germplasm collection and evaluation of pineapple – Continuing.
- Assessment of the effectiveness of triple row method for pineapple cultivation - Trial has been established.
- Study of the effect of using Plant Growth Regulators on fruit enlargement of pineapple - Trial has been established.
- Planting material production of pineapple & banana by tissue culture techniques- 40000 *in vitro* Mauritius plants were produced.
- Development of protocol for micro propagation of new anthurium varieties - Cultures are in multiplication stage.

### Fruit Breeding and Agronomy

- Hybridization Program of Pomegranate - Desirable fruit characters were found in F1 (AxD and CxD) hybrids. Data collection is in progress.
- Improvement Program of Pomegranate Cultivar Kalpitiya red - First harvest fruit and fruit quality characters were taken, research is continuing.
- Banana Germplasm Collection, Evaluation and Characterization- Desirable fruit characters were found in an Ambul selection. Evaluation and data collection is continuing.
- Improvement of rooted stem cuttings using PGR in pomegranate (Variety -

Nimali) - IBA 500ppm + borax 1% combination recorded highest rooting

- National Coordinated Variety Trial – Banana Seeni kesel – 2<sup>nd</sup> harvest data collection is in progress.

### Vegetable

- Collection and evaluation of local pumpkin - 20 germplasm were evaluated in the field, 2 lines selected as parental lines for hybridization programme and another 3 was selected for purification.
- National Co-ordinated Varietal Adaptability Trial (NCVT) pumpkin - Line B and Vilachchi were performed better than Ruhuna and comparable to Arjuna, VAT will be conducted in yala 2014.
- Evaluation of IPM package for pumpkin at Wariyapola ARU - Line B, Vilachchi, Moragollagama gave higher yield than Arjuna (commercial) but the number of fruits was higher in HORDI PU 1 and less pest disease incidence were observed.
- NCVT for Mae, Capsicum, Brinjal, Tomato, winged bean and cucumber - In winged bean NCVT, WBMW and WBMP was 5-6 days early than SLS 44 and yield also high.
- Seed production through purification of pumpkin variety Villachi – 1.25kg.
- Production of mas mae seed- 8.5 kg.
- Breeders seed production of Snake gourd variety TA 2 - 3.65kg.
- Breeder seed production of Bitter gourd variety Thinnavelli - 2.3kg.

## Floriculture

- *Ex situ* conservation and utilization of genetic resources of *Anthurium andraeanum* – four varieties were released ( M30, M 36, M 5, M 7) at varietal release committee meeting in 2013.
- Selection programme of Idda varieties – one variety was released in 2013.

## Soil Science

- Efficient nutrient management on productivity of pineapple – Trial was established and 40 soil and plant samples were collected and analyzed.
- Survey on usage of fertilizer for vegetable and fruits in Kalpitiya – 22 soil and water samples were collected and analyzed for available P, Exchangeable K, pH, EC, organic matter, Heavy metals (Cd, Pb).

## Compost

- 326 compost related samples were analyzed for evaluating their quality standards.
- Production of compost – 273 mt and distributed 33876 of 5kg inoculum bags.
- Two IPNS demonstrations were established.
- ¼ Ac of green manure was cultivated.

## Entomology

- Pest identification & management in guava, pomegranate, annona – Horana Red, Horana Rosy and Red Giant identified as the most infested varieties. Horana Sweet, Pubudu and Lanka Giant-identified as least infested varieties.
- Causal factor has been suspected as a bark eating caterpillar.

- Monitoring on spatial and temporal distribution of scale insects in Mango - Population was higher during flowering stages.
- Evaluation of selected organic extracts to control scale insects - Neem seed extract can be effectively use for home gardens to control scale insects.

## Pathology

- Usage of Tricoderma and compost wash to control disease in vegetables – Experiment was established in the field.
- New roofing material for oyster mushroom growing house – material purchased.
- Development of cultivation package for Ganoderma mushroom – material purchased.
- Introduction of new mushroom variety – seed production started and other material purchased.

## Root & Tuber crops

- Productivity improvement of cassava in both quality and quantity by applying root inducing hormones - Trial was completed and 25% yield increment was reported.
- Fertilizer studies in sweet potato cultivation - Restoration of yield performance and sweet potato under lime application was successful if 23 ton/ha yield was available.
- Technology generation for improving the cost effectiveness and year round availability of cassava planting material - Trial is in progress in the field (7 months old).

## Seed & Planting Material Production

**Table 1.2.3.3: Seed & Planting material production - 2013**

Name of Plant	No of plants sold
Dragon Fruit	1300
Banana	260
Anthurium	380
Mushroom	50

## Technology Dissemination

**Table 1.2.3.2: Technology dissemination**

Topic of the programme	Leaf lets	Field days	Soil test ing	Exhibition
Compost	135,086	-	-	03
Soil	-	-	326	-
Mushroom	2,000	-	-	01
Pineapple	2,500	-	-	02
Pomegranate	2,200	-	-	-
Floriculture	2,500	-	-	01

**Table 1.2.3.4: Training programs**

Topic of the programme	No of Programs	No of Participants
Pineapples	13	520
Banana	7	400
Dragon Fruit	10	200
Vegetable	30	1700
Home garden	20	2000
Root & Tuber	06	300
Floriculture	25	1200
Mushroom	15	300
Compost	86	4623

**Table 1.2.3.4: Advisory Services**

Field	No of advisories during the year 2013
Compost	115
Mushroom	210
Pineapples	32
Floriculture	2
Home garden	14
Root & Tuber	17
Dragon Fruit	20
Banana	15
Pathology	42
Entomology	20
Vegetable	25

## PLAN FOR 2014

### Fruit Breeding & Tissue culture

- Pineapple Hybridization Program.
- Germplasm collection and evaluation of pineapple.
- Assessment of the effectiveness of triple row method for pineapple cultivation.
- Study of the effect of using Plant Growth Regulators on fruit enlargement of pineapple.
- Planting material production of pineapple & banana by tissue culture techniques.
- Development of protocol for micro propagation of new anthurium varieties.

### Fruit Breeding & Agronomy

- Hybridization program of pomegranate.
- Improvement program of pomegranate Cultivar Kalpitiya red.
- Improvement of rooting stem cuttings using PGR in pomegranate (Variety - Nimali).

- Manipulation of harvesting season of dragon fruit (*Hylocereus spp.*).
- Optimization of the mango tree for flower induction through paclobutrazol.
- National Coordinated Variety Trial – Papaya hybrid.
- Enhancement of productivity of mango through rejuvenilization.

## Vegetable

- Purification of Selected Germplasm - 5 germplasm will be purified using selfing technique.
- Seed production through purification of pumpkin variety Villachchi and line B - 5kgs- Vilachchi , 3 kgs- line B.
- National Co-ordinated Varietal Adaptability Trial (NCVT) and VAT in Moragollagama and Vilachchi area.
- Breeders seed production of snake gourd variety TA 2 - 10kgs.
- Breeder seed production of bitter gourd variety Thinnavelli - 3kgs.
- Breeder seed production of cucumber variety LY 58 -1 kgs.
- NCVT for mae, capsicum, brinjal, tomato, winged bean and cucumber.
- Growth regulator trial, COMcat - ROW (Imported Hybrid Capsicum variety evaluation, Luffa).

## Pathology & Mushroom

- Usage of Tricoderma and compost wash to control diseases in vegetables.
- Roofing material for oyster mushroom growing house.
- Development of cultivation package for Ganoderma mushroom.
- Introduction of new mushroom variety.

## Floriculture

- Development of novel varieties by conventional breeding ( Anthurium and Idda).

## Root & Tuber Crops

- Technology generation for improving the cost effectiveness and year round availability of cassava planting material.

## Entomology

- Pest identification & management in guava, pomegranate, annona.
- Evaluation of recommended insecticides (with insect growth regulators) to control scale insects in mango.
- Identification of parasitoid and predators in mango scale insect.
- Pilot scale testing of Acetamiprid 200 SP for pineapple mealy bug.
- Pesticide screening tests against pineapple mealy bug.
- Isolate the entomo pathogenic fungi.

## Soil Science

- Vermicompost production and usage for crop productivity.
- Making a leaflets on efficient management of fertilizer.
- Efficient nutrient management on productivity of pineapple.
- Survey on usage of fertilizer for vegetable and fruits in Kalpitiya.

## Compost

- Production of compost – 300mt.
- Distribution of 5kg inoculum bags – 40,000.

- Establishment of two IPNS demonstrations.
- Conducting 5 exhibitions, distribution of 500,000 leaflets and training of 10,000 trainees.
- Analysis of 400 compost, soil and water samples.

## STAFF LIST

Designation	No.
Deputy Director (Research)	01
Research Officer	07
Agriculture Monitoring Officer	02
Programme Assistant	02
Development Officer	05
Agricultural Instructor	18
Research Assistant	10
Farm Manager	01
Farm Clerk	02
Research Sub Assistant	01
Driver	04
KKS	01
Watchers	11
Nursery men	01
Tractor Operator	02
Sanitary Labourer	01
Grass Cutters Operator	01
Unskilled Labourer (Grade I)	33
Labourer (Contract)	60
<b>Total</b>	<b>163</b>

## 1.2.4 AGRICULTURAL RESEARCH AND DEVELOPMENT CENTRE (ARDC) - SITA ELIYA

Potato is the priority crop, followed by up country vegetables, temperate fruits and some floricultural crops of this station. Crop improvement programs include varietal development, introduction and selection of suitable high yielding varieties. Enhancement of crop productivity is done through development of improved agronomic packages, use of good

agricultural practices for the management of pest, disease and nutrient. Further, national programs are being continued to up lift-quality and quantity of seed potato, planting materials of strawberry and some ornamentals. Also, research on seed production of potato and some exotic vegetables are conducted for further improvement of locally developed technology.

### BUDGET

**Table 1.2.4.1: Annual budget – 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	2,006,300	1,649,845	82
Recurrent	7,329,859	6,466,881	88
Projects			
• Improvement of seed potato production technology (NARP)	1,183,500	992,869	89
• Development of new potato varieties for local conditions (NARP)	197,500	197,452	100
• Evaluation of citrus varieties	100,000	99,758	100
• Tissue Culture	9,500,000	7,132,304	99
• IFAD	212,550	212,296	100
• Vegetable Cultivation Technology (KOPIA)	100,000	99,796	100
• Soil Fertility Management - (KOPIA)	236,000	158,313	67
• Mushroom (KOPIA)	1,228,095	45,388	4
• Potato (KOPIA)	2,450,751	2,450,751	100
<b>Total</b>	<b>24,544,555</b>	<b>17,847,287</b>	<b>79</b>

### PROGRESS

#### RESEARCH

##### Agronomy

- Ten commercial potato varieties were evaluated in Nuwara Eliya district during 2013 yala season and, variety ‘Laperla’ and

‘Destiny’ performed well during Yala season under UCWZ conditions.

- Performances of different potato planting materials were studied in hydroponic system & mini tubers have given higher tuber yield.

- Evaluate the effect of within row spacing on seed yield of potato under farm management conditions and experiment will be repeated.
- Performance of seed tuber pieces of potato as planting material were evaluated and potato tuber pieces of 60g were given significantly similar yield to whole tuber (60g) (28mm -55mm seed size) in UCWZ conditions.

### Plant Breeding

- 4 locally developed potato lines (M-18, 19, 01-12-10 and 01-09-05) were evaluated under NCVT under research conditions and 3 lines (19, 01-12-10 and 01-09-05) gave significant higher yield. Trial was established again in research and seed potato farms in Nuwara Eliya to confirm results.
- 5 locally developed potato lines (01-11-01, 99-25, 01-10-01, 01-08-15 and A-17) were established under NCVT under research conditions during Maha 2013/14.
- Identified 32 locally developed potato lines from 107 lines to develop heat tolerant varieties for nontraditional areas (Kalpitiya and Jaffna), based on yield and tuber characters
- Identified 35 locally developed lines from 78 lines to develop high yielding varieties.
- Evaluated 9 locally developed lines under AMYT.
- Evaluated 9 locally developed lines under MYT.
- Established already identified 32 locally developed potato lines in Kalpitiya and Thirunelveli research stations to identify heat tolerant varieties.

- Selected 7 imported potato lines from 15 lines for further evaluation.

### Tissue Culture

- Developed a protocol for *in-vitro* establishment and multiplication of pears.
- Different populations were identified from granola collected from different areas of up country region of Sri Lanka.
- Developed protocol for Chrysanthemum and Statice for micro propagation.

### Entomology

- A solution of viral infected black cut worm larva (8g/lit.) has been found to effectively control Black cut worm as a biological control agent. Mortality rate was recorded as 48.3%.
- 5631, number of *Diglyphus isae*, the natural bio control agent of *Liriomyza huidobrensis* were released to field and polytunnels during year 2013.
- Virtako 40 WG (Thiamethoxam 20% + Chlorantraniliprole 20%) was recommended for the control of Cut Worm, Potato Tuber Moth, Aphids and Thrips (potato pest complex) as environmentally safe insecticide.
- *Bacillus thuringiensis* (BT) “isolate 2” was equally effective as Chlorpyrifos in controlling White grubs.

### Pathology

- The new fungicides Amistar @ 1.00 ml/l & Blighcozeb @ 2.5 ml/l were screened against Potato Late Blight. Amistar @ 1.00 ml/l was effective for the control of the late blight of potato under field conditions. (Maha 2012/2013)

- Efficacy of Azoxystrobin 25% SC, from new source was tested under farmers' field conditions (Pilot scale test). It was effective for the control of the late blight of potato under farmer field conditions. (*yala* 2013)
- Tested 15 new commercial potato varieties Servane, Bellanova, YP-04-80 and YP-04-88 & based on the late blight tolerance and yield, can be selected for further evaluation (*Maha* 2012/2013).
- Tested 10 new commercial potato varieties were found to be tolerant for late blight under sprayed conditions. YP-4-88 varieties based on the late blight tolerance and yield can be selected for further evaluation. (2013 Yala).
- New potato breeding lines 19 and 99-99 were found to be tolerant for late blight and gave higher yield under sprayed conditions. These lines were selected for further evaluation.
- New fungicide Kaligreen @ 2.5g/l was screened against powdery mildew of Zucchini. Kaligreen @ 2.5g/l can be recommended for the management of powdery mildew of Zuchchini. (*yala* 2013).
- Management of Black Rot of cabbage using hot water seed treatment was studied.
- 26 potato lines and varieties were screened against Powdery Scab of potato and none of them are resistance to Powdery Scab of potato.

### Soil Science

- An experiment was conducted to compare the four nutrient solutions formulated by the Department of Agriculture with commercially available Albert's solutions for mini tuber production. Experiment indicated that locally prepared nutrient

solution performed well under hydroponic system.

### Vegetable

Identified two exotic carrot varieties, two cabbage varieties and two cauliflower varieties as high yielding with quality and tolerance/resistance to pest & disease in UCWZ conditions.

## DEVELOPMENT ACTIVITIES

### Agronomy

- Potato mini tuber production- 0.67 million pre basic seeds (G<sub>0</sub>) were produced using Hydroponic, Aeroponic and Geoponic systems. Seed production under aeroponic was discontinued after June 14<sup>th</sup> due to damage of polytunnel.
- Hydroponic unit was constructed and production of G<sub>0</sub> was initiated in September.
- 453,700 of pre basic seeds (G<sub>0</sub>) were issued to farmers for production of G<sub>1</sub> seed tubers.
- 50,000 pre basic seeds were issued to 100 small scale farmers for off season seed production. Success was 30%. Further 50,000 issued for research trials.
- Number of small farmer societies and one cooperative were formed in collaboration with PDOA Nuwara Eliya and Badulla, IFAD Project leaders and District Director Nuwara Eliya for seed production using G<sub>0</sub>. This programme is in progress.
- Transfer of Technology for G<sub>0</sub> seed production using hydroponic and aeroponic to seed and planting material division.
- Transfer of Technology for hydroponic and aeroponic unit construction to seed and planting material division.

## Breeding

- A New 2500ft<sup>2</sup> polytunnel was constructed for Lanka Ball radish breeder seed production.
- Potato varietal promotion program- Large scale demonstration of Golden Star First season production was satisfactory but failures in second multiplication have to be investigated.

## Tissue Culture

- 19,560 numbers of *in-vitro* plantlets of variety Granola were issued for formal seed potato production programme. Further 2,310 of Granola, 130 of Golden Star, 107 of Raja and 107 of Desiree *in-vitro* plantlets were issued for in-formal seed production programme.
- 522 of Granola, 12 of Desiree and 12 of Raja, *in-vitro* plantlets were issued for experimental purpose.
- 12 Granola *in-vitro* plantlets were issued for a private seed potato producing company.
- 3388 numbers of *in-vitro* strawberry plantlets and 2634 numbers of *in-vitro* derived planting materials were issued for private farmers.
- 306 numbers of *in-vitro* strawberry plantlets used for runner production in research station.
- 2473 Baby's breath, 637 Madona lily, 370 Grebera, 506 Limonium and 78 Chrysanthemum, *in-vitro* plantlets were produced to fulfill the demand of growers.

## Entomology

- A total of 656 soil samples from Govt. Seed Potato Farms were tested for PCN.

## Pathology

- 650 soil samples were tested for Bacterial Wilt.
- 39 plant samples—received for disease diagnosis and given recommendations.
- 30 potato plant samples were indexed for PLRV, PVY, PVX, PVS, PVM and PVA which were collected from different phases of seed production, ie. *In-vitro*, RSCC, Pre-basic, basic seed potato and farmer fields population.

## Soil Science

- Testing of soil samples (pH - 345, EC - 106, Phosphorus (P) - 60and Potash (K) - 58)

## Training

- One officer participated in the training on “Professional development training and study visits program for the officers of DZLiSPP, Sri Lanka on small – scale project formulation monitoring and evaluation” in the Thailand.
- One officer participated in the training on “Seed potato production technology” in the Korea.
- Newly recruited 3 Research Officers participated in induction training at In-service training institute, Gannoruwa and SLIDA.
- Seven B.Sc. undergraduate students completed their final year specialization projects related to Tissue Culture, Entomology and Agronomy.
- 277 university students, 322 Agricultural students, 457 School students, 70 Agriculture related officers and 150 Farmers were trained on potato cultivation

and management, potato seed production, tissue culture, floriculture, strawberry cultivation, protected culture, pest and disease management, up country vegetable cultivation, home garden and soil conservation.

## PLAN FOR 2014

### Agronomy

- Evaluation of commercial potato varieties for adaptability and yield.
- Evaluate the effects of different chemicals on sprouting of potato pre basic seeds.
- Evaluate the effect of weight of the G<sub>0</sub> seed potato mini tubers on emergence, development and seed yield of potato.

### Plant Breeding

- Evaluation of locally developed 4 potato lines under NCVT and VAT in Nuwara Eliya and Badulla districts.
- Evaluation of locally developed 5 potato lines under NCVT in Sita Eliya and Bandarawela Research Stations as well as in Government Seed Potato Farms.
- Evaluation of 32 locally developed potato lines in Bandarawela, Kalpitiya and Thirunelweli research stations to identify heat tolerant varieties.
- Evaluation of locally developed 12 potato lines under AMYT.
- Evaluation of CIP germplasm to select desirable traits and parental lines.
- Evaluation of locally developed 35 potato lines under OYT.
- Evaluation of selected imported potato varieties to study the performance under Sri Lankan conditions.

- Evaluation of existing 10 Granola eco populations under field conditions.
- Breeder seed production of Lanka Ball radish.
- Improvement of technology for beet seed production.

### Tissue Culture

- Applicability of Korean technology for hardening of *in-vitro* plants.
- Development of new varieties of flower crops through induced mutation.
- Rooting and acclimatization of pears.
- Improvement of potato micro tuber production technology.

### Entomology

- Monitoring of PCN population in government seed potato farms in Nuwara Eliya.
- Biological control of Black Cut Worm.
- Mass rearing of, *Diglyphus isearae* parasitoid of *Liriomyza huidobrensis*.
- Studies on efficacy of pheromone based techniques for the management of Potato Tuber Moth (PTM) in storage and field.
- Evaluation of Pirimiphosmethyl 2% Dustable formulation for Potato Tuber Moth (PTM) control in storage.
- Evaluation of new pesticides against the sucking pest of potato.
- Evaluation of new pesticides against Cabbage Caterpillar Complex.

### Pathology

- Fungicide screening against Potato Late Blight.

- Screening of commercial potato varieties and new potato breeding lines against late blight.
- Screening of potato varieties against Powdery Scab of potato.
- Epidemiological studies on Powdery Scab *Spongospora subtereneae*.
- Monitoring of Bacterial Wilt in government seed potato farms in Nuwara Eliya.

### Soil Science

- Testing of different nutrient formulations for hydroponic system.
- Testing of different concentrations of liquid nutrient solution on potato tuber yield of variety Golden Star.
- Testing of different fertilizer formula for Beet root.
- Testing of different fertilizer formula on tuber yield of potato.
- Land improvement and soil conservation.

### Vegetable

- Evaluation of introduced exotic vegetable varieties, namely carrot, cabbage, leek, cauliflower etc. for their adaptability.
- Studies on Bell pepper, ice burg lettuce, cauliflower, salad cucumber and tomato under protected agriculture.

### Mushroom

- Establishment of mushroom unit and spawn production laboratory.
- Development of improved growing media and spawn substrates for high yield.
- Introduction of new varieties of oyster, Shitake etc.

### Fruits

- Varietal evaluation of pears, strawberry and citrus.

## STAFF LIST

Designation	No.
Deputy Director (Research)	1
Research Officer	6
Administrative Officer	1
Agriculture Monitoring Officer	1
Programme Assistant	1
Research Assistant	6
Agriculture Instructor	1
Public Management Assistant	4
Farm Clerk	1
Driver	3
Research Sub Assistant	2
Field Machine (Soil ) Operator	1
Nursery Man	1
Watcher	6
Labour	14
Labour (Contract)	34
<b>Total</b>	<b>83</b>

## 1.2.5 AGRICULTURAL RESEARCH STATION (ARS) - TELIJJAWILA

Agricultural Research Station, Telijjawila, function under the administration of HORDI, Gannoruwa. Research and Development activities at ARS, Telijjawila mainly focus on developing and disseminating technologies pertaining to productivity improvement of vegetables, fruits, root and tuber crops mushrooms and floriculture. In addition

emphasis were given for the production and distribution of planting materials, training and education of extension staff and farmers to ensure the sustainability of the crop production particularly in the southern region of Sri Lanka.

### BUDGET

Table 1.2.5.1: Annual budget - 2013

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Recurrent	5,754,600	5,488,554	95
Capital	1,755,640	1,068,842	61
<b>Projects</b>			
NARP - <i>In-vitro</i> mutagenesis of banana for <i>Fusarium</i> wilt	479,910	472,004	98
NARP" (Mushroom) Programme	417,300	402,007	96
KOPIA Mushroom project	1,432,778	39,131	0
Promotion of quality planting material of important crops through tissue culture technology	1,500,000	1,493,847	99
Hybrid vegetable development project	375,000	332,000	89
<b>Total</b>	<b>11,715,228</b>	<b>9,296,385</b>	<b>79</b>

### PROGRESS

#### RESEARCH

##### Genetics & Plant Breeding

##### Mae

- Six vegetable cowpea accessions were collected from Hambantota District

- Five lines with one recommended varieties of *Vigna sesquipedalis* (mae) were evaluated under NCVT.
- Germplasms were screened to identify suitable lines as mae/vegetable cowpea and 6 accessions (mae/vegetable cowpea) were selected for further evaluation

## Brinjal

- Three lines with 2 varieties of brinjal were evaluated under NCVT.
- Six brinjal accessions were collected from Hambantota District.

## Chilli

Forty traditional chilli accessions collected from Southern province were evaluated and five promising lines were selected for further evaluations.

## Sweet potato

Adaptability of sweet potato lines were tested in two farmer fields at Nilwala region.

## Horticulture

### Banana

Availability of potassium and its management for banana under annual planting system for the enhancement of crop productivity was assessed.

## Pathology & Microbial

### Biotechnology

#### Mushrooms

- Influence of biochar, Gliricidia and Neem leaf powder for the growth and yield of Pleurotus mushroom was identified.
- Protein, fat, ash and dry matter in Pleurotus mushroom were initially analysed

## Tissue Culture

### *In-vitro* mutagenesis of banana for Fusarium wilt (*Fusarium oxysporium* f.sp. cubense (Foc)) resistance/tolerance (NARP)

- *In-vitro* multiplication of shoots (cv. Agra) was carried out in modified Murashige and Skoog (MS) medium with 4mg/l BAP and 2mg/l IAA.
- Three experiments were conducted to identify suitable dosage of chemical mutagen Ethyl Methane Sulphonate (EMS) to mutate banana shoot tip cultures of Cv. Agra.
- Rapid proliferation of meristems to form Cauliflower like meristems (CLMs) was induced in modified MS medium +22.3mg/l BAP + 0.175mg/l IAA +3% Sucrose+ 0.3% Gelrite + 10mg/l Ascorbic acid.

## PROJECTS

### Promotion of quality planting materials of important crops through tissue culture technology

- Tissue culture based planting material production was initiated in this year and presently the *in-vitro* cultures of all recommended banana varieties are being multiplied.
- *In-vitro* multiplication of pineapple variety Mauritius was started.
- Planting material production of selected floricultural crops (orchids, Gypsophila spp. and chrysanthemum) was undertaken.
- Fully protected polytunnel (46 m<sup>2</sup>) was constructed for maintaining tissue cultured plantlets.

- A plant propagator (14m<sup>2</sup>) was established to harden the tissue culture plantlets.
- A shade house (54m<sup>2</sup>) was repaired to facilitate research and development activities of Anthurium.
- Shade house (72m<sup>2</sup>) facilities were improved for cultivation of orchids.
- Tissue Culture Laboratory facilities were improved.

### Hybrid vegetable variety development

Seeds of parental lines of bitter guard (150g) and cucumber (250g) were produced at the first season and work commenced for the second season.

### NARP Mushroom

Cost-effective compost mixtures were identified for the cultivation of oyster mushrooms.

### KOPIA funded mushroom project

Strategies were drawn to implement activities to enhance the productivity of selected oyster mushrooms in Sri Lanka.

### Vegetable seed production programme (OPV)

Vegetable seed production (OPV) of about 0.5 ha.

### OTHER ACTIVITIES

- Preliminary work to the development of 1.5 ac research field was commenced.
- Establishment of vegetable demonstration plots in the field.
- 18 mushroom training programs were conducted for 1000 participants in

Matara, Galle, Hambantota, Ratnapura and Gampaha Districts

- Training was provided to establish small scale tissue culture laboratories for 3 numbers of persons and 1 laboratory was already established for banana tissue culture.
- Five banana training programmes and three pineapple training programs were conducted to train 100 trainees and 25 trainees respectively.
- A mushroom production unit was built
- The medicinal plant garden was established
- Production of planting materials and compost

Pineapple	- 5840
Banana	- 3500
Compost	-8 tons
Mushroom seeds	-185 packets
Banana <i>in-vitro</i> cultures	- 35

### Conferences & Seminars Attended

Popularizing multiple cropping innovations as a means to raise productivity and farm income in SAARC countries at PGRC Gannoruwa by DOA and SAARC Agricultural Centres.

## PLAN FOR 2014

### Plant Breeding

- Line evaluation of vegetable cowpea accessions for yield and other agronomic characteristics.
- Yield evaluation of vegetable cowpea and mae germplasm for year round production.
- Germplasm collection, characterization, management, evaluation and selection of brinjal in the low country wet zone.

- Germplasm collection, characterization, evaluation and selection of local traditional vegetables in the low country wet zone.
- Germplasm collection, characterization, evaluation and selection of nematode tolerant high yielding Innala variety.
- Adaptability testing of salinity tolerant sweet potato lines at four sites of Nilwala region.

### Horticulture

- Continuation of availability of potassium and its management for banana under annual planting system for the enhancement of crop productivity (collaboration of HORDI).
- Integrated management of pineapple mealy bug.

### Pathology & Microbial Biotechnology

- Identify the nutritional profile and antioxidant property of some selected Pleurotus mushroom.
- Development of mushroom derived product.
- Evaluation of brinjal, chillie, and innala Germplasms for Bacterial wilt, chilli leaf curl and major pests and diseses respectively.

### Biotechnology & Tissue Culture

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

- Multiplication of shoot tips, Mass Irradiation of shoot tip cultures.
- *In-vitro* multiplication of irradiated shoot tips.

- Establishment of scalp cultures using CLMs.
- Establishment of Embryogenic Cell Suspension Cultures (ECS).

### Promotion of quality planting materials of important crops through tissue culture technology

- Identification of low cost micropropagation protocols for banana, pineapple and some selected floricultural crops.
- Supply of banana and orchid *in-vitro* cultures to private laboratories as initial planting materials.
- Improvement of Tissue Culture facility.
- Production of planting materials and compost
 

Pineapple	- 5000
Banana	- 3500
Compost	- 8 tons
Mushroom seeds	- 300 packets

### Other

- KOPIA mushroom project.
- Vegetable seed production (OPV) about 1ha.
- Complete research field development and improvement of irrigation facilities.

### STAFF LIST

Designation	No.
Research Officer In Charge	01
Research Officer	02
Agricultural Officer	01
Programme Assistant	03
Development Officer	01
Research Assistant	02
Agriculture Instructor	06
Research Sub Assistant	01

<b>Designation</b>	<b>No.</b>
State Management Assistant	02
Farm Clerk	02
Office Assistant	01
Store men	01
Driver	02
Watcher	05
Labourer	05
Sanitary Labourer	01
Contract Labourer	31
<b>Total</b>	<b>67</b>

## 1.2.6 AGRICULTURAL RESEARCH STATION (ARS) - GIRANDURUKOTTE

The Agricultural Research Station, Girandurukotte was established in 1980 by the Mahaweli Authority of Sri Lanka. This Station was handed over to the DOA in 1984 and is responsible for research and development activities in agriculture. Furthermore ARS is responsible for addressing the field problems pertaining to crop production of the farming community in Mahaweli system “C” belonged to the IL2 climate zone. It is functioned under the administrative control of FCRDI until year

2000, after which station was affiliated to HORDI Gannoruwa.

The station is also focused on research and development activities to improve the productivity of vegetables, fruits and root and tuber crops. 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 2013 are given in the Table.

**Table 1.2.6.1: Annual budget - 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	2,165,000	674,945	31
Recurrent	4,996,525	4,987,055	100
• Hybrid Seed Production Programme of Vegetable	350,000	349,259	100
• Citrus Evaluation Programme (NARP Project)	100,000	97,962	98
• Traditional Vegetable Seed Production Programme	220,000	207,465	94
• Fruit Village Development Programme	400,000	386,429	97
• NCVT Banana (NARP Project)	50,000	50,000	100
• Farmer Trust Fund (Paddy Seed Production Programme)	680,000	611,380	90
<b>Total</b>	<b>8,961,525</b>	<b>7,364,497</b>	<b>82</b>

### PROGRESS

#### RESEARCH

##### Fruits

- Continuation of varietal evaluation of local and introduced citrus varieties.

##### Varieties

Local - 07 varieties (Arogya, Bibila sweet, MKD, Rahangala selection, HOCR 23, HOCR 25 and HOCR 29)

Introduced - 08 varieties from Japan (NCN, MYG, OTA, NAN, OUT, YSD, SRD, KYM)

- National coordinated varietal trial of banana  
Number of varieties -07 (Hose 21, PGRC 2, PGRC 1, Parakum , Hose 13, HCK 143 MKS).
- Evaluation of exotic varieties of papaya and melon.
- Established 4 ha mixed fruit garden for future research activities.

### Vegetables

- National coordinated varietal trials for following vegetables were carried out.

**Table 1.2.6.2: NCVT conducted for vegetables**

Crop	2012/13 Maha	2013 Yala
Brinjal	05 Varieties	06 Varieties
Mae	07 Varieties	05 Varieties
Capsicum	05 Varieties	-
Tomato	06 Varieties	-
Wing bean	-	04 Varieties

- Evaluation of SAARC pumpkin varieties - programme conducted in Yala 2013.

### Rice (NCRVT)

- National coordinated rice varietal trials of 2 ½ month, 3 months, 3 ½ months, 4 months and 4 ½ months age groups were conducted in 2012/13 Maha and 2013 Yala seasons.
- Preliminary Yield Trial (PYT) for 16 rice varieties were conducted in Yala 2013

### Other Field Crops / Root & Tuber Crops

- National coordinated varietal trials of OFC, root and tuber crops were carried out.  
Six trials during 2012/13 Maha and 06 trials during 2013 Yala season were conducted for sweet potato.

### SEED PRODUCTION PROGRAMME

#### Breeder seed production - Brinjal

Amanda female parental line was established in 0.04ha during 2013 and produced 13 kg of breeder seeds.

#### Seed paddy production programme

During 2012/13 Maha 18291 kg of Bg 360, 4275 kg of suwadel rice, 1990 kg of Pachchaperumal rice were produced as a production stock. In 2013 Yala AT 306, 19560 kg were produced as seed paddy under enhancement of rice biscuits production programme.

#### Registered seed production programme of Soybean (Pb1)

1409 kg Soybean seed (PB 1) were produced during 2012/13 Maha.

## PLANTING MATERIAL PRODUCTION

**Table 1.2.6.3: Planting material production during 2013**

Crop	Varieties	Production in 2013
Banana	Embul kesel, Kandula and Other varieties	95 Suckers
Cassava	Kirikawadi and Jaffna selection	110 meters of stems
Sweet potato	Gannoruwa sudu Ranabima Ama and Dahawala	17 kg of cuttings
Papaya	Rathna	228 potted plants
Emberella		13 plants

## TECHNOLOGY DISSEMINATION

Several awareness programmes were conducted at ARS Girandurukotte during year 2013. More than 328 school children, farmers and government officers visited the station for collection of information and other services during the year. One student from National Youth Council was started 03 months induction training.

### PLAN FOR 2014

- National coordinated varietal trials of selected vegetables (NCVT).
- National coordinated rice varietal trails (NCRVT).
- Preliminary Yield Trials (PYT) for rice

- National coordinated varietal trials (NCVT) of selected tuber crop and OFC.
- Production of seeds and planting materials of root and tuber crops, fruits, vegetables and OFC.
- National coordinated varietal trials of banana.
- National coordinated herbicide screening trial.
- Propagation of exotic citrus accessions.
- Evaluation of exotic mango germplasm for their desirable characters.
- Rehabilitation of underutilized fruit crop garden.
- Breeder seed production programme of brinjal.
- Collection, characterization and evaluation of locally collected "Elabatu" Lines.
- Purification of capsicum (Lanka yellow wax).
- Increase seed availability of traditional vegetable "Red okra" and "Mahaweli mae".
- Vegetable Seed production programme on recommended open pollinated varieties "Spinach, Wing bean, Luffa".
- Seed paddy production programme.
- Extension and training programmes for school children and farmers.

### STAFF LIST

Designation	No.
Deputy Director (Research)	01
Research Officer	02
Agricultural Instructor	02
Research Assistant	03
Technical Assistant	01
Research Sub Assistant	02
Public Management Assistant (III)	01

<b>Designation</b>	<b>No.</b>
Farm clerk	01
Tractor Operator	02
Mechanic (III)	01
Store men	01
Carpenter	01
Circuit Bungalow Keeper	01
Watchers	07
Driver	01
Labour (Grade III)	22
Labour (Contract)	25
<b>Total</b>	<b>72</b>

## 1.3 FRUIT RESEARCH AND DEVELOPMENT INSTITUTE (FRDI) - HORANA

The mandate of the Fruit Research and Development Institute (FRDI) at Horana is to develop appropriate technology for enhancing the productivity, production and quality of fruit crops in the country. The FRDI gives a special emphasis on the crops adapted to the low country wet zone (LCWZ) while giving leadership for satellite research station & centres, units and farms. 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 plant propagation techniques and planting material production. The institute also works on research and development activities on vegetables adapted to the conditions of LCWZ in fulfilling the needs of the farmers in the region.

### BUDGET

**Table 1.3.1: Annual budget - 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	12,131,840	2,005,302	17
Recurrent	22,434,450	14,990,899	67
Potassium Management of Banana (NSF Project)	100,000	93,949	94
Flowering Induction of Productivity Enhancement of Fruit Trees	1,000,000	989,085	99
Development of Fruit Village	30,000,000	28,815,298	96
Hybrid Seed Development (Vegetable- Okra)	200,000	187,815	94
Evaluation of Promising Banana Accessions in Different Agro-Ecological Regions (NARP)	100,000	88,966	89
Development of High Yielding Good Quality Citrus (Orange And Mandarin) Varieties (NARP)	1555200	1,401,738	90
Development of Promising Durian Varieties For Commercial Cultivation (NARP)	270,000	267,363	99
Studies on Biology and Management of Root Knot Nematode ( <i>Meloidogyne</i> spp.) of Guava ( <i>Psidium</i> Guajava) in Major Growing Areas of Sri Lanka (NARP)	1,180,500	841,679	71
Develop Good Quality High Yielding Cultivars of Mango From Existing Germplasm (NARP)	889,800	737,883	83
Development of High Yielding Good Quality Papaya Varieties	350,000	344,586	98

<b>Vote</b>	<b>Allocation (Rs.)</b>	<b>Expenditure (Rs.)</b>	<b>Expenditure %</b>
Development of an Efficient Nutrient Management Package to Enhance the Productivity of Pineapple	181,500	134,230	74
Pruning and Rehabilitation of Fruit Trees	3,000,000	2,555,344	85
Production of Quality Planting Material of Important Crops through Tissue Culture Technology	2,270,000	2,130,837	94
<b>Total</b>	<b>75,663,290</b>	<b>55,584,974</b>	<b>73</b>

## **PROGRESS**

### **CROP IMPROVEMENT**

#### **Development of efficient layering technique for non/weakly rooted crops**

Among potential fruit crops, sour sop (*Annona muricata*), mangosteen (*Garcinia mangostana*), strawberry guava (*Psidium cattleianum*) are suitable crops for cultivation in pots, which has become a new trend in urban horticulture. Due to adventitious root system in layered plants they are more appropriate for pot gardening than budded plants with tap root system. However, these fruit plants do not response to air layering. Therefore, air layering was performed along with the inserted root portion with the objective of increasing the efficiency of root formation. Out of 3 crops tested, sour sop developed roots with success rate of 42%. No response was shown in other crops. The study will be repeated by tuning up the technique.

#### **Evaluation of promising accession of sour-sop (*A.muricata*) in farmers' field for yield and quality characteristics**

The selected sour sop accession of high fruit quality characteristics was established in two

locations in farmers' field for further evaluation.

#### **Evaluation of papaya hybrids (funded by hybrid seed production project)**

Papaya has gained an important place in commercial horticulture due to early maturation resulting in faster returns. At present, the majority of commercial papaya cultivation consists of exotic hybrids. The entire seed requirement is imported spending considerable amount of foreign exchange. Though the improvement of a local papaya variety or a hybrid will take several years, papaya improvement programmes is a timely requirement. As a result of the breeding programme at FRDI two promising hybrids with high yield (more than 50 kg/ tree/ year) and good quality was produced. These hybrids are being evaluated in six different agro-ecological regions of Sri Lanka. Selected hybrid will be submitted to Varietal Release Committee in 2014 for releasing and subsequent cultivation.

#### **Development of papaya varieties (Funded by NARP Papaya Project)**

Continuous development of papaya varieties to replace existing varieties. The collected

superior local accessions are being advanced to third generation and eight individuals have been selected for next generation advancement.

### **Development of passionfruit varieties (Funded by hybrid seed production project)**

Development of a synthetic/composite passionfruit variety is the most appropriate method to disseminate a passionfruit variety by seeds. It assists to incorporate more desirable characteristics in commercial varieties reducing risk of virus contamination/infection. Therefore, the passion fruit development programme at FRDI gives more effort in producing a composite variety. Seed production in third composite generation has been completed during 2013. Four kilograms of synthetic seeds were produced and the varieties are being evaluated in different agro-ecological zones.

### **Evaluation of mango hybrids (Funded by hybrid seed production project - HORDI, Gannoruwa)**

Development of mango hybrids was initiated during 2007 with the objective of incorporating desirable quality characteristics into current varieties. Seven hybrids produced using Karthakolomban, Vellikolomban, Willard and Namdocmai are being evaluated in open field. The hybridity of the seedlings needs to be confirmed because otherwise they should be maintained in the field for several years. Therefore, the DNA analysis for confirming hybridity was initiated with the collaboration of PGRC. The DNA extraction protocol was perfected.

### **Development of a guava variety resistant /tolerant to plant parasitic nematodes**

Hundred and nineteen guava individuals obtained from generation advancement were evaluated in six plots. Ten individuals were selected based on visual observations. They were propagated by air layering and handed over to Entomology division to confirm the results.

### **Selection of promising varieties of Durian**

A total of 68 durian accessions including 24 collected accessions, three introductions, three HORDI promising lines and 36 seedling trees were evaluated against recommended varieties. Out of them, 12 promising varieties were selected from this population. Four varieties from that were proposed at the Varietal Release Committee (VRC) meeting in 2012. Two varieties were released and other two varieties were conditionally released for farmer cultivation. Grafted plants from recommended varieties are being made available for cultivation.

### **Development of durian F<sub>1</sub> hybrids**

Eight hundred durian hybrid individuals are being evaluated in the field condition. Another 50 F<sub>1</sub> individuals are to be established for evaluation. Flowering induction was done to collect materials for crossing. Crossing programme with promising lines are being continued.

### **Variety development of Citrus spp.**

Under the collection and selection programme 14 heen naran (*Citrus crenatifolia*), 32

mandarin (*Citrus reticulata*), eight sweet orange (*Citrus sinensis*), 16 pumello (*Citrus maxima*) and seven lime (*Citrus aurantifolia*) are being evaluated. Three promising mandarin varieties were selected and evaluated in eight different agro ecological zones. One promising pumello accession was selected. Four lines of orange accessions and one mandarin and three varieties are being established in the field.

Eight Japanese sweet orange and mandarin varieties introduced are being evaluated in eight different agro ecological zones. Three promising varieties are proposed to release for farmers. Mutation breeding programme was initiated in 2007. At present, fruit quality data and growth parameters of the mutants (nasaran and HOCR 24) are being collected. Hybridization programme is being continued while 50 hybrids are grafted for evaluation.

### **Development of good quality high yielding cultivar of mango from existing germplasm found in the wet zone (Funded by NARP)**

Collection and selection of promising mango accessions were started at FRDI Horana in year 2011. At present 79 different accessions have been collected from farmers fields and other government farms and established in the field gene bank covering 2½ hec. These accessions were collected from cultivars that perform well in the wet zone and that have being brought to Sri Lanka from different countries under different projects. Their growth parameters are being measured and mapping of gene bank is in progress. One promising accession have been identified from

the previously collected germplasm. This accession possess fruit qualities of Brix<sup>0</sup> 17, mean fruit weight 450 g, flesh/seed ratio 4.3 and moderately resistant to anthracnose. Another five accessions have been selected at Walpita. Multiplication of selected accessions is in progress.

### **Germplasm evaluation of banana**

National Coordinated Varietal Testing Trial (NCVT) of seeni kesel (group 1), puwalu, suwandel, kolikuttu (group 2) and ambon, bin kesel (group 3) is being conducted. Ninety percent and 70% of plants gave first and second harvest respectively. Experiment is being continued.

### **Evaluation of avocado accessions for yield and quality**

Out of twenty four avocado accessions established at FRDI, Horana, Four promising accessions were identified. However, plants are affected by unknown diseases. Experiment is concluded.

### **Germplasm collection, conservation, characterization and evaluation of under-utilized fruit crops**

This program was initiated in late 2002. Two hundred different fruit accessions have been established in the field gene banks of 3.7ha. Gene bank comprised with the accessions of beli (24), citrus (47), lavulu (05), lovi (04), jak (32), weralu (17), uguressa (22), goraka (33), gaduguda (13), durian (35), sapota (17), anona (14), wax apple (26), strawberry guava (07) and guava (07). Characterization and evaluation are being continued to identify promising varieties for cultivation. Jak (13)

and gaduguda (08) were added to the respective gene banks in 2012.

- **Evaluation of sapodilla (*Manilkara zapota*) accessions**

Experiment was started using materials collected in the FRDI farm consisting of 17 accessions in 2007. Growth performance, yield, fruit quality, fruit size and shape were evaluated in all accessions. Most promising accessions of HoS 2, HoS 12 and HoS 13 were nominated for official release and HoS 12 and HoS 13 were released for cultivation in 2012.

- **Study of floral biology, flowering and fruiting behaviour of Weralu (*Elaeocarpus serratus*)**

Study was carried out in the field gene bank of weralu at FRDI Horana. Eight different accessions were selected for the study. Flower is a raceme formed from matured leaf axil. Variation was observed in size, shape, number and colour of different components of the raceme. A floret is a perfect flower. Four to five nos. of light green sepals are freely arranged in outer whorl, 2<sup>nd</sup> whorl consists of 4-5 nos. white petals freely arranged with lobed margins. 3<sup>rd</sup> whorl consists of 25-30 numbers of off white coloured freely arranged stamens. One ovule is found in the superior ovary. Weralu, flowers twice in a year, i.e. January to March and July to October in the wet zone. In one flowering season flowers are formed in 3 stages. Time taken to attain different stages of flowering and fruiting have been observed.

- **Exploration, collection, conservation and characterization of Uguressa**

Twenty two accessions of uguressa were collected and established in the field gene bank at FRDI. Characterization and evaluation are being continued to select high yielding, good quality accessions for recommendation. Accession No. 9 showed fruit splitting and therefore, Boron was applied. Accession No. 7 showed mite attack in leaves. However, year round availability of fruits can be seen in Accession No. 7 and considered as good quality accessions.

- **Evaluation of Lavulu**

It is evident that lavulu is under-utilized even though a considerable unexploited genetic variation exists in this crop. Therefore, germplasm collection, evaluation and conservation program of Lavulu was initiated under SL/USA project in year 2004 at Fruit Research and Development Institute. Five lavulu accessions have been collected and established. As an outcome of evaluation, 3 accessions of lavulu with high yield were identified. Among 5 accessions evaluated, HoLav 4 and HoLav 5 were capable of high yielding. HoLav1 gave high yield although it bore less fruits. HoLav 1 is comparatively a larger elongated fruit with low percentage of seed weight. Moreover, HoLav 4 & HoLav 5 gave medium sized fruits. Evaluation is being continued.

- Selection of promising accession of Jackfruit (*Artocarpus heterophyllus*) from existing germplasm**

Experiment was started using materials collected at FRDI Horana. The genebank consist of 36 different accessions including four recommended varieties. Evaluation of growth parameters is completed and assessment of fruit quality parameters is in progress.
- Characterization and evaluation of chempadak (*Artocarpus integer*)**

Grafted plants were established in field gene bank of jackfruit at FRDI, Horana in RCBD design in year 2003 . Vegetative and reproductive phases were characterized by using International Plant Genetic Resource Institute descriptor for jackfruit (IPGRI) aiming for conservation and utilization through research activities in future. It possess characters similar to jackfruit except few characters of leaf, fruit and fruit quality. Ripen fruit has favourable qualities as a desert with high total soluble solids (Brix) value and good aroma. Grafted plants are being produced to evaluate in other climatic zones.
- Maintance of Okra Hybrid (OK-H<sub>1</sub>) Parental lines**

Parental lines of OK-H<sub>1</sub>, OK<sub>2</sub> (female) OK-is (male) were maintained. Seeds of 2 parental lines OK<sub>2</sub> – (1150g) & OK-is (1750g) were produced & submitted to seed & planting material division Gannoruwa.
- Seed production & purity maintenance of Varaniya Green chilli variety**

Discarded off types – purified the variety & conducted VAT trials in District Agriculture training Centre Horana & District Agriculture training Centre Walpita. VAT trials are being continued.
- National coordinated varietal testing trial for sweet potato**

Trials were carried out at FRDI Horana. Data was collected at 2013 Yala season and completed the NCVT trial. Date was submitted to Horticulture crop Research & Development Institute Gannoruwa.
- National coordinated varietal testing trial for pumpkin**

Trials were carried out in FRDI Horana. Data was collected 2012/2013 Maha season and completed the NCVT trial. Data was submitted to Makandura Regional Agriculture Research & Development Centre.

## CROP PROTECTION

### Control of Anthracnose disease of guava through fungicides, organic and inorganic compounds

Ammonium bicarbonate (10,000 ppm) was found as the best treatment to control anthracnose disease of guava out of the different concentrations of the chemicals tested. (Sodium benzoate, Sodium metabisulphite, Acetaldehyde, Benzaldehyde and Cinnamaldehyde)

### **Control of anthracnose disease of papaya through organic and inorganic compounds**

Sodium metabisulphate (1500 ppm) was effective for papaya in *in vitro* experiments.

### **Control of anthracnose disease of mango through organic and inorganic compounds**

Cinnamaldehyde (5 ppm) was performed good results in control of anthracnose caused by *Colletotrichum gloeosporioides* out of the different concentrations of the chemicals tested. (Sodium bicarbonate, Potassium sorbate, Sodium propionate and Vanilline) in *in vitro* experiments.

### **Biology and management of root knot nematode of Guava in Sri Lanka**

Guava (*Psidium guajava*) is a tropical fruit tree that has become a commercial fruit crop in Sri Lanka. Root knot nematode (*Meloidogyne* spp) is one of the major problems in guava cultivation. This project was initiated to investigate on the distribution, severity, species identification, biology of identified species and management practices including varietal resistance.

A survey was planned to map out the distribution and severity in affected areas of selected districts. According to the survey carried out in Puttlam district (Kalpitiya area), all commercial cultivations observed were infected with root knot nematode. The percentage of dead plants due to root knot nematode varied from 5% - 22%. Average juvenile counts in 100g soil varied from 192 to 361. Root samples were also highly infected

with nematodes. The average number of juvenile 2 per 100g soil in guava research fields at FRDI varied from 4 to 133. Pure cultures of nematode were maintained in tomato plants to identify the species. Guava plants were infested with juveniles to study the biology. The project will be continuing

- **Study on guava root stocks tolerant to parasitic nematodes**

Air layered plants produced from selected individuals were inoculated with *Meloidogyne* spp. and root galling was assessed at 8 to 10 weeks after inoculation. Root galling was high in all plants and showed susceptible to root knot nematode.

### **Evaluation of soil amendments against plant parasitic nematodes of guava**

Different rates of poultry manure, goat manure and burned rice husk (1, 2, 3&4% w/w of each) were mixed in to pots with sterilized soil & transplanted guava seedlings. External symptoms due to root knot nematode were mild in poultry manure and goat manure added plants at higher rates (3&4%) as compared to the untreated control. Root gall indexes were high in all plants at 5 months after inoculation.

### **Evaluation of granular insecticides against banana root/stem weevil**

Among the granular insecticides evaluated in traps, Thiocyclam hydrogen oxalate 4G (Evisect s), Virtako 40WG and Diazinon 50GR were effective against banana weevil. This will be continued to give recommendations as alternatives to the Carbofuran.

### **Evaluation of environmentally safer chemicals against white waxy scale on (*Gascardia brevicauda*) Goraka**

White waxy scale (*Gascardia brevicauda*) is a serious pest found in Passion fruit and Goraka. It is very difficult to control only by chemical applications because the adult forms a hard covering and eggs, nymphs are inside this covering. Therefore, the adults should be removed mechanically before chemical applications. Among the chemicals tested, 2 applications of Thiomethoxam 25Wg (Actara) at 10 days interval significantly reduced the scale population. However, it should be further tested.

### **SOIL NUTRIENT MANAGEMENT**

#### **Gamboge and Translucent flesh disorders of mangosteen**

Gamboge and Translucent flesh formation are problems which affect fruit quality of mangosteen. In gamboge disorder, yellow color resins occur inside and outside the fruit. When latex infiltrates in to the white fruit segments, they give bitter taste. Sometimes segments become translucent and hard. Experiments were continued to further test the different methods of applying calcium and boron nutrients in minimizing the disorders. It was found that foliar application of 1% calcium nitrate and 0.2% borax sprayed 3 times at fruiting together with soil application of dolomite to adjust the soil pH to 5.5 – 6.0 significantly reduced the severity of both disorders.

### **Organic fertilizer for dragon fruit**

The demand for organic products is very high. However, there is no proper fertilizer management practice for organically grown dragon fruit. Experiments were carried out to develop an efficient practice using different organic manure including vermin compost and vermiwash. Poultry manure at 20 t /ha/yr in the first year and 30 t/ha/yr in the following years recorded significantly higher yields than other treatments. The fruiting duration of the year also was extended with the same treatment. Addition of vermin wash to other manures had no significant yield increase.

### **CROP MANAGEMENT**

#### **Evaluation of double root-stocked grafts of mangosteen for growth and yield performances**

Mangosteen (*Garcinia mangostana*) is a fruit with a high demand in Sri Lanka. However, it is limited to a few small scale plantings of the moist region in the low and mid country. The reason is the crop needs specific ecological requirements and cultural practices for its survival. Added to this, the inherent characteristics of slow growth habit has become the major draw back. This is primarily due to the slow growth rate, associated with the long vegetative period of 8-10 years. Eventhough, conventional wedge grafting was effective in shortening the long juvenile period by 3-4 years, poor canopy development and low productivity have been identified as major shortcomings.

Therefore, with the objectives of overcoming the slow vegetative growth rate and thereby increasing the productivity of mangosteen by

providing an additional root system for grafts were initiated in 2004.

In the 9<sup>th</sup> year after planting, double root stocked grafts formed into densely grown tree canopies with higher tertiary branch development while single root stocked plants exhibited poorly grown crown with sparse foliage. In year 2013, grafts yielded for the 6<sup>th</sup> consecutive year, giving an average of 118 fruits per graft, which was relatively high compared to the previous fruiting season.

In post graft performance evaluation it was observed that grafts had an inclined vegetative growth habit, which was a common typical characteristics in grafts. In mangosteen trees, branches show an inherent horizontal branching pattern. Scion shoots are to be taken from those branches and this results in grafted plants also to grow horizontally, showing an inclined growth habit. Such horizontal growth habit of double root stocked plants was prevented by using two stakes placing as a form of a cross at initial growth stages until 3-4 years. Thereafter, grafts have grown erectly.

### **Growth and yield potential of seed plants of mangosteen with double root systems**

Low expansion of mangosteen crop is mainly responsible for its inherent slow growth habit associated with long juvenile phase of 8-10 yrs. To overcome such constraint and thereby enhance productivity, introduction of an additional root system for seed plants of mangosteen by the technique of inarching was attempted.

Evaluation of growth and yield characteristics of seed plants with two root systems along with seed plants (as the control) of mangosteen in the second fruiting year indicated that

significant increases in canopy development. Number of primary and secondary shoot formation were observed in seed plants with added root system, compared to ordinary seed plants.

All (100%) seed plants with an additional root system, set fruits for the second consecutive fruiting year at the 6<sup>th</sup> year after field establishment. In the second fruiting year, such plants produced a mean yield of 56 fruits. This was in contrast to single root system seed plants of similar age in which no fruits have formed. Thus, technology of double root system seed plants promoted early fruiting and enhanced productivity by accelerating its canopy development. This technology could be adopted in cultivations where seed plants are needed.

### **Establishment of sour-sop villages**

Sour-sop is one of the high potential fruits having rich source of nutrients. But it is mostly found in home gardens. Small - medium scale cultivations are scarce. With the objective of popularizing the fruit, 4 villages in Ratnapura and 2 in Matara districts have been established.

### **Effect of length of stem cutting & number of cuttings per training post on growth of vines, yield and quality of dragon fruit (*Hylocerus undatus*)**

Statistically significant results were obtained for the growth measurements (growth of stem and number of branches). Growth of stem and total no of branches were increased with the increment of length of stem cutting and no of cuttings per post respectively. However few numbers of fruits were produced in all treatments. Highest fruit yield were 620 g, 1.9

kg, 1.5 kg and 3.3kg recorded from 2010, 2011, 2012 and 2013 respectively. This indicated that no treatment has given considerable yield. Therefore, experiment was discontinued.

### **Adaptability testing of newly recommended Goraka varieties**

In 2012, three promising Goraka accessions (HoG-3, HoG- 8 and HoG- 11) were recommended for Low Country Wet Zone. Therefore, this study was initiated to test the adaptability in two other agro-ecological regions, DLIa (Angunakolapelessa) and IL1c (Moneragala).

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

36 plants of Malwana special were planted at three different plant densities {10mx10m (recommendation) 10m x 7.5m, 10mx5.0m} and two different branching heights {90cm (recommendation) and 30cm}. Growth characters, leaf characters, flower characters and some fruit characteristics were recorded. So far there is no significant difference in plant height, canopy spread and yield. The study is being continued.

### **Selection of Rambutan varieties from existing seedling population at farmer fields**

Eight accessions were selected based on the fruit quality characters and planted at FRDI, Horana. In 2013, all accessions have given yield and Accession No. 8, 9 and 10 have given more than 34 kg of fruit yield/tree.

Quality characters were analyzed for accession No. 8 and Malwana Special but there were no significant differences between them.

### **Characterization of existing rambutan population at FRDI, Horana**

The existing rambutan population at FRDI, Horana can be used to select high yielding, good quality Rambutan through proper characterization for the variety development programme. Some fruit characteristics such as fruit shape, fruit rind colour, aril colour, aril thickness, aril taste, aril juiciness, aril detachment, spine length, spine density and overall fruit quality of 56 plants were recorded and photo catalog for rambutan accessions was prepared to identify the differences clearly.

### **Effect of plant growth regulators on flowering and fruiting of Dragon fruit**

Effect of plant growth regulators on flowering, yield & quality of dragon fruit was tested. Quality and yield of dragon fruit can be improved by application of plant growth regulators. However, effective plant growth regulators have not been sufficiently identified under local conditions. Hence, this experiment was initiated to study the potential of some PGR on increasing yield and quality. Growth & yield parameters were not significantly different.

## FRUIT DEVELOPMENT

### ACTIVITIES

#### Income earned from planting material production and other activities

During 2013 the centre sold 23,560 budded plants, 1,808 grafted plants and 3,181 seedlings plants of rambutan, mango, durian, jak, avocado, star fruit, sapodilla, garcena, lime, mangosteen, jambu, lovi, annona, guava, orange, beli, weralu, mandarin, passion fruit, strawberry guava, sapota etc. and earned Rs. 4,270,020.00 as gross profit and from other activities has earned Rs. 2,507,180.90.

#### Programmes funded by Promotion of quality planting material of important crops through tissue culture project

- **Micro propagation of Banana**

Plant tissue culture is a worldwide accepted technology for quality planting material production of crops such as banana and pineapple. Therefore, tissue culture laboratory was established in this centre to conduct research on micro-propagation of fruit crops and for quality planting material production. Under the project of “quality planting material production of selected crops through tissue culture techniques, the laboratory facilities were enhanced and culture room capacity was increased from 1500 to 4500 cultures. More than 7500 banana plants were produced during this year . Around 1000 banana plants from different varieties were established in research and farmer fields

for evaluation and no somoclonal variations were observed. Therefore, the protocols optimized for micro-propagation of banana cultivars ambul, seeni, netrapplam can be successfully used for multiplication of above varieties. More than 30,000 pineapple plants were produced and around 3000 plants were planted in research fields for evaluation.

- **Embryo rescue of Mango**

Fruit drop is a common problem in mango cultivation and it creates many limitations in mango breeding. Embryo rescue is a technique for *in vitro* culture of immature embryos in nutrient medium under aseptic and controlled environmental conditions. Hybrid embryo rescue technique is successfully used in rescue of dropped or harvested immature fruits. Therefore, a research program was initiated to develop protocol for Embryo rescue of local mango varieties. At present, the sterilization procedure was optimized. Program will be continued.

#### Development of value added products from underutilized fruit crops (Sapota, Lavalu and Weralu)

With the aim of increasing the utilization of these fruits following products were produced by manipulating the existing recipes of producing them. From sapota a sauce, chutney, jam and a milk shake were produced and from weralu, a chutney was prepared. When preparing the sugar and citric acid levels were altered accordingly. A snack (murukku) was prepared using ripe lavalu by mixing with rice flour. From matured lavalu a snack (spicy bite), rotti, pittu and wade (ulundu wade and

masala wade) were prepared. When preparing pittu, rotti and masala wade rice flour was added to scraped lavalu in 1:1 ratio and when preparing ulundu wade in addition ulundu flour was added in 2:1:1 ratio.

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

A home garden was establishment at FRDI, Horana in 2005 to demonstrate the usefulness of home gardening and to educating school children etc. In 2013 – 2790 school children 234 teachers and 206 other personal were visited the home garden and improved their knowledge in home gardening.

### **Training programmes**

Following training programmes were conducted in 2012

- 760 school children and 16 teachers were visited the institute from 14 schools.
- Two training programmes were conducted for 16 university students and lectures.
- Sixteen training programmes on fruit cultivation , home gardening tissue culture and nursery management were conducted for 571 trainees.

### **Mass Media**

Officers from FRDI participated in 03 TV programme and 04 Radio programs on fruit crop cultivation, pest and diseases control and home gardening.

### **Crop Improvement**

- Selection of promising accession of jackfruit (*Artocarpus heterophyllus*) from existing germplasm.
- Develop good quality high yielding cultivar of mango from existing germplasm found in the wet zone (Funded by NARP).
- National coordinated varietal Testing Trial (NCVT) of banana.
- Study on induction of off season flowering of dragon fruit through plant growth regulators.
- Effect of age of bunch harvest on quality & shelf life of banana var Millewa Suwandel.
- Studies on various vegetative propagation methods for lavalu.
- Collection and evaluation of rambutan.
- Effect of plant density and pruning height on growth and yield of rambutan.
- Productivity improvement of rambutan through avoiding flower and fruit drop using chemicals.
- Delay the fruit ripening of rambutan using chemicals.
- Development of a fruit availability calendar for rambutan.
- Characterization of existing Rambutan population at FRDI for superior accessions.
- Adaptability testing of newly recommended Goraka (*Garcinia quaesita*) varieties.
- Selection of promising accessions of Uguressa (*Flacourtia indica*).
- Maintenance of Goraka and Uguressa accessions for future use.

- Development of Mangosteen Fruit Availability Calendar across the island.
- Manipulation of fruiting by periodic pruning of guava.
- Evaluation of effects of Gibberellic acid (GA<sub>3</sub>) on fruit growth and yield parameters of wax apple (*Syzygium samarangense*).
- Studying the possibility of high density planting of sour sop along with the development of suitable training system.
- Development of a suitable canopy management system for wax apple.
- Development of propagation techniques for ber (*Ziziphus jujuba*).
- Development of high yielding and good quality durian varieties for commercial cultivation.
  - Collection, evaluation, selection and characterization of local accessions
  - Development of durian hybrids for commercial cultivation.
  - Study the flowering behavior and pollen viability of durian to increase the fruiting ability.
  - Development of artificial pollination technology for durian.
- Development of high yielding and good quality citrus varieties (Mandarin, Orange, Pummelo and lime)
  - Collection, evaluation, selection and characterization of local accessions of citrus (Mandarin, Orange, Pummelo and lime).
  - Development of mandarin and sweet orange hybrid varieties.
  - Development of high yielding and good quality mutants of selected citrus accessions (Nasnanan, HOCR 24).
    - Evaluation of introduced new Mandarin and orange exotic varieties.
    - Identification of new agroclimatic areas for off season fruit production of sweet orange and mandarin.
- Development of high yielding and good quality Beli varieties.
  - Collection, evaluation and selection of Beli germplasm.
  - Study the floral biology and flowering behavior of beli.

### Crop Management

- Development of tree management package for grafted durian.
- Artificial flower induction of durian in off seasons.
- Development of profitable crop management practices for Rambutan.
- Maintenance of Goraka and Uguressa accessions for future use.
- Adaptability testing of newly recommended Goraka (*Garcinia quaesita*) varieties.
- Effect of size of cutting and number of cuttings per training post on growth of vines, yield and quality of Dragon fruit.
- Evaluation of double root stocked grafts for growth and yield performances.
- Effect of tree training on yield of seedling sour sop.
- Evaluation of different trellising systems of passion fruit.
- Use of Paclobutazole for flowering induction in recommended mango varieties for the region.
- Seed germination study in weralu.

## Soil Science & Plant Nutrition

- Assessment of potassium availability in banana growing soils and potassium management to enhance the productivity under annual planting system. (Coordinated).
- Development of an efficient nutrient management package to enhance the productivity of pineapple (Coordinated).
- Preharvest treatment of potassium and calcium on banana.
- Field testing of different fertilizer products for passion fruit.

## Plant Pathology

- Management of devastative root diseases through biological & chemical methods.
- Isolation & Identification of antagonistic microorganisms to control anthracnose disease of papaya.
- Control of soft rot & styler end rot of guava through non chemical methods.

## Entomology

- Studies on biology and management of root knot nematode (*Meloidogyne* spp) of guava in major growing areas of Sri Lanka. (NARP funded project).
- Use of granular insecticides against banana root/stem weevil.
- Controlling of white waxy scale (*Gascardia brevicauda*) in Goraka using insecticides.
- Monitoring of fruit fly in fruit crops using different pheromone-lure.
- Field evaluation of botanicals against mealy bug (*Pseudococcus* spp) in fruit crops.

- Management of trunk borer in fruit crops (Rambutan, Durian, and Mango and Jack fruit).
- Identification of natural enemies of white waxy scale in fruit crops.
- Pest monitoring using solar energy light traps.
- Island wide fruit fly management programme in collaboration with HORDI.
- Investigations on Jackfruit borer.

## Tissue Culture

- Embryo rescue of Mango
- Large scale adoptability testing and assessment of variations of micro-propagated banana.
- Large scale adoptability testing and assessment of variations of micro-propagated pineapple.
- Regeneration of plantlets through somatic embryogenesis in passion fruit (combined program of tissue culture and mutation breeding).

## Post Harvest & Food Technology

- Develop value added products from underutilized fruit crops (Lovi, Jambu, Crambola).
- Selection of a suitable material for bagging of guava fruit for quality improvement.
- Identification of conditions for cold storage of veralu pulp.

## Plant Propagation Techniques

- Study of the enhancement of seed germination pattern of underutilized fruit crops. (Varalu, lovi, Uguessa).

- Study the rapid vegetative growth technique for Mangosteen.
- Study the split seed germination pattern & storage of Durian seeds.
- Development of grafting technology for improving success rate of Durian.
- Study the low weight (Soil less/light mixture) potting media for budded / Vegetative propagated fruit plants.
- Improving root balling techniques for mature Mango seedlings.
- Improving multiple grafting techniques for mature Mango seedlings.
- Pineapple – Study the effect of pre harvest treatments (PGK) on fruit quality & shelf life of Maurities Pineapple.
- Study the possibility of high density cropping pattern (3 row planting system) for pineapple.

## STAFF LIST

Designation	No.
Director	01
Additional Director	01
Deputy Director	01
Research Officer	13
Economic Assistant	01
Program Assistant	10
Research Assistant	09
Agriculture Instructor	12
Public Management Assistant	04
Drivers	05
Store man	01
Tractor Operator	02
Watcher	07
Budder	03
Permanent Labourer	29
Labourer (Contract)	104
<b>Total</b>	<b>203</b>

### Socioeconomics

- Preparation of INFORM report – 2013 for FRDI.
- Development of database on socio-economic information of fruit crops.

### Development Programmes

- Development and maintenance of established model home garden.
- Establishment of Bio Diversity Garden of Tropical Fruits at Horana – Initiated by Addl. DGA (Research).
- Fruit village programme– Initiated by former Director (Fruit Crop Research & Development).

## 1.3.1 FRUIT CROP RESEARCH AND DEVELOPMENT STATION (FCRDS) - GANNORUWA

Fruit Crop Research and Development Station is a specialized research station to undertake research and development activities of fruit crops especially, variety development, propagation techniques, nursery management and crop management to enhance the production and productivity of these crops. Moreover, the Research Station conducts research and development activities on major fruit crops such as rambutan, avocado, mango, durian and many other potential fruit crops such as masan, beli, veralu, madan, mora etc.

The station is given more emphasis on crops that were adapted to mid country wet zone. In addition, it serves the community by conducting training programmes for officers, universities, higher diploma and other students, farmers and other stakeholders. The station has a fruit nursery which produces large number (more than 15000/year) of planting materials including potential fruit crop spp.

### BUDGET

**Table 1.3.1.1: Annual budget – 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	1,820,000	1,819,237	100
Recurrent	4,484,050	3,896,365	87
Project -NARP			
Papaya	703,000	671,985	96
Durian	570,000	561,503	99
Banana	650,000	608,442	94
<b>Total</b>	<b>28,687,000</b>	<b>19,735,916</b>	<b>69</b>

### PROGRESS

#### RESEARCH

##### Fruit Breeding

Identification, selection and development of new high yielding, good quality and pest and disease resistant/tolerant varieties of major fruit crops as well as underutilized fruit crops are carried out during the year.

##### Banana

Artificially induced mutant banana plants of 'Embon' were screened for Panama disease caused by *Fusarium oxysporum* sp.cubense. One plant which showed resistant to the disease after inoculation was established in the field. Further multiplication of the line was initiated using tissue culture method. Twelve Banana accessions which showed field tolerant

to Panama disease were evaluated with three high yielding and good quality Seeni Kesel accessions, one Embon and one Kolikuttu accession was selected for further evaluation.

Out of seventeen different Embon accession collected from different locations, promising one accession was selected and multiplied for further evaluation. NCVT Trial was established in 7 locations to test the performances of selected banana accessions and data collection is being continued.

### **Papaya**

Papaya accessions with suitable fruit characters, high yield and tolerance to Papaya ring spot virus were collected during past 5 years. Eight lines were selected by selfing and selection in 4 cycles for further selection to develop inbred lines.

### **Mandarin/Orange**

Fifteen exotic and local varieties were evaluated during past 4 years. Three exotic mandarin varieties performed well in the mid country wet zone condition and was recommended for release. One local Orange variety with high yield and good quality was selected for further evaluation and planting material production of the variety is in progress.

### **Durian**

Exotic and local accessions were evaluated for yield and quality characters. Characterization was completed in 5 accessions. One exotic accession produced high quality fruit with thick flesh, good taste, colour and appearance. Further testing is continued.

### **Mango**

Evaluation of different local and exotic accessions were carried out. TOM EJC plants produced fruit with better quality, however, other accessions did not flower.

### **Under utilized Fruit Crops**

Promising accessions of the following crops were identified and multi-locational testing are being carried out in five locations to evaluate performances of them.

- Bale fruit (*Aegle marmelos*) (L) Corr.
- Ber (*Ziziphus mauritiana* & *Ziziphus jujuba*).
- Jamun (*Syzygium cumini* (L) skeels).
- Governor's Plum (*Flacourtia inermis*)
- Longan (*Euphoria longana* lam).
- Wax apple (*Syzygium samarangense* Merr & Perry).
- Bignay (*Antidesm bunius* (L) spreng).
- Lansone (*Baccaurea motleyana*).

New superior accessions were identified in following fruit crops.

- Amla (*Phyllanthus emblica*) – Larger fruits and high yielding.
- Pummelo (*Citrus maxima*) (Burm)- Attractive Red flesh with less bitterness.
- Nil weralu (*Elaeocarpus sphaericus* L)- Attractive blue colour fruits.

Three local fruit crops i.e Pata Bambara, Himbutu (*Salacia chinensis*) and Kiri koon (*Scheleichera oleosa*) and two exotic fruit crops Jaboticaba (*Myrciaria cauliflora*) and Abue (*Pouteria calmito*) were propagated to identify the possibility of cultivation. Evaluation is in progress.

## Agronomy

### Mango

Different combination of rootstock and inter stock varieties are being evaluated. Interstock has not shown any effect on plant height of Malwana and Karthakolomban varieties. However, Plant height and canopy structure of Malwana variety was changed when Vellikolomban variety was used as a rootstock. Evaluation is being continued to collect fruit and other characters.

### Dragon Fruit

Testing of different No. of plants per post were continued. Yield and agronomic data were collected during two year period and studies are continuing.

### Jak Fruit

Studies were conducted to enhance the success rate of grafting of variety Father Long. Application of concentrated Chitosan solution 20 mg<sup>l</sup><sup>-1</sup> to root stock, 30 minute seed treatment and spray in to growing seedlings within two week interval showed 80% grafting success.

## DEVELOPMENT

### Training programmes

Training programmes were conducted on fruit cultivation, pruning and training of fruit crops, flower induction, growing fruit plants in containers and planting material production.

Farmer training programmes- 20 classes No. of farmers participated - 2400

Officer training programmes- 12 classes No. of Officers participated - 750

University students- 3 programmes No. of students participated - 210

## Exhibition

Actively engaged to Deyata Kirula and Govi Sathiya exhibition and arranged stalls on fruit cultivation and established underutilized fruit garden in these sites.

## Extension activities

During the year officers participated at 6 radio programmes on fruit cultivation and engaged to develop 6 leaflets, published of 5 paper articles and edited fruit cultivation booklets. Instruction were given about 400 fruit growers on fruit cultivation and pest and disease management, who visited the station and by telephone.

## Planting material production

Fruit nursery of the station produced large no of plants of recommended and selected varieties of fruit crops of both major and underutilized fruit crops and issued for planting.

**Table 1.3.1.2: Planting material production during 2013**

Type of plants	No of plants produced	No of plants issued
Grafted plants	10,510	6,782
Seedlings	4,099	1,360
Rooted cuttings	1,700	984

## Establishment of underutilized fruit gardens/ field gene banks

**Table 1.3.1.3: Fruit gardens/ Field Gene Banks established during 2013**

Fruit garden / field gene bank	No. of fruit plants established	No. of accessions
District Director - Polonnaruwa	60	29
Field Crop Research and Development Institute –MI	50	165
Regional Agriculture Research and Development Centre, Makandura	18	18
Guruwella Model Farm, Guruwella	07	20
Thelijawila Research Station	20	20
Audio Visual Centre, Gannoruwa	12	12
In Service Training Institute, Angunakolapalassa	17	49
Plant Virus index centre, Homagama	07	14
In Service Training Institute, -MI	20	32
Agro Park, Bataatha	26	52
Agriculture Research Station, Giradurukotte	02	06
Sri Lanka Navy Camp, Thalathuoya	13	17
North Western Province Department of Agriculture	20	20
Agriculture School, Kundasale	27	39
Wariyapola Government Farm	28	46

## PLAN FOR 2014

### RESEARCH

#### Fruit Breeding

- Development of high yielding good quality Papaya varieties.
- Development of Panama resistant/tolerant high yielding good quality Banana varieties through induced mutation.
- Selection of Panama tolerant high yielding, good quality Banana varieties.
- Selection of high yielding good quality Citrus varieties for mid country wet zone.
- Selection of Avocado varieties for mid country wet zone.
- Preliminary yield evaluation of the promising Embon banana accession selected from the germplasm evaluation.
- Evaluation of promising banana accessions for yield and quality to select best varieties for the region.
- Evaluation of local and exotic mango germplasm and selection of promising accessions.
- Evaluation of Durian germplasm to select better accessions for release.
- *Ex-situ* evaluation of underutilized fruit species
- Evaluation of outstanding underutilized fruit crop accessions. Bale, Ber, Longan, Jamun
- Collection and evaluation of unidentified potential local fruits.

#### Agronomy and Other activities

- Evaluation of vegetative propagation methods for underutilized fruit crop spp. (Wax apple, Lansone, Ceylon olive).

- Evaluation of different seed bed mediums for seed germination of Ceylon olive.
- Evaluation of local fruit spp. in large containers.
- Study the pest and diseases incidences on underutilized fruits species.
- Study the effect of root balling on local fruit crops.
- Studying of crop phenology of Ber plant
- Study the methods to enhance early seed germination, seedling growth, grafting success of Ber and Anona.
- Establishment of Fruit villages - Sour soup and Ber.
- Effect of chemicals on fruit drop and yield of Rambutan.
- Effect of chemicals on fruit set, retention and yield of Avocado.
- Effect of Gibberellins on fruit size of Thomson Seedless grapes.
- Evaluation of different material for fruit covering for quality improvement of mango fruits.
- Testing of different foliar fertilizers application for increasing fruit set and the prevention of immature fruit drop in durian.
- Evaluation of the variety and different number of plants per post of dragon fruits on the performance and productivity.

### Development

- Planting material production- Grafted plants – 15000.

### STAFF LIST

Designation	No.
Research Officer In Charge	01
Research Officer	02
Farm Manager	01
Agriculture Instructor	02
Program Assistant	01
Research Assistant	01
Chief State Management Assistant	01
Farm Clerk	02
Development Officer	02
Research Sub Assistant	01
Driver	02
Welder	01
Tractor Operator	01
Budder	02
Watcher	09
Labourer	11
Labourer (Contract)	25
<b>Total</b>	<b>65</b>

## 1.3.2 PLANT VIRUS INDEXING CENTRE (PVIC) – HOMAGAMA

The Plant Virus Indexing Centre, Homagama functions under the administration of Director - Fruit Crop Research & Development Institute, Horana. The activities of this center include development and application of advanced technologies for the detection of plant virus and virus like organism, production of test kits for detection of virus and other organism in laboratory and field indexing, quarantine purposes, epidemiological

investigations, evaluation of possible control/ management methods, development of virus free basic foundation stocks, investigations on virus coat protein mediated resistance, detection of other pathogenic organisms (Fungal, Bacterial, Nematodes, Viroids and Phytoplasma), related work at agriculture unit at Diyagama (Homagama) and technology dissemination activities.

### BUDGET

**Table 1.3.2: Annual budget - 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Recurrent	3,483,300	2,883,820	83
Capital	3,600,000	3,051,244	85
Projects			
NARPP- Papaya Project	800,000	694,329	87
NARPP- Bacteria Project	1,477,300	1,451,831	98
Fruit Village Development Project	900,000	689,993	77
Tissue Culture Project	2,370,000	2,343,869	99
Mahinda Rajapaksha Sport Complex (agriculture unit)	10,000,000	6,228,628	62
<b>Total</b>	<b>22,630,600</b>	<b>17,343,714</b>	<b>77</b>

### PROGRESS

#### Conventional Plant Virology

- Optimization of the protocol for locally developed papaya phytoplasma antiserum. Finding of this study are cross absorbed antiserum with healthy plant sap 1:1 (v/v) ratio gave higher diseased to healthy ratio than crude antiserum, Optimum antiserum dilution 1:200, Optimum conjugate dilution 1:500. Phytoplasma purification

buffer was used as antigen extraction and before adding antiserum, blocking step was included. Locally produced antiserum has been used for routine detection.

- Production of polyclonal antiserum for pineapple wilt virus (PWV). In this study, virus was purified successfully and an antiserum was produced. Optimization of the protocol will be continued. Locally produced antiserum will be utilized for future indexing.

- Optimization of the protocol for locally produced polyclonal antiserum for BBTV. Clear difference among the diseased and healthy samples was not visible. Therefore, reproduction of this antiserum will be continued.
- Studies on suppressing Papaya Rings Spot Virus (PRSV) through induced systemic resistance using Plant Growth Promoting Rhizobacteria (PGPR). Three suspected *Pseudomonas fluorescense* were isolated. Virus suppression programme will be carried out
- *In situ* detection of Papaya Ring Spot Virus (PRSV) through Rapid Immuno Filter Paper Assay (RIPA). Clarification of the specification of the required item is in progress.
- Identification of virus and virus like diseases in papaya. Survey was carried out in Meegahakiula, Haldumulla, Dambulla, Sigirya, Pannala, Wariyapola Agrarian service center areas and Puttalam district . Papaya phytoplasma infection was reported in Pannala area. All the location had PRSV. Papaya mosaic and tomato spotted wilt virus was not reported. As a new disease is spreading across the country, awareness programmes were carried out.
- Routine virus indexing. Total of 970 samples were indexed.  
Application: Promote disease free planting material production, correct identification of pathogen to manage further spread of virus diseases and minimise overuse of agrochemicals.

### Molecular Virology

Identification of virus and virus like diseases in papaya and develop sensitive detection kit at

field level. Survey was carried out in Meegahakiula, Haldumulla, Dambulla, Sigirya, Pannala, and Wariyapola Agrarian service center areas. Papaya phytoplasma infection was reported in Pannala area.

- Detection technologies for Cucumber Green Mottle Mosaic Virus. PCR based protocol was developed to detect CGMMV.
- Detection of Banana Bract Mosaic Virus and Cucumber Mosaic Virus (CMV) by duplex method. Experiments are continuing.
- Detection of Potato virus X (PVX) and Potato Leaf Roll Virus ( PLRV) in potato cultivating areas by using RT-PCR with specific primers. Optimization studies are being carried out.
- Testing of already detected viruses by PCR and confirmation by gene sequencing.
- Total numbers of samples indexed were 356.

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

### Virus Epidemiology

- Testing of tree injection of pesticides to control insect pests of perennial fruit crops under local conditions. Fipronil 50g/l SC, Thiomethoxam25% WG were tested for the control of “Wood boring insects” and “leaf hoppers” in jack, mango and durian trees. The borers’ damage was recovered with Fipronil. Further elimination of unwanted trees can be done using suitable chemical. This study will be continued.

- Development of a package for managing Cassava Mosaic Virus (CMV) by field screening of stems. The preliminary study was carried out to manage CMV disease by screening collected stems from fields. The plants produced from slightly infected middle stems part, produces healthy plants. This will be continued.
- Study the effect of foliar application of different micro nutrients on managements of Papaya Ring Spot Virus (PRSV) disease in papaya. In this study, the PRSV symptoms expression was delayed in copper spray treatment in the early stage. But no difference in the later stages. This study will be continued for mature trees.
- Field evaluation of papaya cultivar MS 100 for Papaya Ring Spot Virus (PRSV) tolerance. All the papaya cultivars taken for this study were infected by the PRSV, but the expression of PRSV symptoms was significantly lower in MS 100 compared to Ratna & Sinta. (Especially mosaic symptoms) This study will be continued.
- Advisory service to the small and medium scale crop growers. Fifteen field visits and 5 awareness programmes were conducted to manage virus infection and further spread.
- Testing of tree injection of fungicides to control fungal diseases (white root rot, anthracnose & root rot) of perennial fruit crops under local conditions. Field testing of fungicides injection on different concentration of Thiophanate methyl and Propiconazole effectively in mango and jack. Study will be continued.
- Identification and management of diseases in selected fruit crops. The causal agent of different papaya diseases were identified from different agro ecological zones. This study will be continued.
- Routine diseases (fungus, bacteria) indexing programme. More than 200 samples were diagnosed and delivered IPM based solution  
Application: Disease identification and provide control and management methods.

### Tissue Culture

- Protocol development to produce papaya plants through Tissue Culture. 300 *in-vitro* bottles for multiplication, 50 *in-vitro* bottles for rooting were done. Acclimatization has already commenced. This study will be continued.
- Production of virus resistant papaya variety through indirect organogenesis. 200 *in-vitro* bottles of papaya were grown and shoot proliferation started. This study will be continued.
- Field evaluation of different sub culture levels for banana of different varieties. 50 banana TC plants were field established from different subculture levels to test the variation and identify suitable subculture level. This study will be continued.
- Disease free basic planting material production and field evaluation. 22,000

### Microbiology

- Characterization of different Plant Growth Promoting Rhizobacteria (PGPR) isolated from different plant Rhizosphere. In this study the potential Plant Growth Promoting Rhizobacteria (PGPR) has been isolated to control diseases in environmental friendly way. This study will be continued.

pineapple & 12,000 Banana Virus free TC plants were produced. Plants were established in different farmer's fields and government fields.

- Rapid propagation method for MG3 pineapple through leaf culture. 450 MG3 leaf cultured TC pineapple plants were established at Walpita farm to test the variation and suitability of the ex plants.
- Micro propagation of selected anthurium cultivar through leaf culture. 646 in-vitro bottles for multiplications and rooting of "Kirimatiya selection" and "sprit" are grown and acclimatization started.
- Novel method for propagation of recommended varieties of orange and mandarin through "semi micro grafting". 20 grafted plants were established for field observation. This study will be continued.
- Studies on inter specific hybridization among *Capsicum* spp. (*C. annuum*, *C. chinense* and *C. frutescens*) to incorporate the resistance or tolerant agronomic traits against viruses to cultivating varieties/landraces. Inter-specific crosses were initiated. Success rate was very low. This study will be continued.
- National Coordinated Varietal Trial for newly developed promising chilli hybrids. Collaborative program with Field Crops Research & Development Institute, Mahailuppallama will be conducted during 2013/2014 maha.
- Development of well adapted high yielding hot pepper (*Capsicum chinense* or *Capsicum frutescens*) cultivar with better qualities for local and export market. Identification of farmer groups is in progress and the experiment will be continued.

### Plant Breeding

- Identification of available viruses and virus like diseases of chilli (*Capsicum annuum* L) and other *Capsicum* spp. under field level and laboratory conditions. In this study CMV & CVMV were identified serologically. TMV, TSWV & TMV were not found yet. This study will be continued.
- Screening of available germplasm (*Capsicum* spp.)/cultivars and varieties for viruses and selection of resistance or tolerant sources. Hundred and two land races were tested (PGRC, Local & Exotic). Duplicates and more similar accessions were found. CMV & CVMV tolerant landraces were identified for further testing (artificial inoculation). This study will be continued.
- Crop improvement program in pineapple. Hybridization & Selection of pineapple. Several crosses were made. Seeds were cultured in T/C media and few numbers of seedlings were produced. This will be continued.
- Evaluation of papaya cultivars for consumer acceptability combined with tolerance to Papaya Ring Spot Virus (PRSV) by using MS 100. Field evaluation is in progress. This experiment will be continued.

### Technology Transfer

- 05 radio programmes, 01 leaflet, 05 tissue culture fields observations, 25 field visits, 15 crop clinics were done.
- Advises were given to 110 farmers / growers who have visited the center. In

addition, telephone call advises were given to more than 500 farmers / growers

- One short communication, one research note and one poster abstract were published at the Annals of the Sri Lanka Department of Agriculture, 2013.
- One urban agriculture model and 01 home garden model were maintained in the centre.
- Several extension activities were conducted for environmental friendly agriculture programme at Diyagama Mahinda Rajapaksha Sports Complex. 16 schools students groups were visited.
- Local & foreign training obtained.  
Foreign trainings – None  
Local training –  
(i) Training on instrument handling, Industrial Technology Institute, Colombo  
(ii) Training on pest risk analysis November 2013 organized by NPQS

### Other Activities

Acting DD(R) served as,

- Secretary of SLAAS Section B
- Acting DD(R) served as 2<sup>nd</sup> Committee member of National Biotechnology Committee

## PLAN FOR 2014

### Conventional Plant Virology

- Biological characterization of Sri Lankan isolates of cucumber mosaic virus (CMV)
- Improve the efficacy of detection of Pineapple wilt virus in pineapple by serology using locally produced antiserum.

- Control of Papaya Ring Spot Virus (PRSV) in papaya through induced systemic resistance using *Pseudomonas fluorescenc.*
- Biological characterization of Sri Lankan isolates of Papaya Ring Spot Virus (PRSV).
- Identification of virus and virus like disease in papaya and develop sensitive detection kits at field level.
- Production of polyclonal antiserum for Cucumber green mottle mosaic virus and Banana bunchy top virus.
- Identification of virus and virus like diseases in grape.
- Routine virus diseases indexing programme and issue test reports.

### Molecular Virology

- Identification of virus and virus like disease in papaya and development of detection techniques.
- Coat protein mediated gene studies for PRSV resistance.
- Develop DNA based detection techniques for indexing purposes.
  - Banana virus detection (BBRMV & CMV) by duplex method (Continuation).
  - Identification of virus and virus like disease in grapes by DNA based technologies.
  - PVX & PLRV in potato cultivating areas by using RT-PCR with specific primers. (Continuation).
- Testing already detected viruses by PCR and confirmation by gene sequencing (Continuation).
- Routine virus indexing by PCR and issue test reports.

## Virus Epidemiology

- Development of package for managing Cassava Mosaic Virus (CMV) by field screening of stems.
- Study the potential use of tree injection techniques to control insect pest in mango and jack fruit trees.
- Testing of mosquito breeding in pineapple plant axils and its management.
- Testing of selected slow releasing natural and synthetic volatile compounds for expelling vector insects in fruit crops.
- Study the effect of foliar application of different micro nutrients on managements of PRSV disease in papaya for matured plants with virus symptoms.

## Microbiology

- Characterization of different Plant Growth Promoting Rhizobacteria (PGPR) isolated from different plant rhizosphere.
- Study the potential of use of tree injectors to control fungal diseases in selected perennial fruit crops under local conditions.
- Identification and management of bacterial diseases in Dragon fruits.
- Routine disease indexing programme and issue test reports.

## Tissue Culture

- Identification of protocol to produce papaya plants through shoot tip culture.
- Methodology for production of virus resistant papaya variety through tissue culture and gene transfer.
- Field evaluation of suitable sub culture levels for tissue culture banana & pineapple.

- Suitability of pineapple & banana tissue culture planting material for commercial cultivation.
- Increase the efficacy of mass propagation of anthurium through leaf culture.
- Disease free basis planting material and mother plant production of banana & pineapple.
- Tissue culture training and evaluation program for small scale tissue culture producers.

## Plant Breeding

- Genetic improvement of chili (*Capsicum annum* L.) against the major virus diseases.
- Identification of prominent viruses and virus like diseases in chilli (*Capsicum annum* L) and other *Capsicum* spp. under field level and laboratory conditions.
- Screening of common germplasm (*Capsicum spp.*)/cultivars and varieties for viruses and selection of resistance or tolerant sources.
- Studies on inter-specific hybridization among *Capsicum spp.* (*C. annum*, *C. chinense* and *C. frutescens*) to incorporate the resistance or tolerant agronomic traits against viruses to cultivating varieties/landraces.
- National coordinated Varietal Trial for newly developed promising chilli hybrids.
- Genetic improvement of well adapted high yielding hot pepper (*Capsicum chinense* or *Capsicum frutescens*) cultivar with better qualities for local and export market.
- Development of superior variety of pineapple through hybridization & selection.
- Production of 1000 chilli seedling pots and distribute among the farmers in

western province to promote small scale cultivation.

- Demonstrations of chilli cultivation in grow bags (500 grow bags).

### Technology Transfer

- 19 awareness programs and novel technology transfer will be conducted for AI, farmers, officers, teachers & students.
- 04 plant clinic programmes, 15 Field experiments & field days.
- 103 Organic Home Garden and 150 limited space area home gardens development.
- 12 training sessions for the productivity enhancement of existing fruit crops.
- Handling 250 pest & disease problems of the farmers who visit the center & telephone advisory services for farmers.
- TC banana & pineapple fields visits.
- Publication of 12 newspaper articles, two radio and television programmes

- 01 urban agriculture & home garden models and Promotion of vegetable cultivation at PVIC land (1.5 Acs)
- Agriculture programmes at Diyagama Mahinda Rajapaksha Sports Complex

### STAFF LIST

Designation	No.
Deputy Director. (Research)	01
Research Officers	05
Programme Assistants	04
Agricultural Instructors	09
Research Assistant	06
Sub Lab Assistant	01
Management Assistants	04
Store man	01
Driver	03
Labourer (Permanent)	02
Labourer (Contract)	12
Labourer (Projects)	06
Watchers	02
<b>Total</b>	<b>56</b>

## 1.4 RICE RESEARCH AND DEVELOPMENT INSTITUTE (RRDI) - BATALAGODA

Presently, the rice production has achieved the level of self sufficiency and it is of vital importance to maintain the stability of annual productivity to ensure food security. Prevailing adverse weather conditions and frequent changing of rainfall pattern due to global warming are major constraints of maintaining the stability of rice productivity. Therefore,

rice research and development program is targeted to develop high yielding rice varieties adaptable to different rice growing ecosystems. Development of appropriate technologies for identified varieties and primarily dissemination of varieties and relevant technologies are other main goals of the institute.

### BUDGET

**Table 1.4.1: Annual budget – 2013**

<b>Vote</b>	<b>Allocation (Rs.)</b>	<b>Expenditure (Rs.)</b>	<b>Expenditure %</b>
Capital	42,198,808	25,727,569	61
Recurrent	36,726,070	35,583,753	97
Infra Structure Development	6,855,315	6,855,315	100
<b>Special Projects</b>			
<u>Foreign projects</u>			
Weed Management	1,250,000	684,708	55
Green Super Rice	2,150,000	641,168	30
Multi Environment Testing	1,023,670	313,195	31
Closing Rice Yield Gap	1,500,000	529,428	35
SAARC Australia	254,170	254,777	100
AFACI	1,300,000	408,795	31
<u>Local projects</u>			
LCWZ	2,000,000	2,000,000	100
Hybrid seed	1,500,000	1,464,581	98
Abiotic stress	2,766,500	2,354,105	85
Fertilizer use	2,400,000	2,124,225	85
Weedy rice	1,584,800	1,457,073	92
Water use	2,386,100	2,383,583	100
Liquid fertilizer	212,000	92,651	44
<b>Total</b>	<b>106,101,433</b>	<b>82,874,928</b>	<b>78</b>

## PROGRESS

### RESEARCH

#### Rice varietal improvement

The varietal improvement programme at RRDI is focused on developing varieties with higher yield potential and high genetic resistance for pest and diseases to minimize the use of external production inputs. Development of tolerant varieties against salinity, iron toxicity and submergence is also anticipated. Substantial gains have been achieved by developing new elite lines with wide genetic base, having resistance to many biotic factors and good grain quality during the year 2013.

#### New rice varieties

**Bg 370** – The line Bg 3R which was conditionally released in 2012 as Bg 370. It is a white, short, round grain type variety with a realizable yield of 7 t/ha. The variety matures in 95 days and is tolerant to major pests and diseases, and also to lodging.

**Bg 96-741** - This is a 4<sup>1</sup>/<sub>2</sub> month red pericarp variety showing moderate tolerance to flashfloods. It was tested in 28 locations in Matara, Galle, Ratnapura and Kalutara districts. Bg 96-741 gave yields up to 5.4 t/ha under flooded conditions. The line was presented to Seed Certification Service for DUS clearance.

**Bg 4-91** – This is a three months white pericarped, rice line showing tolerance to salinity. This line was presented to Seed Certification Service for DUS clearance

#### 4<sup>1</sup>/<sub>2</sub> months age class

Varieties of this age class covers nearly 8% of the total annual rice crop extent in Sri Lanka. Eighteen elite lines identified from different classes were evaluated in yield trial for major pest and disease, grain yield and grain quality characteristics. Line number 09-606 and 08-301 were identified as promising.

#### 3<sup>1</sup>/<sub>2</sub> month age class

This age class rice varieties covers about 66% of the total rice growing area in Sri Lanka. Sixteen elite lines were selected in yield trials. The lines selected for NCRVT are Bg 10–1399 (Ld 12-38-1/Bg 358), Bg 08–1258 (At 307/IR 64) and Bg 10–1407 (Bg 1420/IR64).

#### 3 months age class

Presently 3 months age rice varieties cover more than 26% of the, total annual cultivation extent in Sri Lanka. Bg 11-2366, Bg 11-2370 and 11-2364 were selected as elite lines in preliminary yield trials and Bg 11-1051 was identified as promising in major yield trials.

Bg 10-3375, Bg 10-1083, Bg 10-1166, Bg 09-1851 and Bg 09-1888) were selected to test in NCRVT in yala 2013 onwards.

#### 2.5 months age class

The ultra short age varieties which mature around 80 days are becoming very important as these varieties can fit well into rainfed ecosystems especially in yala season with short growing season.

Bg 12-1666, 12-1643, 12-1697, 12-1679 and 12-1676 were evaluated in preliminary yield trial. 11-2508, 11-2537, 10-2881, 10-2884, 10-

2891 were evaluated in major yield trial. Bg 10-2907 (red pericarp, short round grain type) was multiplied to supply the purified seeds.

### Traditional rice

Traditional rice cultivars are becoming popular among growers but are low yielding and susceptible to pests, diseases and lodging. Therefore, improvement of traditional cultivars is needed.

SW 25 a Gamma irradiated mutant of traditional cultivar *Suduru Samba*, was multiplied and tested at Preliminary Yield Trial.

Two lines (WH 20 and WH 48) obtained by wide hybridization of *Oryza nivara* to *Oryza sativa* (Bg 380) with higher yield potential and BPH resistant characters was multiplied. Eleven traditional cultivars were purified and multiplied.

### Quality rice

Grain quality improvement has been highly emphasized after achieving the self sufficiency. Aroma, amylose content, soft/medium gel consistency, high head rice percentage, minimum white belly, intermediate gelatinization temperature, good taste and good appearance are some of the grain quality determinants.

Forty three entries received from IRRI were tested and 24 aromatic elite lines were selected. All these lines belong to 3½ - 4½ month age group. Seven lines (IR 71146-97-1-2-1-3, IR 03A477, IR 03A568, IR 04A212, IR 04A381, IR 07A167 and IR 04A395) were

found to be promising having yield of greater than 5 t/ha.

### Hybrid rice

Use of hybrid vigor is a key technology aimed at bridging the yield gap and raising the yield potential.

Hundred and eighty new F1 combinations and 87 crosses were selected for back crossing in order to develop new CMS and maintainer lines. Sixteen combinations were selected as new parental lines for further testing and high fertile combinations were used for F1 seed production which are to be tested at PYT.

Fifty CMS lines and 186 restorer lines were maintained. New crosses were made with selected parental lines. 27 hybrids combinations were tested in PYT. IR68897A/R160, Bg CMS4A/R147 and Bg 407H recorded yields of 6.78 t/ha, 6.65 t/ha and 5.49 t/ha respectively in Maha 2012/2013. Nuclear seeds of Bg CMS 1A/B, Bg CMS 4A/B and Bg CMS 4A/SN50 were included in the programme to produce hybrid rice.

F1 seeds of Bg 407H and Bg CMS 4A/R147 were produced. F1 seeds of Bg CMS 4A/R147 were given to farms at Girandurukotte (3 kg), Pollonnaruwa (2 kg) and Ambalanthota (600g).

### Biotechnology

Crosses of Bg 352, Bg 359 and Bg 250 with BLB donor IRBB60 were made in order to improve BLB resistance of these varieties. Backcross populations of Bg 250/IRBB60 were raised during this year.

Pokurusamba and Bg 94-1 were crossed with Tetep and IRBB60 as donor parents for Blast and BLB resistance respectively. F<sub>1</sub> seeds were produced.

In order to introgress economically important traits present in wild species into elite rice lines F<sub>1</sub> *O. sativa* / *O. rhyzomatis* was back crossed and embryos were rescued. A single plant was obtained for further advancement.

With the objective of developing favorable mutants from in-vitro somaclonal variants in rice variety Bg 250, sub culturing of seed calli of Bg 250 was performed. Regenerated variants were field screened to select stable lines with 2½ month age. Fifteen lines have been obtained in its G<sub>4</sub> generation.

Mutations were induced in Bg 300 seed calli and regenerated plants were screened for 90 days age and salinity tolerance. They are in G<sub>1</sub> generation. Seed calli of Suwandel, Kuruluthuda, Gonabaru, Radal, Suwanda Samba and Suduheenati traditional varieties were mutated for dwarfism. They are in acclimatization stage.

Tagging genes and identifying molecular markers are essential for marker assisted breeding. Single seed decent method was followed for crosses of Dahanala/Suduru samba and Bg 300/Goda Heenati having submergence tolerance and thrips resistance traits, and F<sub>2</sub> and F<sub>3</sub> generations were raised to tag genes and identify molecular markers.

## **Grain quality**

### **Grain quality characteristics of raw rice and parboiled rice in NCRVT entries and advanced breeding material**

All the lines under PYT, MYT and NCRVT were evaluated for raw and parboiled rice grain quality. 156 samples of breeding line entries were tested.

### **Eating and cooking qualities and nutritionally important starch fraction of traditional rice varieties**

Twenty one selected traditional rice varieties were analyzed for grain physical properties and physicochemical properties. Brown rice and hull percentages varied between 77-80% and 20-23%, respectively. Head rice yield varied between 55-73% for raw rice milling except for the variety Kuruluthuda. Volume expansion during cooking was more than 2.6 times in all the varieties except for Kuruluthuda and Masuran. Gelatinization temperature (GT) of majority of the evaluated varieties were intermediate GT (70-74<sup>0</sup>C). Madathawalu, Pokkali, Maa Wee, Gonabaru, Inginimitiya and Dular showed low GT values (55-69<sup>0</sup>C). Intermediate amylose content (AC) was observed in majority of varieties except Suduru Samba that recorded the lowest AC. Herath Banda and Kalu Heenati recorded high amylose contents. Gel consistency (GC) highly varied among the selected varieties. Herath Banda, Wannu Dahanala, Rathal, Hondarawalu, Kuruluthuda, Deveraddiri, Sulai and Masuran were identified as the soft GC varieties.

## Disease Management

### Screening for Bacterial Leaf Blight (BLB)

Total of 403 lines were screened against BLB disease in both seasons. Among them 3 lines in Maha and 31 lines in Yala showed resistance or moderate resistance.

### Screening for rice blast

Total of 3899 lines were screened against rice blast disease. Among the lines screened 1309 entries in maha and 1433 entries in yala were identified as resistant or moderately resistant to rice blast.

Fourteen already released varieties were screened for blast and found that their level of resistance at present is similar to that of the level recorded when these varieties were first released.

### Re-evaluation of recommended fungicide for sheath blight

Five recommended fungicides received from ROP were re-tested for rice sheath blight and found that all five were equally effective.

### Effect of organic liquid extracts on rice disease under in-vitro conditions

The effect of organic liquid extracts to control blast and sheath blight in rice was studied. Compost tea (Brewed Compost Extract), extracts of Kappetiya (*Croton laccifer*), Gliricidia (*Gliricidia sepium*), Pawatta (*Ardathoda vasica*) leaves, neem (*Azadirachta indica*) seed extract and Tebuconazole fungicide were screened *in vitro* and in the green house. While Tebuconazole fungicide highly inhibited the mycelia growth, the other organic extracts also significantly reduced the mycelia growth of both fungi.

## Pest management

### Screening of pest resistance

Green house and field screening was performed to observe the resistance to Gall midge and Brown plant hopper. Total of 4124 entries were checked and 841 and 1761 entries were identified as resistant or moderately resistant to the Gall midge and Brown plant hopper.

### Population dynamics of rice pests attracted to light trap

Temporal variation of rice insect pests was studied using light trap collections. Results showed that both temperature and RH increased the Brown plant hopper and Green hopper populations. Stem borer, Black bug and Paddy bug populations decreased with elevated temperature.

### Evaluation of new molecules of insecticides

Buprofezin 25% SC is a new, Class III insecticide. It was found that it effectively controls the BPH at the rate of 1.5 ml/l of water.

### Arthropod faunal diversity in organic and conventional rice systems

Arthropod fauna in organic and conventional rice systems were studied. Results revealed that Arthropod species diversity, species richness and abundance were significantly higher in organic rice system compared to the conventional system. Order Coleoptera was the most diverse order. The aquatic environment of organic system was rich with arthropods, especially primary consumers of food webs.

## Weed Management

### Agro-morphological variations of Weedy Rice populations (*Oryza sativa Spontanea*)

Morphological variations of weedy rice biotypes in the country were studied. Panicle samples were collected from highly infested weedy-rice fields and categorized. Accordingly, 251 groups were identified. Observations suggest that weedy rice morpho-types collected have all possible combinations of grain features. After planting of 251 morpho-types under uniform condition, it was observed that there was very high degree of diversity. Thousand grain weight and filled grain percentage of majority of weedy rice morpho-types were less than 20g and less than 70g respectively. Evidences suggest that weedy rice in Sri Lanka have emerged from different origins and sources could be wild rice species in certain areas and traditional rice cultivars in other areas.

### Effect of *Isachne globosa* on growth and yield of rice

A pot experiment was conducted to find out the effect of different densities of *Isachne globosa* on growth and yield of rice. Both plant growth and yield of rice were significantly affected by *I. globosa*.

### Bio-efficacy of Cyhalofop-butyl 10EC on *Paspalum* spp. in direct seeded rice

This study was conducted to determine the best application rate and time for Cyhalofop-butyl for the control of grasses especially *Paspalum* spp. in direct seeded rice. Application of 200 - 250g ai/ha Cyhalofop-butyl at early growth stages (1 and 3 WAS) controlled *Paspalum* effectively.

### Screening of recommended herbicides on control of *Murdannia nudiflora*

A pot experiment was conducted to select effective herbicides for controlling *Murdannia nudiflora*. More than 80% control efficacy was observed with Orthosulfamuron + Propanial, Azimsulfuron, MCPA, Orthosulfamuron and 50-80% control efficacy was observed in Ethoxysulfuron, Cyclosulfamuron, Fenoxaprop-p-ethyl + ethoxysulfuron, Bensulfuron methyl + Metsulfuron methyl. Pretilachlor+pyribenzox, Bispyribac sodium and Pyrozulfomuron-ethyl showed less than 50% control efficacy.

## Soil fertility Management

Potassium management in rice cultivation was studied in long term basis. In the last six seasons of the long term study, there was no response of rice to application of K fertilizer even with a grain yield of 5t/ha or more. Non exchangeable K contents in soil were highly correlated with grain yield of rice.

Long term application of organic manure and chemical fertilizer on soil fertility and crop productivity was studied. Soil fertility evaluation made revealed that combined application of chemical fertilizer and organic manure was superior to separate application of each type. Organic manure application assisted to maintain soil OM, P and K levels. Build up of soil fertility was not observed in long run when chemical fertilizer or organic manure alone was applied every season to rice fields. Therefore, such, seasonal application of both organic manure and chemical fertilizer is necessary to maintain optimum soil fertility levels and to obtain optimum crop yields.

Application of organic manure decreased the uptake of heavy metal by rice plants.

Long term field experiments were conducted to observe long term effect of application of P fertilizer. Experiments conducted in 2013 revealed that reduction in available soil P levels could be observed when P fertilizer was not applied. However, there was no significant yield difference observed between plots treated with alternative season and seasonal P application.

Nano fertilizers are slow release fertilizers meant to reduce fertilizer wastage. Different nano-formulations of N and K produced by the institute of Nano Technology were tested. There was a significant yield increase with the application of nano K fertilizer. It was also observed that urea application rate can be reduced by 25% when nano - N fertilizer is used.

A study conducted to develop a suitable organic manure application technology recommendation showed that application of compost in two splits as basal and at top dressing was more effective than single application of compost.

Different types of liquid organic formulas were tested under organic farming and Integrated Plant Nutrient Management system (IPNS) for paddy cultivation. Among the tested formulates, Jeewamurtha, Pancha gavya and compost tea performed well giving yields of 7.1, 5.8 and 5.3 t ha<sup>-1</sup>. Compost tea can be used as a foliar nutrient source, pest repellent and an antibiotic in paddy cultivation.

## **Water Management and GIS**

### **Evaluation of rice varieties under rainfed and irrigated conditions**

Twenty six recommended rice varieties were screened for rainfed and irrigated farming conditions. All varieties tested performed well under irrigated condition while Bg 250 and Bg 2907 performed well under rainfed condition.

### **Time of sowing of rice in rainfed paddy farming**

Evaluation was performed by using APSIM Oryza computer model and by field experiment to find out the best date of sowing rice in Yala. Soil, climate and crop data were used to calibrate the model and scenario analysis was carried out for different dates of sowing. Results showed that the best period of sowing paddy for Yala season lies throughout the month of April.

Model simulation results showed that the best period of sowing paddy during wet season (Maha) in the Intermediate Zone of Sri Lanka is 1<sup>st</sup> week of October for Bg 366, 2<sup>nd</sup> week of October for Bg 300 and 3<sup>rd</sup> week of October for Bg 250.

### **Evaluation of fertilizer application timing under lowland rainfed rice cultivation**

An experiment was conducted to find out a suitable method of fertilizer application for lowland rainfed paddy using Bg 300. No significant yield difference was observed when fertilizer was applied with rainfall. Application of fertilizer based on Leaf Color Charts also gave similar yield. The rainfall was normal and well distributed during the cropping seasons.

### **Assessment of water availability in rainfed paddy fields in Kurunegala district**

Assessment of water availability in rainfed paddy fields is important to introduce suitable rice varieties and suitable management package. Climatic water availability was calculated on monthly and weekly basis for three locations representing dry, intermediate and wet zone to evaluate the soil water availability. The most suitable growing periods and locations were identified for rainfed paddy during Yala and Maha seasons. Suitable age groups of rice were found and the stress periods were recorded. Location specific fertility problems were recognized. These findings will be evaluated under farmer condition next two seasons.

## **Agronomy**

### **National Coordinated Rice Variety Testing (NCRVT)**

Nine new rice lines were tested with standard check varieties in 12 locations in NCRVT. Following lines were selected for further testing in farmers' fields in VATT programme. Bg 08-1258, 3½ months white, nadu type, yield higher than Bg 357 and Bg 359

Bg 08-1407 – 3½ months white samba, yield higher than Bg 358

Bg 08-1909 – 4 months white nadu line – higher yield and head grain yield than Bg 403

Fourteen new rice lines were tested under 2½, 3 and 3½ maturity classes in Yala 2013.

### **Variety Adaptability Testing Trials (VATT)**

Adaptability testing of 8 new elite lines namely At 09-861, At 08-593, Ld 8-6-7, At 08-1078, Bg 08-2398, At 08-617, Bg 05-110 and Bg 11-139 were conducted in Maha 2012/13. Among the lines tested, At 7-800 (3

months line), Bg 07-997 (4½ months line) and Bg 07-1350 (4½ months line) gave higher yields and found to be more adaptable than the standard check varieties and promoted to LSVATT.

### **Large Scale Variety Adaptability Testing Trials (LSVATT)**

Three new elite lines, At 07-800 (3 months white nadu), At 06-631 (3½ months white samba small grain type), and Bw-1621 (3½ months red nadu) were tested in farmers' fields. Based on the responses of farmers on various characteristics, all three lines were confirmed as adaptable.

### **Shoot and root morphological characters of selected rice varieties in relation to early and intermittent drought stress**

Shoot and root morphological characters related to drought tolerance were studied in 11 rice varieties.

Plants were subjected to drought stress in two cycles i.e. in mid and late vegetative stages. DSN 22 was characterized by high number of leaf hairs, high amount of shoot dry matter and high root length and volume under drought stress and was identified as the most tolerant line. In contrast, Bg 357 was identified as the most susceptible variety among the tested varieties.

### **Multiplication of cold tolerant rice lines and varieties**

Forty cold tolerant rice lines received from IRRI, three traditional varieties grown in upcountry (Hathial, Mudukirial and Suduwee) and PL -16 were multiplied during yala 2013

To be used in future cold tolerance screening purposes.

## SEED PRODUCTION

- Following amounts of breeder seeds of recommended rice varieties were produced for the national seed paddy programme.

**Table 1.4.2: Amount of breeder seeds produced in 2013**

Age class and variety	Breeder Seed Quantity (kg)		
	Maha 2012/13	Yala 2013	Total
<b>150-180 days</b>			
Bg 3-5	10.0		10.0
Bg 745	20.5		20.5
Bg 38	10.0		10.0
Bg 407	10.0		10.0
<b>4 months</b>			
Bg 379-2	193.5	53.5	247.0
Bg 450	86.0	43.0	129.0
Bg 403	150.5	21.5	172.0
Bg 454	21.5		21.5
Bg 406	21.5		21.5
<b>3½ months</b>			
Bg 94-1	164.0	143.5	307.5
Bg 352	164.0	184.5	348.5
Bg 357	123.0	102.5	225.5
Bg 358	184.5	215.0	399.5
Bg 359	164.0	122.5	286.5
Bg 360	143.5	123.0	266.5
Bg 366	220.0	240.0	460.0
Bg 369		100	100
<b>3 months</b>			
Bg 300	120.0	180.0	300.0
<b>80 days</b>			
Bg 250	61.5	61.5	123
<b>Total</b>	<b>1868.0</b>	<b>1590.5</b>	<b>3458.5</b>

- Varieties of Bg 304 and Bg 305 were multiplied and 80 kg of seeds were produced from each variety.
- 1435 kg seeds of rice line Bg 1165-6 were produced and provided to farmers and Aluththarama seed farm for the production

of seed paddy. This line has been identified as producing rice of export quality

- Rice cultivar ‘MA2’ is suitable for biscuit production and 45,960 kg of seed paddy was produced.
- 7851.5 kg of paddy seeds (foundation, registered and certified) of popular varieties were produced and sold to farmers.

## SPECIAL PROJECTS

Following special small scale research and development projects were implemented

- Multi-environment testing (Funded by IRRI) - This project aims to adopt harmonized procedure for nominating, advancing and discarding breeding lines and to facilitate exchange of germplasm between the participating countries.
- Optimizing technology package for dry seeded rice cultivation (Funded by IRRI) - The objective of this project is to develop a suitable technology package for irrigated dry, direct-seeding (IDDS) in upland condition.
- Green super rice (Funded by IRRI) – The objective of this project is to develop and promote rice cultivars with high nutrient efficiency and stress resistance.
- Closing rice Yield gap in Asia (Funded by IRRI) -
- Crop simulation and modeling approach with APSIM *ORYZA* (Funded by SAC) The project aims to develop capacity in cropping systems modeling to promote food security and sustainable use of water resources in South Asia.
- Development of rice production technologies for increasing self sufficiency

- of staple food in Sri Lanka (Funded by AFACI – Korea) – The aim of this project is to develop rice production technologies in saline affected areas in Sri Lanka
- Productivity enhancement of Low Country Wet Zone paddies (Funded by NARP) – The project aims to enhance the rice productivity in Low Country Wet Zone of Sri Lanka which is constrained by biotic and abiotic stresses like salinity, iron toxicity, submergence and boggy soils.
  - Development of rice varieties for abiotic stress; submergence, salinity, drought escape / tolerance and iron toxicity (Funded by NARP) – The objective of the project is to incorporate the abiotic stress tolerance to popular rice varieties grown in the country.
  - Adaptability testing of efficient fertilizer use technologies in farmers' fields (Funded by NARP) - This project aims to test the adaptability of fertilizer use technologies developed at the RRDI under farmer conditions.
  - Management of weedy rice in wet seeded rice in Sri Lanka (Funded by NARP) - This project aims in dissemination of integrated approach of technology package among farmers through field trials and awareness programs..
  - Assessment of water availability in rainfed paddy fields in Kurunegala district for optimum utilization of water in rice production (Funded by NARP) – The objective of this project is to assess the water availability in rainfed paddy fields in Kurunegala district.
  - Leaf colour charts were prepared in Sinhala for wet and dry zone situations. 700 leaf colour charts were distributed among extension officers in Colombo, Ratnapura, Matara, Galle, Kegalla, and Kalutara districts. 100 leaf colour charts were distributed among extension officers in the dry and intermediate zones.
  - Seventy six demonstration plots were established in Puttalam district to ascertain the adaptability of salt tolerant lines. Two salt tolerant rice lines (Bg 5-110 and Bg 4-91) along with Bg 369 were used. According to information collected, most farmers preferred Bg 4-91 because it is tolerant to salinity and belong to 3.5 months age class.
  - Twenty four demonstrations were conducted on nursery and field establishment of paddy by seedling broadcasting method for extension officers and farmers in the Colombo, Gampaha, Matale, Anuradhapura, Polonnaruwa, Kalutara, Nuwara eliya, Badulla, Galle, Matara and Vavunia districts.
  - Six awareness programmes on efficient management of N fertilizer using Leaf Colour Charts were conducted for extension officers in Colombo, Kalutara, Ratnapura, Galle, Matara and Kegalle districts.
  - Two awareness programs on new fertilizer recommendation of rice for farmers and extension officers at the Matara and Badulla Districts and one awareness programme for field officers of the national fertilizer secretariat were conducted.
  - One awareness programme was conducted for farmers in Anamaduwa Agriculture Segments on development of soil salinity in

## **TECHNOLOGY DISSEMINATION**

- Fertilizer recommendation for rice was revised and formulated.

paddy fields and measures to alleviate soil salinity.

- Eighteen, one-day on field awareness programs on weedy rice and weed control were conducted for farmers and extension officer totaling 564 participants.
- 10 training programs were conducted for farmers, extension officers, university students as well as students of agriculture schools on hybrid seed production.
- Rice Production Technology Center of RRDI conducted training programmes as shown in table 1.4.3.

**Table 1:4:3 Summary of training programmes conducted in 2013 by Rice Production Technology Centre**

Type of Programme	No. of Programmes	No. of Participants
Farmer trainings (one day)	21	344
Farmer trainings (2 or 3 days)	03	114
Agriculture technical officer trainings (one day)	16	547
Subject Matter Officer trainings (seasonal)	03	90
Private sector trainings (one day)	03	130
Diploma student and university student visits	10	357
School children visits	9	1159
<b>Total</b>	<b>65</b>	<b>2741</b>

- Twenty one samples brought by farmers were inspected and appropriate instructions were given for the control of pests and diseases.

- Eight farmer fields were inspected for diseases, and instructions were given for the control of pests and diseases.
- Officers attended as resource persons for 3 trainings organized by the other units of DOA.
- Demonstration field on paddy farming was established at RRDI premises.
- Nine radio programs were conducted (2 programs on ‘current important diseases in rice’, 4 programs on ‘new fertilizer recommendation of rice’, 2 programs on ‘rice disease and pests’, 2 programs on ‘weedy rice and weed control in rice’ and 2 programs on ‘rice cultivation in Maha season’).
- Three video programs were produced and telecast on television channel ‘Rupawahini’ (2 on new fertilizer recommendation for rice and 1 video program on cadmium accumulation in rice).

## **TRAINING, CONFERENCES & WORKSHOPS ATTENDED**

Following trainings, workshops and conferences were attended by the officers of RRDI.

- Plant Pathology Training Program for New Research Officers. 07-08 Jan 2013, HORDI, Gannoruwa.
- Workshop on Patent Drafting. 28 Jan-01 Feb 2013, National Science Foundation & Industrial Technology Institute, Colombo.
- Training on sustainable manure utilization. 18 Feb-01 March 2013, PTC, Netherlands.
- Third training workshop and final review meeting of SAARC-Australia Project. 10-14 March 2013, SAARC Agriculture Center (SAC), Bangladesh.

- Inception meeting of Green Super Rice for Resource Poor of Africa and Asia Phase II Project. 12-13 March 2013, Sanya, China: Chinese Academy Agricultural Sciences.
- Planning workshop on the project Regional Capacity Building Training on Participatory Plant Breeding. 9-11 May 2013, ISTI, Gannoruwa: DOA.
- Training on Crop Modeling ‘STICS’. 13-17 May 2013, Department of Crop Science, Faculty of Agriculture, University of Peradeniya, Peradeniya.
- Workshop on Molecular Biology. 10–12 July 2013, Industrial Technology Institute, Colombo.
- Training Workshop for Selected National Trainers on Permanent Crop Clinics– Module 1 & 2. 3–8 June 2013, PGRC, Gannoruwa.
- Training Workshop for Selected National Trainers on Permanent Crop Clinics – Module 4. 23-26 July 2013, PGRC, Gannoruwa.
- Training on Instruments Handling. Industrial Technology Institute, Colombo: ITI.
- Inception and planning meeting of the project on Increasing Productivity of Direct Seeded Rice Areas by Incorporating Genes for Tolerance of Anaerobic Conditions during Germination. 13-14 August 2013, IRRI, Philippines: IRRI.
- Principal investigators meeting on new Pan-Asian and regional projects of the Asian Food and Agriculture Cooperation Initiative (AFACI). 09-13 Sep. 2013, Bangkok, Thailand: APO.
- National Conference on Livelihoods, Biodiversity and Ecosystem Services. 26-27 Sep. 2013, Sri Lanka Foundation Institute, Colombo.
- Training Workshop for Selected National Trainers on Permanent Crop Clinics – Module 3. 28 Oct – 02 Nov. 2013, PGRC, Gannoruwa.
- Inception and training workshop for the UNEP/GEF project on Mainstreaming Biodiversity Conservation and Use in Sri Lankan Agro-Ecosystems for Livelihood and adaptation to Climate Change. Ministry of Environment and Renewable Energy, 22-23 Oct. 2013, Kandy.
- 24<sup>th</sup> Asian Pacific Weed Science Society Conference. 22–25 Oct. 2013, Bandung, Indonesia.
- Training on Techniques in Molecular Biology. 4-7 Nov 2013, Agricultural Biotechnology Centre, Peradeniya.
- Benefit of Plant Variety Protection Systems in line with the UPOV Convention. 25-26 Nov. 2013. Plant Genetic Resources Center, Peradeniya.
- 7<sup>th</sup> International Rice Genetics Symposium. 5-8 Nov. 2013, Manila, Philippines: IRRI
- Coordinating Workshop for Biotech Stakeholders: Innovative Approaches for Fuelling the National Economy. 21 Nov. 2013, Colombo: Coordinating Secretariat for Science Technology and Innovation
- Regional expert consultation meeting on Best Practices and Procedure of Saline Soil reclamation Systems in SAARC Region, 27-29 Nov. 2013, Haryana, India.
- AGRINET User seminar. 06 Dec 2013, Sri Lanka Council for Agricultural Research Policy (CARP), Colombo.
- Workshop on Permanent Crop Clinic Programme (PCCP). 19-20 December 2013, Kandy.

## OTHER ACTIVITIES

- Nine hundred and fifty rice accessions including traditional cultivars, introductions and improved lines were established and seed samples were conserved at RRDI short term germplasm conservation unit. Seed samples were distributed among other research stations, farmers, school children, universities, NGOs and other interested group.
- Facilities were provided for 12 students of Agriculture Schools to carry out their in plant trainings Facilities were provided for 5 undergraduate and 4 postgraduate students to carry out their research projects.
- Various publications and CD's of the DOA (total number 1356 and 42 respectively) worth Rs. 104446.00 were sold at the outlet at Rice Production Technology Center.
- *Sesbenia rostrata* and Sunhemp seeds were distributed for *in-situ* production of green manure for paddy cultivations practiced by farmers.

## PLAN FOR 2014

### Research

- Varietal improvement and multiplication of 2<sup>1/2</sup>, 3, 3<sup>1/2</sup>, 4-4<sup>1/2</sup> and 5-6 months age groups.
- Hybridization and selection of lines in 2<sup>1/2</sup>, 3, 3<sup>1/2</sup>, 4-4<sup>1/2</sup> and 5-6 months age groups.
- Evaluation of elite rice lines in 2<sup>1/2</sup>, 3, 3<sup>1/2</sup>, 4-4<sup>1/2</sup> and 5-6 months age groups in Preliminary Yield Trials and Major Yield Trials.
- Back crossing and marker assisted selection and seed culturing for developing biotic

and abiotic stress tolerant, and quality rice varieties.

- Development of new hybrids through heterosis breeding.
- Nuclear seed production of selected hybrid lines.
- Multiplication and purification of selected traditional rice cultivars.
- Conservation of germplasm through multiplication.
- Screening of recommended and traditional rice varieties for different traits.
- Evaluation of the efficacy of pesticides and pest dynamics of major rice pests.
- Investigation of methods to control rice diseases.
- Evaluation of appropriate methods for rice weed management.
- Investigation on weedy rice (*Oryza sativa spontanea*).
- Evaluation of fertilizer application time under lowland rainfed rice cultivation.
- Investigation on water availability and associated technologies in rainfed paddy cultivation.
- Crop simulation and modeling for rainfed rice cultivation.

### Seed Production

- Production of breeder seeds of recommended rice varieties.
- Production of basic seeds of export quality rice variety Bg 1165-6).
- Production of commercial seeds of popular rice varieties.

### Special Projects

Following small scale research and development projects funded by international agencies and NARP will be implemented.

- Multi-environment testing.
- Optimizing technology package for dry seeded rice cultivation.
- Development of rice production technologies for increasing self sufficiency staple food in Sri Lanka.
- Green super rice.
- Closing rice yield gap in Asia.
- Increasing productivity of direct seeded rice areas by incorporating genes for tolerance of anaerobic conditions during germination.
- Productivity enhancement of Low Country Wet Zone paddies.
- Development of rice varieties for abiotic stress; submergence, salinity, drought escape / tolerance and iron toxicity.
- Weedy rice management in wet seeded rice in Sri Lanka.
- Assessment of water availability in rainfed paddy fields in Kurunegala district for optimum utilization of water in rice production.

### Technology Dissemination

- Trainings on rice breeding, rice varieties, seed paddy production for field officers of DoA, university students, students of agriculture schools, farmers and school children.

## RICE RESEARCH STATION – AMBALANTHOTA

The prime objective of the Rice Research Station, Ambalanthota is the development of improved red-pericarped, salinity tolerant, short-maturity, high yielding rice varieties with

improved grain quality attributes. In addition production of breeder seeds of recommended “At” varieties is also a mandate of the station.

## PROGRESS

### RESEARCH

#### Rice varietal improvement

##### New rice varieties

**At 309** - 3 month white pericarp aromatic variety with long slender grain type was released for general cultivation. Variety is suitable for biscuit and rice based products. Variety has 7.1 t/ha yield potential, resistant to lodging and moderately resistant to major pest and diseases.

**At 06-631**- 3<sup>1/2</sup> month white, small, samba grain type variety with good cooking quality and appearance. The line has been presented to Seed Certification Service for DUS clearance.

**At 676** - 3 month white, nadu grain type variety with high yield, resistant to major pests and diseases. The line has been presented to Seed Certification Service for DUS clearance.

##### 3 month age class

Forty eight new crosses were made. Thirty one early segregating generations were selected and maintained separately. Twenty nine advance progeny lines were selected for Preliminary Yield Testing. Four advance breeding lines were selected to Major Yield Trial. At 08-1283, At 10-1350, At 09-1024 and At 09-898 were identified as promising lines and nominated to evaluate in NCRVT.

### **3 ½ month age class**

Eighty crosses were made. Thirteen promising lines were selected to test yield potential in preliminary yield trials (PYT) and 12 lines were selected from preliminary yield trials to further evaluate in major yield trials (MYT).

## **Agronomy**

### **Time of establishment of Mawee**

Best time period for establishing improved Mawee (photoperiod sensitive long age) cultivation was investigated. It was found that August to end of September as suitable for Mawee varieties Bg 38 and Bg 745.

### **Response of At 05-1382 to nitrogen fertilizers**

Nitrogen response of newly developed line At 05-1382 indicated that there is no significant yield difference with the check variety At 306 up to 150 kg/ha nitrogen.

### **National Coordinated Rice Variety Testing (NCRVT)**

Three trials were conducted. Fifteen new rice lines were tested with standard check varieties. Bg 08-1258 (3½ months white nadu type line), At 08-1024 (3½ months white nadu line), Bg 08-1407 (3½ months white samba line) and Bg 08-1909 (4 months white nadu line) were found promising.

### **Variety Adaptability Testing Trials (VATT)**

Sixteen trials for testing adaptability of 8 new elite lines namely At 09-861, At 08-593, Ld 8-6-7, At 08-1078, Bg 08-2398, At 08-617, Bg 05-110 and Bg 11-139 were conducted in Matara and Hambantota districts. Among the lines tested, At 7-800 (3 months line), Bg 07-997 (4½ months line) and Bg 07-1350 (4½

months line) gave higher yields and found to be more adaptable than that of the standard check varieties.

## **Grain quality and post harvest aspects**

Sprouted rice based instant soup mix was experimented with 2 red rice varieties. Two soup mixtures were identified as acceptable from each variety and they contain considerable amount of protein, fat, fiber and ash. These products can be stored in aluminum foil or low density polyethylene pouches for 3 months safely.

Production of sprouted brown rice (SR) consumes lengthy time of 48hrs. Sprouting of rice to the optimum sprout length could be achieved in less than 12hrs by soaking the brown rice in plastic boxes.

The study conducted to determine the effect of LCC based N application on rice grain mass and quality attributes revealed that, LCC based N application could maintain the grain mass and grain quality of rice equal to that of the LCC based fertilizer recommendations.

## **TECHNOLOGY DISSEMINATION**

- Supervised two undergraduate students on their final year research project.
- Training of students of Agriculture Schools.
- Attending monthly crop clinics as resource persons arranged by the DOA extension staff.
- Dissemination of information for university students, technical staff of

DOA, school children, and farmers, who visit the institute.

## BREEDER SEED PRODUCTION

Following amounts of breeder seeds were produced.

**Table 1.4.4: Breeder seed production during 2013**

Variety	Breeder seed quantity (kg)		Total
	Maha	Yala	
	2011/12	2012	
<b><u>3 months</u></b>			
At 306	40	-	40
At 307	100	80	180
At 308	60	80	140
<b><u>3 ½ months</u></b>			
At 353	20	20	40
At 362	320	220	540

## TRAINING, CONFERENCES & WORKSHOPS ATTENDED

- 7<sup>th</sup> International Rice Genetics Symposium. 5-8 Nov. 2013, Manila, Philippines: IRRI.

## PLAN FOR 2014

- Hybridization and selection of lines of 3 and 3½ months age groups.
- Evaluation of elite rice lines of 3 and 3½ months age groups in Preliminary Yield Trials and Major Yield Trials.
- Multiplication of elite rice lines (advanced generations) of 3 and 3½ months age groups.
- Production of breeder seeds of recommended rice varieties.
- Conducting trials of NCRVT and VAT.

## RICE RESEARCH STATION – SAMMANTHURAI

The main objective of the station is to identify knowledge gaps encountered with the rice cultivation in the Eastern Province, especially in the Ampara district and to introduce new rice technologies to increase productivity. The station also involve with producing basic seeds and conducting trials of NCRVT.

## PROGRESS

### RESEARCH

#### Varietal Improvement

#### National Coordinated Rice Variety Testing (NCRVT)

Fifteen new rice lines were tested with standard check varieties. Bg 08-1258, At 08-1024, Bg 08-1407 and Bg 08-1909 were found promising.

#### Variety Adaptability Testing Trials (VATT)

Eight new elite lines namely At 09-861, At 08-593, Ld 8-6-7, At 08-1078, Bg 08-2398, At 08-617, Bg 05-110 and Bg 11-139 were used for VATT. Among the lines tested, At 7-800 (3 months line), Bg 07-997 (4½ months line) and Bg 07-1350 (4½ months line) gave higher yields and found to be more adaptable than the standard check varieties.

#### BASIC SEED PRODUCTION

328 kg from Bg 357 and 307.5 kg from Bg 94-1 were produced and issued to Seed Farm, Malwaththa.

## TECHNOLOGY DISSEMINATION

- Conducted 13 farmer training programs for 1245 farmers.
- Distributed 2500 leaflets to farmers.
- Conducted 29 demonstrations in farmers fields on seedling broadcasting, machine transplanting and use of pre-emergent herbicides and row seeding.
- Participated in 3 radio programs:
  - Effective weed management in Ampara district.
  - How to overcome the paddy post harvesting losses.
  - Compost production and usage.

## PLAN FOR 2014

- Selection of bulk populations to identify promising lines
- Conducting trials of NCRVT and VAT
- Production of basic seeds

## RICE RESEARCH STATION - PARANTHAN

The mandate of the station is to cater the research needs of the rice cultivation in the Northern region especially in the Kilinochchi district and to introduce new rice technologies to increase productivity. The station also has other responsibilities such as conducting National Coordinated Trials and finding solution to field problems of rice farmers in the region.

## PROGRESS

### RESEARCH

#### Varietal Improvement

##### National Coordinated Rice Variety Testing (NCRVT)

Fifteen new rice lines were tested with standard check varieties. Bg 08-1399, Bw 03-1198, and Bg 08-1909 were found promising.

#### Weed Science

##### Effect of different herbicides on *Cyperus iria* in Northern region

*Cyperus iria* is a difficult weed to control at Mallavi farmer fields. It was found that Thiobencarb 40% + Propanil 20% was the most effective herbicide formulation to control *Cyperus iria* among 7 herbicides tested.

##### Re-evaluation of common herbicides used in paddy cultivation

Fifteen herbicides were tested. Pyrazosulfuron-ethyl (SIRIUS) performed well to control the sedges; Gulliver and Profit performed well controlling the broad leaves and pyroxasulfone performed well controlling grasses. Applications of Pyroxasulfone, Oxadizon + Propanil, Oxyfluorfen significantly reduced the yield loss in paddy.

### BASIC SEED PRODUCTION

Produced 6150 kg of Bg 300.

## TRAINING, CONFERENCES & WORKSHOPS ATTENDED

- Inception and planning workshop of Closing Rice Yield Gap in Asia project. 12-13 March 2013, IRRI, Philippines.

### PLAN FOR 2014

- Collection and purification of deteriorated cultivars & local land races of rice in northern region.
- Pure line Selection from deteriorated cultivars & local land races of rice in northern region.
- Coordinated variety testing and adaptability testing trials.

### STAFF LIST

#### RRDI, Batalagoda

Designation	No.
Director	01
Additional Director	01
Deputy Director	01
Research Officer	20
Agricultural Economist	01
Assistant Director of Agriculture	01
Agriculture Officer	03
Agricultural Monitoring Officer	01
Programme Assistant	07
Agricultural Instructor	16
Research Assistant	16
Research Sub Assistant	05
Administrative Officer	01
State Management Assistant	13
Development Officer	07
Office Assistant	01
Tractor Operator	02
Farm Clerk	01
Technician	01

Designation	No.
Mechanic	01
Carpenter	01
Driver	09
Lorry Cleaner	01
Circuit Bungalow Keeper	02
Cook	01
Watcher	11
Permanent Labourer	44
Contract Labourer	98
<b>Total</b>	<b>267</b>

#### RRS, Ambalanthota

Designation	No.
Research Officer in Charge	01
Research Officer	04
Agricultural Instructor	02
Research Assistant	04
Research Sub Assistant	02
Development Officer	02
State Management Assistant	01
Driver	02
Watcher	03
Tractor Operator	01
Permanent Labourer	14
Contract Labourer	20
<b>Total</b>	<b>56</b>

#### RRS, Sammanthurai

Designation	No.
Research Officer in Charge	01
Agricultural Officer	01
Agricultural Instructor	01
Research Assistant	01
Development Officer	04
Technical Assistant	02
State Management Assistant	02
KKS	01

<b>Designation</b>	<b>No.</b>
Driver	01
Tractor Operator	01
Watcher	04
Permanent Labourer	02
Contract Labourer	07
<b>Total</b>	<b>28</b>

### **RRS, Paranthan**

<b>Designation</b>	<b>No.</b>
Research Officer in Charge	01
Research Assistant	01
Research Sub Assistant	01
Tractor Operator	01
Watcher	01
Permanent Labourer	01
Contract Labourer	06
<b>Total</b>	<b>12</b>

## 1.4.1 REGIONAL RICE RESEARCH AND DEVELOPMENT CENTRE (RRRDC) – BOMBUWELA

The Regional Rice Research and Development Centre (RRRDC), Bombuwela and its satellite research stations at Labuduwa and Bentota are located in the Low Country Wet Zone (LCWZ). The RRRDC Bombuwela has the mandate to develop high yielding red and white pericarped rice varieties tolerant to iron toxicity, whereas

ARS, Labuduwa is focused to develop mainly red pericarped small rounded rice varieties. The ARS, Bentota focused its programme to develop rice varieties and related technologies for the flood prone and saline affected areas in the region.

### BUDGET

**Table1.4.1.1: Annual budget - 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	4,574,800	4,574,800	100
Recurrent	9,535,000	8,043,627	93
Projects			
1. Adaptability testing of efficient fertilizer using technology in farmer fields	255,000	254,674	99
2. Development of rice varieties for submergence tolerance and iron toxicity tolerance	533,850	273,130	51
3. Rice productivity improvement in LCWZ	2,500,000	2,499,963	99
4. Evaluation of different types of liquid fertilizers on rice cultivation	212,000	150,000	71
<b>Total</b>	<b>17,610,650</b>	<b>15,796,194</b>	<b>90</b>

### PROGRESS

#### RESEARCH

##### Varietal Improvement

###### Newly Recommended Rice Varieties

A red intermediate bold rice variety of 3 ½ months age group named as BW 372 was released for cultivation in the wet zone. Average yield of BW 372 was estimated as 7.68 t/ha.

A new promising line, Bw 11-722 was nominated to the NCRVT programme. This is a 3 ½ month age group rice line with white short round grain type.

Line Bw 03-1198, 3 ½ months age group intermediate bold white grain type was nominated for NCRVT programme.

Three lines from 4-4 ½ months maturity group were selected for Major Yield Trial (MYT).

Eighteen lines were selected from 3 ½ months maturity group for Preliminary Yield Trial (PYT) and MYT.

Three lines and 5 lines were selected respectively from 3 months and 85 day maturity groups for MYTs.

### **Disease Management**

A total of 90 rice lines developed by the rice improvement programmes at Bombuwela, Ambalantota and Labuduwa were screened for rice blast and 45 lines were identified as resistant.

Seventy rice lines received from IRRI under the INGER programme were screened and 42 lines were identified as resistant to blast.

### **Pest Management**

Total of 58 NCRVT entries were screened under green house conditions for Brown Plant Hopper (BPH) *Nilaparvata lugens* and 15 entries were identified as moderately resistant while 4 entries as resistant/moderately resistant to BPH.

Another 114 breeding lines from Bombuwela and 54 from INGER programme were screened for BPH under green house conditions in 2013 Yala. Five resistant lines, 14 resistant/moderately resistant and 48 moderately resistant lines were identified.

Screening for Gall Midge (GM) *Orceolia oryzae* at Bombuwela was not successful due to very low infestation levels prevailed in 2012/13 Maha. However, 2013 Yala results showed 3 resistant entries and 18 moderately resistant entries to GM.

### **Agronomy**

Study on zero tillage practices for rice cultivation in boggy and half boggy soils confirmed that, zero tillage practices can be used successfully to re-cultivate of neglected boggy paddy fields in the Low Country Wet Zone. It's drastically reduced the labor cost for land preparation.

Effect of commercially prepared liquid bio-fertilizers on rice grown in LCWZ was studied. Results revealed that tested bio-fertilizers were not effective in yield formation of rice compared to the DOA fertilizer recommendations.

The NCRVT and Variety Adaptability Testing Trial (VATT) programmes were continued for the Wet Zone areas and a total of 24 promising lines were evaluated under NCRVT programme. Under VATT programme, 3 ½ months, short rounded 1 line, 3 ½ months long slender 2 lines and 3 months 2 lines and salinity tolerance 2 lines were evaluated in Kalutara, Colombo, Gampaha and Ratnapura districts.

### **Weed Management**

Recommended herbicides were re-evaluated. Thiobencarb 400g/l, Propanil 200g/l EC were still effective in controlling all weeds and Cyclosulfamuron 10% WP and Bensulfuron – methyl 8.25% + Metsulfuron methyl 1.75% effectively controlled sedges and broad leaves. Fenoxaprop –p-ethyl + Ethoxysulfuron 69+20g/l OD effectively controlled all weeds.

### **Soil Fertility Management**

Different combinations of Eppawala Rock phosphate (ERP) and *Gliricidia* were tested to increase solubility of P in rice lands in LCWZ. Results showed that ERP can be used as P fertilizer for rice cultivation together with

Gliricidia. Further experimentation is however necessary to confirm the results.

Soil testing programme at RRRDC Bombuwela was conducted with the objective of reducing over fertilization. Total of 561 soil samples were analyzed and out of them 527 soil samples originated from the research centers and 34 were received from farmers.

### Technology Dissemination

- Six radio programs were conducted on land preparation and fertilizer application in paddy fields.
- A total of 188 stakeholders and three students at tertiary level were trained on various aspects of paddy cultivation.

- 21 presentations were made by the staff on different subject areas under Monthly Seminar Programme of the Centre.

### Trainings

- Mrs. GDSN Chandrasena participated AFACI project meeting on “Construction of Epidemiology Information Interchange System for Migratory Disease and Insect Pests in Asia Region (IPM) in Vientiane, Lao PDR from 28<sup>th</sup> October – 01<sup>st</sup> November 2013.

### Breeder Seed Production

Quantities of breeder seeds produced during 2013 are given in Table 1.4.1.2.

**Table 1.4.1.2: Amount of breeder seeds produced in 2013**

Variety	Quantity produced (kg)					
	Routine programme			Rice productivity improvement project		
	Maha 2012/13	Yala 2013	Total	Maha 2012/13	Yala 2013	Total
<b><u>3.5 months</u></b>						
Bw 364	41.0	41.0	82.0	450.0	366.0	816.0
Bw 361	20.5	20.5	41.0	389.5	611.0	1000.5
Bw 367	61.5	82.0	143.5	703.0	321.0	1024.0
Bw 363	20.5	20.5	41.0	195.0	290.0	485.0
Bw 267/3	20.5	10.0	30.5	297.0	291.0	588.0
<b><u>3 months</u></b>						
Bw272-6b	20.5	20.5	41.0	307.0	210.0	517.0
<b>Total</b>	<b>184.5</b>	<b>194.5</b>	<b>379.0</b>	<b>2341.5</b>	<b>2089.0</b>	<b>4430.5</b>

### Details of Special Projects – Local

#### **NARP project on Development of rice varieties tolerant to submergence and iron toxicity**

29 rice breeding lines tolerant to iron toxicity were produced through back cross breeding

followed by evaluation of artificial and field screening.

191 submergence tolerant rice breeding lines were produced through back cross breeding program followed by artificial screening of submergence tolerance.

### **NARP project on Adaptability testing of fertilizer use efficient technology under farmer field**

New fertilizer recommendation was tested at four farmer location under farmer management conditions, for three different soil types. It was also tested under research condition at RRRDC, Bombuwela.

### **Rice productivity improvement for LCWZ**

Under this project seed paddy of six Bw varieties were produced. Total of 4430.5 kg of seeds (foundation, registered, certified and commercial seeds) were produced to meet the seed paddy requirement. Seeds were handed over to government seed farms and other stakeholders in the LCWZ for multiplication. Quantities of breeder seeds produced under this project are given in Table 1.4.1.2.

## **RICE RESEARCH STATION – LABUDUWA**

Rice Research Station, Labuduwa is responsible for developing red-pericarped rice varieties and relevant technologies to improve the rice productivity in high potential mineral soil, in the Low Country Wet Zone of Sri Lanka.

### **Varietal Improvement Programme**

#### **Newly Recommended Rice Varieties**

**Ld 371**, a 3.5 months white Samba variety released for the general cultivation. Yield potential of the variety is 3-4 t/ha in the Low Country Wet Zone and 5-7 t/ha in Low Country Dry and Intermediate zones. This variety is tolerant to Neck Blast and Seed discolouration and shows moderate resistance to Blast, Gall Midge and BPH.

### **Breeding programme**

Ld 8-15-15, 2 ½ months red pericarped samba line was tested in NCVRT programme. White pericarped 2 ½ months rice line (Ld 8-15-30) was tested in the VAT programme and 3 ½ months red pericarped samba line (Ld 8-6-7) was tested in LSVAT. 15 successful crosses were made. Two hundred and thirty six advanced breeding lines were maintained and evaluated.

### **Plant Protection**

Six rice lines received from IRRI were selected as resistant/ moderately resistant to Bacterial Blight. Field experiments were completed to develop a major pest forecasting model for low country wet zone. Study is in progress.

Five recommended herbicides were re-evaluated and effective herbicides for controlling broad leaves & sedges in rice fields of low country wet zone were identified.

### **Agronomy**

The yellowing and brown spot occurrence occurred in wet zone during Maha season can be decreased with good management of major nutrients. New method of seedling raising on polythene layer was comparable with seedlings raised in parachute trays. Study further revealed that Banana leaves and Partially Burnt Rice Husk Charcoal could also be used as alternative bedding materials.

## Breeder Seed Production Programme

**Table 1.4.1.3: Amount of breeder seeds produced in year 2013**

Variety	Breeder seed quantity (kg)		
	Maha 2012/13	Yala 2013	Total
<b>3.5 months</b>			
Ld 368	82.0	82.0	164.0
Ld 365	41.0	41.0	82.0
<b>4 months</b>			
Ld 408	41.0	41.0	82.0
<b>Total</b>	<b>164.0</b>	<b>164.0</b>	<b>328.0</b>

## RICE RESEARCH STATION – BENTOTA

The major emphasis of the Rice Research Station (RRS), Bentota is to develop rice varieties for the flood prone and saline lands.

### Varietal Improvement Programme

Bg 96-741 was multiplied to distribute the seeds among the farmers in flood prone areas.

Hundred and thirty rice progenies were screened for submergence tolerance. No progeny was found to be tolerant.

Thirty two INGER samples were field screening for inland salinity.

### Agronomy

The trial conducted to find the best method of crop establishment in rice cultivation under submerged condition revealed that sprouted (pre germinated) seeds can be sown to the submerged fields successfully.

Bg 96-741 performed better than the tested exotic varieties under submerged condition.

An observational trial was conducted to identify the traditional rice varieties suitable for saline soil in the flood prone area of LCWZ. The trial is being continued.

National Coordinating Rice Varietal Trial (NCRVT) programme was continued with 2 ½, 3 and 3 ½ month maturity classes.

### Soil Fertility Management

In 2013 Yala a trial was carried out to measure the uptake of soil nutrient in bog soil under zero tillage condition by the rice plant. It seems that the zero tillage practice is favorable for bog soil types and results have to be confirmed further.

### Entomology

A collaborative trial was conducted to develop a forecasting system for rice sheath mite for LCWZ will be continued.

## PLAN FOR 2014

### Research

- Varietal improvement with special reference to submergence tolerance and iron toxicity.
- Varietal screening for leaf blast.
- Evaluation of different pesticides for their efficacy against major rice.
- Development of rice sheath mite incidence forecasting system for LCWZ.
- Determination of the influence of crop phenology on reproductive maturity of Paddy Bug (*Leptocorisa oratorius*).
- NCRVT and VATT programmes will be continued as routine programme.
- Identification of suitable BW varieties for boggy soils, under zero tillage condition will be studied. Identification of suitable

harvesting indices for high shattering BW varieties.

- Evaluation of herbicides for rice weed management.
- Evaluation of cultural methods for rice weed management.
- Development of appropriate fertilizer management technologies for LCWZ.
- Breeder seed production.

## STAFF LIST

### RRRDC, Bombuwala

Designation	No.
Deputy Director (Research)	01
Research Officer	07
Farm Manager (Acting)	01
Agriculture Monitoring Officer	02
Programme Assistant	06
Development Assistant	01
Development Officer	01
Research Assistant	12
Agricultural Instructor	07
Administrative Officer	01
State Management Assistant	06
Store Keeper	01
Driver	03
Watcher	04
Circuit Bungalow Keeper	01
Labourer	17
Sanitary Labourer	01
Labourer (Contract)	31
Labourer (Projects)	09
<b>Total</b>	<b>111</b>

### RRS, Labuduwa

Designation	No.
Research Officer In-charge	01
Research Officer	02
Agricultural Instructor	04
Research Assistant	05
Programme Assistant	01
Development Officers	02
State Management Assistant	02
Driver	02
Watcher	04
Tractor Operator	01
Labourer	10
Labourer (Contract)	09
<b>Total</b>	<b>43</b>

### RRS, Bentota

Designation	No.
Research Officer In- Charge	01
Agricultural Instructor	03
Watcher	01
Store Keeper	01
Labourer	08
Labourer (Contract)	06
Labourer (Projects)	02
<b>Total</b>	<b>22</b>

## 1.5 NATURAL RESOURCES MANAGEMENT CENTER (NRMC) – PERADENIYA

The Natural Resources Management Center (NRMC) strives to optimize use of land and water resources to improve national productivity in a sustainable manner. Major thematic areas of research are soil conservation and watershed management, land suitability evaluation, crop monitoring and forecasting, agro-meteorology and climate change, productivity enhancement, soil and water quality and on-farm irrigation management.

Other responsibilities of the centre are maintenance of the agro-meteorological observation network of the country, implementation of the Soil Conservation Act, technology dissemination, provision of technical assistance to clients on related subjects and environmental impact assessment of various development projects.

### BUDGET

**Table 1.5.1: Annual budget – 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	6,430,000	3,323,579	52
Recurrent	3,349,970	3,157,913	94
<b>Projects</b>			
Implementation of Soil Conservation Act	14,000,000	7,017,791	50
NARP	2,800,000	1,621,291	58
CCAFS	3,620,000	2,481,291	69
AFACI – ALMSF 1-7	564,150	463,572	82
AFACI – AMIS - 8	600,975	402,769	67
Enhancing productivity of paddy lands in Low Country Wet Zone	150,000	103,325	69
Regional scale crop suitability assessment & mapping, Uva Province	1,183,861	1,181,550	99
<b>Total</b>	<b>32,698,956</b>	<b>19,753,081</b>	<b>60</b>

### PROGRESS

#### RESEARCH

#### Regional Scale Crop Suitability Assessment and Mapping, Uva Province

Regional scale study was conducted with the aim of developing suitable land use, crop

recommendation and water resources management approaches for the Uva Province and to implement those in regional and local level ensuring long term sustainability. Geo-spatial input data representing rainfall, soils, land slopes and land use were used to model the soil erosion hazard map, which was assessed using Arc Map GIS software. In addition, field data were collected through field surveys, along

with field observations. Based on information, crop suitability for different areas and cropping systems were identified for each Agrarian Service Divisions (ASD) in order to minimize the soil erosion hazard and to enhance the crop productivity.

The study revealed that 16% (1389 Sq km) of the land area lying in Uva Province is extremely vulnerable for soil erosion and the majority (nearly 879 Sq km or 63%) of such lands are situated in Badulla District. The soil erosion hazard map and the report prepared for the province were handed over to relevant policy makers, programme implementing agencies to be utilized to identify suitable areas for growing perennials, annuals and to come up with a regional land use recommendation maps to minimize soil erosion risk of the area.

### **Occurrence of extreme climatic events in Sri Lanka**

Being an island with a tropical monsoonal climate, Sri Lanka exemplifies a variety of climatic conditions along with some extreme climatic events mainly attributing to variations of the rainfall and temperature regimes in different localities of the island. A study was focused only to ascertain any possible trends in rainfall and temperature in those regimes. Daily rainfall and temperature data from 1960-2007 from 14 meteorological stations was analyzed using *RClimDex* software developed by the Climate Research Branch, Meteorological Service of Canada. Trend analysis of temperature reveals that both daytime maximum and night time minimum temperature are significantly increasing at a rate of 0.01 to 0.03<sup>0</sup>C per year with few exceptions. Results have clearly shown that both number of days with Cold Daytimes and Cold Nighttimes are

significantly decreasing at most places of the country. Meanwhile, a significantly increasing trend has been observed with number of days with warm daytimes and warm night times. All these clearly signal a warming trend of the temperature regime in Sri Lanka. Nevertheless, indices used for identification of trends in extreme rainfall events did not show any significant trend in variation of rainfall.

### **Future climate of Sri Lanka: an approach through dynamic downscaling of ECHM4 General Circulation Model (GCM)**

The climatic information generated by the ECHAM General Circulation Model (GCM) under A2 and B2 scenarios of the IPCC was used as the input to the PRECISE Regional Climate Model (RCM) to downscale the output at approximately 50 km resolution covering Sri Lanka. The simulations were performed for the base line period of 1961–1990 and three future periods of 2010–2039 (2020s), 2040-2069 (2050s) and 2070–2099 (2080s). The projected changes in mean annual temperature and rainfall have been calculated for all the three future time slices with respect to the base line climate.

This study reveals that average annual temperature of Sri Lanka will increase by 2.5 – 4.5 <sup>0</sup>C range by the year 2080 under the A2 scenario and a possible average annual temperature increase of 2.5 – 3.25 <sup>0</sup>C under the B2 scenario. Both these projections are analogous with the IPCC global projections of temperature changes at the turn of the century. In terms of future rainfall climatology of Sri Lanka, projections with A2 scenario reveal that Dry zone will become drier while Wet zone and

Intermediate zones become wetter as we reach the end of century. Meanwhile, B2 scenario uncover a complex situation of both Dry zone and Central highlands of Sri Lanka to become drier as time progresses while the wetter parts of Sri Lanka to become wetter at a lesser rate compared to the A2 scenario.

### **Do trends in extreme positive rainfall anomalies in the Central Highlands of Sri Lanka exist?**

This study revealed the results of an analysis of trends in extreme positive rainfall anomalies in the Central Highlands of Sri Lanka. Daily rainfall data recorded at eight rain gauges scattered in four districts of the Central Highlands from 1961-2010 were used in the study. The 95<sup>th</sup> and 99<sup>th</sup> percentile values of daily rainfall time series of each station from 1961-1990 were used as the threshold value to determine the Heavy and Very Heavy rainfall events, respectively. This analysis showed that a significant change of Heavy and Very heavy rainfall events is not discernible in the Central Highlands during the last two decades of 1991-2010. Nevertheless, an apparent increasing trend of such events has been signalled during the most recent pentad of 2006-2010, especially with First Inter Monsoon (FIM) rains. However, in the absence of clear trend of increasing extreme positive rainfall anomalies in the Central Highlands, it is unwise to conclude that land degradation in the Central Highlands may not aggravate in the future due to many other reasons such as human activity, land use changes and change in land management practices.

### **Forecasting paddy extent and yield based on high resolution satellite imageries**

This National Agriculture Research Program (NARP) funded research project was initiated aiming at developing a real time national forecasting system for rice cultivation extent and production in Sri Lanka. High and moderate resolution satellite imageries were tested in Geographic Information System (GIS) to demarcate the paddy lands.

Preparation of digital maps of paddy cultivation lands and development of rapid assessment approach for identification and demarcation of rice cultivated lands in each season, approach for quantification of yield levels in rice cultivated land and production of regional maps showing forecasted yield levels are the main objectives of this study. Paddy land maps has been updated in Ampara and Polonnaruwa districts using on-screen digitizing with high resolution satellite images. Updating paddy land maps of Hambanthota, Anuradhapura, Kurunegala and Batticaloa are in progress. The research is continuing and further evaluation and field verification are in progress.

### **Development, evaluation and application of a toolkit for regional crop yield forecasting and climate change impact assessment for Sri Lanka**

This project is funded by CGIAR Climate Change Agriculture and Food Security (CCAFS) Program - South Asia through IWMI. The main objectives of this project is to monitor and forecast the crop condition with natural and

changed climatic conditions. CRAFT is a toolkit which capable of monitoring and forecasting crop conditions at sub-pixel level at both normal and changed climate conditions.

Most of the soil and plant data were collected and organized into user friendly formats. Climatic data for pilot study districts (Ampara and Polonnaruwa) has been compiled as daily basis for last 10 years. Gathered planting dates for major rice growing Divisional Secretariat of Ampara and Polonnaruwa districts. Reformatting of collected data for CRAFT compatible format has been started. Shape file format maps has been developed for Administrative boundaries at three different levels; 9 Province, 25 Districts, 323 Divisional Secretariats. Installing the CRAFT toolkit software (Draft version) could not be completed. A newer version of the CRAFT software has been released and the initial works for installing the software and data pre-processing has been commenced.

### **Land degradation assessment (LADA) for sustainable land management**

Regional project on “Land Degradation Assessment and Monitoring for Sustainable Land Management and Climate Change Adaptation in South Asia” was initiated in 2012 to develop tools and methods to assess and quantify the nature, extent, severity and impacts of land degradation on dryland ecosystems, watersheds and river basins. The project is funded by FAO and consisted with technical groups of the four project countries namely, Bangladesh, Bhutan, Nepal and Sri Lanka.

Standard LADA methodology and land use system (LUS) based mapping approach and specially designed software "LADA-QM" were successfully tested for wide scale and local level focused streams. National Land Degradation expert groups were formed covering all relevant disciplines. The expert groups were trained on the use of "LADA/WOCAT questionnaire survey manual" following LADA guidelines.

National database on land uses contain 35 land use categories (Department of Surveys). However, for the LADA assessment purpose, some of those land lines were merged based on their management practices and identified 18 landuse systems. Based on this LUS map for whole Sri Lanka was developed using the 18 mapping units and these maps were used as base maps.

### **Development of information System on Crop Water Requirements and Water Use Efficiencies of different crops**

Developing data base on crop water requirement and evaluating their productivity in terms of water use is a prerequisite for selection of crops for irrigation systems in different agro ecological regions and effective irrigation planning of limited water resources. Crop water requirements and water use efficiencies for cultivation of paddy, field crops, vegetable crops and fruit crops were evaluated. In addition, a database on crop water requirements and water use efficiencies for different crop group was developed.

The analysis of water requirements of paddy shows that irrespective of different age groups,

cultivation during Yala season shows higher evapotranspiration and percolation losses in different land classes. The average evapotranspiration loss during Yala is much as 30- 40% higher compared to Maha season. Analysis of crop water use efficiencies (WUE) shows that there is an increase in WUE of 2.5 to 3.5 month varieties. However, paddy varieties of more than 3.5 months age shows a declining trend of WUEs in different land classes. Among the improved paddy varieties 3.0 months cultivars grown in poorly drained soils in dry and intermediate zones under irrigated condition showed the highest Crop WUE values of 2.06kg m<sup>-3</sup>ha and 1.48kgm<sup>-3</sup>ha during Maha and Yala.

The analysis of average yields in different age groups shows an increasing yield trend up to 4.0 months. This is almost 40 % yield increase with compared to 2.5 month variety. Paddy varieties grown for more than 4.0 months show a declining trend of average yields. The average yield reduction of 5.0 – 6.0 month varieties compared to 4.0 month varieties is about 30 -40%.

### **Development of land specific fertilizer recommendations for rice in the Low Country Wet Zone**

The aim of this research is to characterize chemical features of soils in different land type and to develop fertilizer recommendations taking chemical characteristics into consideration. A soil survey was conducted in Gampaha, Colombo and Kegalle districts based on base maps and land classes including a soil sample collection from different land types. This project was initiated in 2012 and will be

continued in 2014. Results showed that soil organic matter content ranged from 5 to 11.1%, Exchangeable potassium level was in the insufficient range in first order valleys showing the need of more fertilizer potassium for this land type. Soils in filled lagoon were affected by salt as mean electrical conductivity was 0.9 dS/m. The study showed that land type based crop recommendations and management practices are better suited for Wet Zone compared to the Yaya approach in the Dry Zone.

### **Assessing soil erosion status in major agricultural lands uses in the central highlands of Sri Lanka using isotope techniques**

The objective of this research is to assess degree of soil erosion in major agricultural land uses in central highlands and to provide conservation guidelines at land use level. For this purpose, soil erosion assessment was conducted in selected two locations, Dolosbage and Heelpankandura. This experiment was initiated in 2012 and will be continued till 2015. Results of this study showed that average soil erosion rate during past 100 years in mid country tea growing soils ranges from 1.12 to 29.29 t/ha/year. It shows location specific soil erosion and the need of taking appropriate measures to combat erosion taking site characteristics into consideration.

### **Monitoring water quality of major streams in central highlands in Sri Lanka**

Most of the rivers in the country originate in central highland (CH) and the quality of water

in these rivers are related to land uses upstream. The objective of this research is to assess the effects of different land uses in central highlands in relation to water pollution in streams originate from CH. For this purpose, water quality survey was conducted. This research was initiated in 2012 and will be continued in 2014. Among the 40 streams studied, the highest recorded turbidity (99.99 NTU) was reported from Uma Oya. The highest recorded electrical conductivity (0.390 dS/m) was reported from Kiullinda Oya. The Ca/Na ratio was highest (1.30) in Thalathu Oya and K/Na ratio was highest (0.61) in Uma Oya. Generally streams in the Western aspect of central highlands such as Kelani, Kalu and Walawe rivers yield better quality water. In contrast, streams in the Eastern aspect of central highlands such as Marassana Oya, Kivulinda stream, Uma Oya have relatively poor quality water.

### **Development of land management guidelines for agro-well based farms**

Agro-well based small holder farms developed on rain-fed uplands do not fully adopt land management technologies. Hence, aim of this study is to develop land management technologies for increasing irrigation efficiency and soil fertility. A baseline study was conducted in 2013 and results showed that organic manure use in this farming system has been not at satisfactory level. Hence organic manure application should be encouraged under agro wells based farming in this area. Further, farmers do not follow scientific guidelines in selection of water lifting devices. Hence a methodology should be developed for selection and introduction of a suitable water lifting devices.

### **Development of multifunctional soil conservation bunds for rain-fed uplands in the Dry Zone**

There is a significant change in rainfed farming in the country specially with popularization of cash crops such as chilli and maize. Use of farm machinery in rain-fed upland farming become more popular and farmers do not adopt soil conservation measures, particularly recommended closely accommodated contour soil conservation structures due to practical difficulties. On the other hand they do not like to leave earth bunds due to various reasons. A study was carried out to study the effect of permanent soil bund system which is taller than recommended soil bunds, having a permanent tree component with wider spacing. Also this wider bunds act as a economical viable structure. Hence suitable crops with economical value were cultivated on the bands. Treatments were soil bund with Kathurumurunga, Mitimurunga, Cinnamon, Pomegranate, Thibbatu and Sera. Results showed that Kathurumurunga, Mitimurunga and Thibbotu performed better with respect to tree growth and crop yields. This research suggested using above crops for developing multifunctional soil conservation bunds in farmers fields in a pilot scale.

### **Present status and factors affecting soil salinity in Minor Tank Systems of The Dry Zone**

Soil salinity is one of the major environmental problems in command areas of minor irrigation systems in North-Western Dry Zone of Sri Lank. High soil salinity negatively affects the paddy yield and deteriorates the socio-economic condition of the farming community

under minor irrigation systems. This study was conducted in Siyabalagama Wewa in Thabuththa Agrarian Service area of Kurunegala District to find the spatial distribution of soil salinity in the command at root-zone depth. Electric Conductivity was measured *in-situ* using EM-38 which is used for survey and mapping of salt affected rice soils. Electrical conductivity was measured in 12.5 m x 12.5 m grids in two different depths of 0-37.5 cm and 0-75 cm, respectively. Farmers who cultivate paddy under irrigation system were interviewed to collect historical, socio economic and yield data.

It was found that the Soil EC values in the command area ranges from 1.00 to 5.46 ds/m. Relatively high salinity levels were found in the middle part of the command area while salinity in head end and tail end of the command area was relatively low. However, only about 6% of the land was identified as salt affected. EC of the soils in rest of the area was less than 2 ds/m which is a tolerable for paddy. The drainage system of this scheme was very poor and the drainage water has been reused for irrigation paddy lands at the tail end. Although, farmers complain their crop yields are low, it cannot be attributed to soil salinity, but other factors may have affected the crop yields. Such as low soil fertility and inadequacy of irrigation water.

### **Study quality of shallow ground water in Vavuniya District**

This study was designed to investigate the water quality in shallow groundwater, particularly salinity in Vavunia D S Division and as the first step quality of ground water was measured in Nelukkulama Grama Niladari Division in Vavuniya DS Division. Agro-wells are the most valuable resource for many

farmers in dry zone of Sri Lanka, because it has a good potential to stabilize and sustain crop yield. This study was conducted to evaluate the suitability of ground water for irrigation in Palamaikkul village of Vavuniya district. Total No of 71 wells were selected for the study and Electrical conductivity (EC) and pH were measured as main quality parameters in every well. Total Dissolved Solids (TDS), Alkalinity, Sodium ( $\text{Na}^+$ ), Magnesium ( $\text{Mg}^{+2}$ ), Calcium ( $\text{Ca}^{+2}$ ), Nitrate Nitrogen ( $\text{NO}_3^- \text{N}$ ), Potassium ( $\text{K}^+$ ) and Total Hardness were analyzed in specially selected 15 agro-wells. Forty one percent (41%) of agro-wells were in total depth of 4-6 m and 42% were in 6-8m. Others were in depth of more than 8m. Thirty one percent (31%) of wells had more than 2m water depth at the end of dry period (end of September) indicating high groundwater potential in the area. Results were compared with FAO standards for irrigation water quality and classified the agro-wells accordingly. Average pH values of the wells ranged from 7.1 to 9.15 and 75% of wells are suitable for irrigation. Eight percent of the wells showed EC below 0.7 dS/m and suitable for irrigation, 76% of the wells showed EC values between 0.7-3 dS/m and those were moderately suitable and 16% are not suitable for irrigation (EC ranged 0.4-6 dS/m). Only one well showed TDS below 450 mg/l and all the other wells are slight to moderate for irrigation due to TDS between 450- 2000 mg/l. 80% of wells showed Alkalinity between 160-500 mg/l hence, most of the wells were desirable and permissible level for irrigation. All the wells are suitable for irrigation according to ( $\text{NO}_3^- \text{N}$ ) and sodium and most of wells except one well had very hard irrigation water.

## TECHNOLOGY DISSEMINATION

### Training on soil and water conservation, Land development and related subject areas

- **Five - day programs**

- 39 officers of the demarcated soil conservation area were trained on soil conservation, land development and soil conservation Act.

- **Three - day programs**

- Seven programmes were conducted for officers of the Northern province, Rathnapura, Matale, Nuwara eliya, Kegalle, Badulla and Monaragale districts. Altogether 250 officers were trained on soil conservation and land development and soil conservation Act.

- **Two- day programs**

- One training programme on soil surveying, fertility management and farm planning was conducted for officers of SGS Lanka (Pvt) Ltd . Participation - 07.
- One programme on “Preparation of Soil and Water Conservation Plan” was conducted for students of National Vocational Training of the DTC Nawayalathanna. Participation - 24.

- **One day programs**

- One programme on Soil conservation and Soil Conservation Act awareness for the Governments agents and officers of District Secretaries at Kandy, Nuwara eliya, Badualla, Rathnapura and Kegalle. Participation - 65.
- Four awareness programmes on soil conservation and soil conservation Act

for officers of the Ceylon Tobacco Company PLC. Participation - 240

- Five programs on soil and water conservation for teachers and school students of Galaha Morahena Vidyalaya, Pilimalawa Maha Vidyalaya, Polgaswatta Maha Vidyalaya, Doluwa Maha Vidyalaya and Hemmathagama Nagaragiri Maha Vidyalaya. Participation - 253 students and 43 teachers
- Two programs on Soil and Water conservation for selected leading leaders at Upper Kotmale watershed area. Participation - 54
- One programme on soil and water conservation and farm plan designing for newly recruited Agricultural Instructors at District Training Center, Bibile. Participation - 34
- One program on “Soil and water conservation for medicinal plant cultivation” for Aurvedic doctors at Nuwaraeliya. Participation - 22

- **Demonstrations of Soil and water conservation**

Soil Conservation demonstration site at Gannoruwa.

- Total number of Farmer group visited – 145 (Farmers 5839, Officers 632, Children 461)
- Other groups visited - 922 (Adults 9370, Children 2777)
- School groups - 837 (Teachers 6428, Students 57749)
- Special groups - 582
- Foreigners (Adults 118, Children 07)

Soil Conservation demonstration site at Agricultural Research station, Sitaeliya

- Students and teachers visited - 1140
- Farmers visited - 125
- Officers visited - 67

## Workshops

- World water day workshop on the theme of “Water and water cooperation” at ISTI, Gannoruwa. Ninety (90) persons were participated including officers of DOA, Provincial Agricultural Departments and teachers of the central province
- Conducted two 5 day regional workshops under the FAO Project on "Land Degradation Assessment and Monitoring for Sustainable Land Management and Climate Change Adaptation in South Asia". Three participants each from Bhutan, Bangladesh, Nepal, and FAO regional Office in Bangkok, Chinese LADA Team and 28 participants from Sri Lanka participated these two programmes.
- Two 2-day National Workshops under the same project on LADA - QM software. Participants from DOA, Provincial DOA, Mahaweli Authority, Irrigation Department, Tea Research Institute, Ministry of Agriculture, Ministry of Environment and Tea Small Holding Development Authority participated the programme and 28 participants were trained on the LADA - QM software technique.

## Exhibitions

NRMC Officers were engaged in technology dissemination activities at the following exhibitions.

- National Farmer Week exhibition, Wariyapola.

- Technical exhibition, Tissapura Maha Vidyalaya.
- Technical and Trade Exhibition, Ravisanda Vidyalaya Mawanella.

## Printed materials

- Soil conservation awareness posters.  
Sinhala (10000 x10)  
Tamil (2500 x 7)
- Soil conservation Act awareness leaflets  
Sinhala (10000)  
Tamil (2500)

## Radio Programmes

Three Radio programs in National Broadcasting Service (Sarabumi), Kandurata Seveya and Wayamba Seveya on Soil erosion its affects on yield reduction. Topics covered were Soil erosion, Soil Conservation and Implementation of Soil Conservation Act.

## Technical Assistance

One of the main activities of the center is to provide technical assistance and expertise knowledge on different development activities. Following technical assistances were provided during the year, 2013.

- Provide guidance for 3 University students for their research.
- Preparation of Crop suitability map of Horana Agriculture Research Farm.
- Preparation of Soil conservation and storm water management plan for the Mahinda Rajapaksha International Sport Complex at Diyagama.
- Preparation of Basemap, Contour map, Soil conservation and Storm Water Management plan for field gene bank at

Field Crop Research and Development Institute, Mahailuppallama.

- Preparation of drainage layout plan for 10 hectares (Talagolla Division) at Ambepussa Farm.
- Preparation of base maps for establishing a minor tank at Ambepussa farm and technical guidance for construction.
- Preparation of interprovincial area maps for following in interprovincial areas.
  - Anuradhapura
  - Moneragala
  - Kandy
  - Polonnaruwa
- Preparation of contour map of Open Prison Camp, Balagolla, Pallekele.
- Preparation of Soil Conservation and storm water management plans for Central Environmental Authority
- Prepared contour, drainage and soil conservation plan of the proposed seed production area at Thelijjawilla research station.
- Land Suitability Survey was completed for Gonapola Farm of Zoological Department and the report was submitted.
- Preparation of map of Sri Lanka indicating the Main Agricultural Institute and Centers of the Department of Agriculture.
- Establishment of 100 demonstration sites in the soil conservation area (Kandy, Nuwaraeliya, Matale, Rathnapura and Badulle districts.)
- Preparation of soil and water conservation plan for conserving erodible portion of the agro technical park at Batata.
- Establishment of soil and water conservation demonstration site at Nugawela Central College.
- Establishment of Soil and water conservation site Kengalla Maha Vidyalaya, Kengalle.
- Establishment of soil and water conservation demonstration at Ravisada Vidyalaya, Mawanella.
- Demarcation and establishment of soil and water conservation measures at Lunugamvehera in Hambantota district.
- Land development of a research field at Agricultural Research Station, Thelijjawila.
- Field investigation conducted and report was submitted on feasibility of ground water extraction for irrigation at seed production farm at Rahangala.

### **Representation in Technical Committees**

- Prepared soil conservation and storm water management plans for Environmental Clearance for various National and Regional development Projects; ie. Land Blocking out & Hotel projects (40), Metal quarries (40), Mini Hydro power Projects (42) and Tree felling Project (100).
- Technical Evaluation of proposed “Uma Oya Multipurpose Development” project .
- Committee for Technical Evaluation of proposed Morana Reservoir project in Badulla district.
- Technical Evaluation of proposed Yan Oya Reservoir project
- Technical Evaluation of proposed Moragahakanda project
- Technical Evaluation of proposed Getambe mini hydro project
- Technical Evaluation of proposed Bibila sugar cultivation project
- Technical Evaluation of proposed Land use planning for LUPPD

## **Soil Conservation Act**

Activities under the Soil Conservation Act were accelerated within the year as response to the allocation of required funding. Activities were broadly categorized into two, namely Legal aspects & their improvements and Technology Transfer & awareness creation.

### **Legal aspects & their improvements**

The existing provisions of the Soil Conservation Act (1951) & Amended (1996 No 24) are not at all sufficient to address the present problems of soil erosion and land degradation in the country. Therefore, legal coverage which covers a broader spectrum of land degradation prevention process is a timely need. Therefore, the Centre has already submitted a new draft Act, namely “Soil Conservation and Land Degradation Prevention Act” to the cabinet and they have given their approval to proceed with the legal process of proposed act.

### **Technology Transfer and awareness creation**

Technology transfer and awareness creation on soil conservation related matters are basically implemented through the Provincial Department of Agriculture as it is a devolved subject under the present constitution. Therefore, the Centre paid its highest attention to formulate and / or update the implementation structure of the Provincial Department of Agriculture. Thus Provincial Departments of Central, Uva and Sabaragamuwa were supported by providing computers, GPS equipments, Road Traces and Dumpy Levels. While improving their working capacity by providing necessary equipments the Centre organized an intensive human resources development activities to enhance the

effectiveness of the activities. Under the program two Subject Matter Officer's (SMO) on soil and water management for each district were identified and given an intensive training on Soil Conservation both on legal and technical matters including practical sessions. In this regard 25 SMO's were trained. In addition all the AIs fallen within the conservation areas (300 No.) of the above provinces were trained on soil and water conservation and legal aspects on soil conservation Act.

- It has been decided to establish soil and water demonstration sites in farmers' fields in respective AI ranges to demonstrate suitable conservation techniques for farmers before implementing legal aspects of soil conservation act. These activities were conducted in collaboration with the Provincial Department of Agriculture in Central, Uva and Sabaragamuwa. 100 demonstration sites were established in selected farmers' fields within the Central Highlands in collaboration with the Central, Uva and Sabaragamuwa Provinces. In addition around 25 field days were conducted along with relevant stakeholder agencies and farmers within their respective surroundings.
- Four (04) hoardings were erected at Ulapane, Rossella, Dunhinda and Unuwinna to make the general public aware of the Soil Conservation Act.
- Maintenance of earlier established soil conservation act awareness board. (Six boards).
- Distributed (6ft x 3ft) Soil Conservation Act awareness boards in Sinhala and Tamil (40) for display at railway stations and at the AGs office premises.

## Agro-meteorological observation network

Agro meteorological observation network consisting of 28 agro-meteorological observation stations along with 70 rain gauging stations was maintained according to the WMO standards.

## Maintenance of database

The database on agro-climate, land and water resources was collected, computerized and maintained for providing information to various clients.

## PLAN FOR 2014

### Research

- Harnessing the potential of agro ecological diversity to increase the agricultural productivity.
- Development of land specific fertilizer recommendations for rice in the low country wet zone.
- Monitoring of water quality of major streams in central highland of Sri Lanka.
- Preparation of soil erosion/sedimentation database and digital maps in central highlands using environmental radionuclides.
- Development of land management guidelines for agro-well based farms.
- Forecasting paddy extent and yield based on satellite imageries in Ampara, Polonnaruwa, Hambantota and Kurunegala districts.
- Land Degradation Assessment (LADA) for Sustainable Land Management.
- Development, evaluation and application of a toolkit for regional crop yield forecasting and climate change impact assessment.

- Digital compilation of crop recommendations for Grama Niladhari Division in Sri Lanka.
- Development of multifunctional soil conservation bund systems for rainfed uplands in the Dry Zone.
- Production of Agro meteorological Information and service of agro meteorological station for adaptation to climate change.
- Study of shallow Ground water quality in Vavunia District.
- Study the impact of rainwater harvesting measures on soil moisture storage and ground water recharge.

## STAFF LIST

Designation	No.
Director	01
Additional Director (CUD)	01
Deputy Director	01
Research Officer	08
Agricultural Officer	03
Subject Matter Specialist	01
Research Assistant	03
Agricultural Instructor	10
Soil Surveyor	04
Programme Assistant	02
Development Officer	03
Research Sub Assistant	02
Administrative Officer	01
Management Assistance Service	05
KKS	01
Driver	07
Watcher	02
Labourer	02
Labourer (Contract)	02
<b>Total</b>	<b>59</b>

## 2.1 SEED CERTIFICATION AND PLANT PROTECTION CENTRE (SCPPC) – GANNORUWA

The mandate of the Seed Certification and Plant Protection Centre (SCPPC) is to provide vital services to farmers by assuring the quality of seed and planting materials, promoting environmentally sound, economically viable practically feasible pest control methods under farmers conditions, limit access only to quality pesticides and ensure their safe use, conserve country's Plant Genetic Resources (PGR) of food crops and to promote their utilization. SCPPC is the core management institution for Seed Certification Service (SCS), Plant Protection Service (PPS), Registrar of Pesticides (ROP) and Plant Genetic Resources Center (PGRC). It also has regulatory functions pertaining to the following acts under Department of Agriculture.

- Plant Protection Act No. 35 of 1999 to protect the local agriculture and promote effective pest management strategies with the least harm to the environment.
- Control of Pesticide Act No. 33 of 1980 to ensure high quality pesticides with the least hazard to human health and environment.
- Seed Act No. 22 of 2003 to safeguard the farmers as well as the seed handlers from malpractices that would harm the seed industry.

### Regulatory Activities

Guidance was provided to enforce the provisions of the Plant Protection Act No 35 of 1999 in controlling and preventing the further spread of Weligama wilt in Coconut.

The draft new regulations of the Plant Protection Act No: 35 of 1999 has been submitted to the Legal Draftsman's Department during the past year and several rounds of discussions were held with the Legal Draftsman on some legal and technical matters mentioned in the regulations.

After conducting several workshops, meetings and discussions with all stakeholders of the seed sector, a final proposal has been prepared to repeal the Seed Act No: 22 of 2003. These amendments were made to avoid any conflicts with complex legal matters and in order to address the present day practical problems of farmers, Seed handlers etc. The necessity has arisen to implement a new Act which will be of assistance to the present Agricultural development programmes in the country. The final draft proposal has been prepared in Sinhala, Tamil and English and submitted to the Cabinet through the Ministry of Agriculture in September 2013.

## BUDGET

**Table 2.1.1: Annual budget – 2013**

Vote	Allocation (Rs.)	Expenditure(Rs.)	Expenditure %
Capital	4,582,000	3,620,024	79
Recurrent	3,709,472	2,957,320	80
<b>Total</b>	<b>8,291,472</b>	<b>6,577,344</b>	<b>79</b>

## PROGRESS

- A database was developed to trace all importation of vegetable seeds and fruit seeds during past several years.
- Seed testing data were analyzed for Paddy, Other Field Crops and Vegetable seeds for the Divineguma programme.

This information will be very valuable for policy makers, extension workers as well as researchers in planning for the future.

### Vegetable and Fruit Seed Import Database

A national database is being developed on vegetable seed imports for easier retrieval of

vital information. This would facilitate to provide all the information relevant to permits issued and the details of actual seed imports through Plant Quarantine Units of Seaport and Airport during the last five years.

Eight hundred and twenty vegetable Seed import permits have been issued during 2013 by the National Plant Quarantine Service. The following table indicates the quantities of vegetable and fruit seeds imported during 2013.

**Table 2.1.2: Total quantity of vegetable seed imports via Seaport and Airport during 2013**

Crop	Quantity (kg)		
	Seaport	Airport	Total
Bean	130,690.00	4.50	<b>130,694.50</b>
Beet	26,693.20	2,905.80	<b>29,599.00</b>
Bitter gourd	2,267.60	215.03	<b>2,482.63</b>
Broccoli	10.00	0.02	<b>10.02</b>
Cabbage	1,060.24	724.93	<b>1,785.17</b>
Carrot	37,617.40	103.00	<b>37,720.40</b>
Cauliflower	148.98	76.07	<b>225.05</b>
Chinese cabbage	20.00	15.00	<b>35.00</b>
Chinese kale	172.00	-	<b>172.00</b>
Cucumber	1,812.09	435.25	<b>2,247.34</b>
Egg plant (Brinjal)	385.32	76.95	<b>462.27</b>
Pepper/ Sweet pepper/Bell pepper etc.	6,016.80	3.12	<b>6,019.92</b>
Hot Pepper/ Chilli	1,637.46	1,216.86	<b>2,854.32</b>
Knol khol (Kholrabi)	5,938.50	1,185.00	<b>7,123.50</b>
Leek	7,290.90	699.75	<b>7,990.65</b>
Lettuce	135.00	-	<b>135.00</b>
Luffa	4,689.19	452.20	<b>5,141.39</b>
Moringa (Drumstick)	-	305.00	<b>305.00</b>
Okra	27.00	6,471.06	<b>6,498.06</b>
Onion	7,500	500.00	<b>8,000.00</b>

Crop	Quantity (kg)		
	Seaport	Airport	Total
Red Onion	600	-	<b>600.00</b>
Pakchoi	25.00	-	<b>25.00</b>
Pumpkin	10,666.11	1,110.44	<b>11,776.55</b>
Radish (Chinese Radish)	21,238.94	515.02	<b>21,753.96</b>
Snake gourd	-	100.00	<b>100.00</b>
Squash	10,323.72	350.00	<b>11,673.72</b>
Tomato	1,108.94	191.89	<b>1,300.82</b>
Water convolvulus (Kang Kung)	905.59	-	<b>905.59</b>
Yard Long Bean	5,310.00	250.30	<b>5,560.30</b>
Zucchini	-	0.50	<b>0.50</b>
Wax gourd	0.12	-	<b>0.12</b>
<b>Total</b>	<b>285,352.10</b>	<b>17,961.69</b>	<b>303,313.77</b>

**Table 2.1.3: Total quantity of fruits and other seed imports via Seaport and Airport**

Crop	Quantity (kg)		
	Seaport	Airport	Total
Papaya	-	12.98	<b>12.98</b>
Water Melon	9,470.03	245.21	<b>9,715.24</b>
Seed Potato	1,450,421.00	-	<b>1,450,421.00</b>
Maize (H.Corn/Corn)	1,654,155.85	6.03	<b>1,654,161.88</b>
Sweet corn	62.00	54.00	<b>116.00</b>
Lillium bulb	25,926.00	-	<b>25,926.00</b>
Grass seed	8,475.00	-	<b>8,475.00</b>
Flower Seeds	-	87.90	<b>87.90</b>
<b>Total</b>	<b>3,148,509.88</b>	<b>406.12</b>	<b>3,148,916.00</b>

### **A New online Database on Seed**

On Director General of Agriculture's instructions a new database is being developed to cover all important aspects of seed production programme of the Department of Agriculture and imports. Financial support will be given by JICA-Vegetable Seed Project. Several workshops were held during 2013 with the participation of relevant stakeholders. The main responsibility of developing this database

was entrusted with the Director Information and Communication Centre.

### **New Regulations of Plant Protection Act No. 35 of 1999**

New Regulations of Plant Protection Act No. 35 of 1999 was submitted to the legal draftsman and now it is in the final stage.

## Other Activities

### Seed Act

Guidelines for importation of seeds were prepared and the preparation of draft standards for proposed seed laboratories are in progress. Two group discussions were conducted with relevant SCS officers, PGRC officers and 2 day workshop was organized to streamline the proposed regulations of the seed and planting material Act with the help of resource persons belonging to relevant fields.

### Staff Database Development

Database was developed for storing staff information of SCPPC and easy retrieving of any information of the staff.

### Seminars / Awareness Programs / Trainings

- Computer Training programme on MS Excel was conducted for 18 officers from Seed Certification Service, Plant Protection Service, Plant Genetic Resources Centre, Office of the Registrar of Pesticide, Seed Certification Service and Seed Certification and Plant Protection Centre at ISTI Gannoruwa on 08<sup>th</sup> and 09<sup>th</sup> April 2013.
- Several workshops, trainings, group discussions and awareness programmes were organized and conducted in various locations for police officers, pesticide dealers, DOA and other relevant officers from government institutes and private sector, seed handlers, seed dealers, contract seed growers, university students and school children. Around 1000 personnel were trained on Seed Act and current issues, plant protection, role of

SCS, seed cleaning and storage etc. at 16 locations.

- Three live Radio programmes (each one hour) were conducted on “Kandurata Sevaya” and “Wayamba Sevaya” on implementation of Seed Act, prevailing regulations of Plant Protection Act and current issues faced by farmers.
- **Permanent Crop Clinic Programme -** Active contributions were made to the above programme which is coordinated by the Plant Protection Service. A master trainer from SCPPC participated in several Plant Clinics held in various locations in the country.

### Awards

- Dr. G.M.W. Chitral was adjudged as the Best Agronomist of the ASDA 2013 for his outstanding contribution to the development of Agriculture.

## PLAN FOR 2014

- Implementing relevant regulations to facilitate safe and effective handling of seeds, plants, planting materials and agrochemicals which will enhance the contribution from agriculture to gross domestic product (GDP).
- Preparation of draft regulations for proposed Seed Act.
- Formulating appropriate plans and policy decisions related to the production of high quality seeds and planting materials.
  - Developing seed enterprise in the country.
  - Development of good quality planting material production in the country

- Strengthening national plant health system.
- Harmonization of regulatory measures.
- Promoting the most effective and safe pest control strategies in agriculture.

## STAFF LIST

Designation	No.
Director	01
Additional Director	01
Research Officer	01
Agriculture Officer	01
Programme Assistant (Agric.)	01
Agricultural Instructor	01
Administrative Officer	01
Development Officer	03
Management Assistant	07
Storeman	01
KKS	02
Driver	04
Circuit Bungalow Keeper	01
Laborer	02
Laborer (Contract)	06
<b>Total</b>	<b>33</b>

## 2.1.1 SEED CERTIFICATION SERVICE (SCS) – GANNORUWA

The seed certification service (SCS) performs regulatory functions pertaining to the assurance of the quality of seeds and planting materials available to farmers.

Responsibilities:

- Implementation of Seed Act
- Certification of the quality of basic seeds and planting material before multiplication.
- Certification of the quality of commercial seeds and planting materials of rice, vegetables, other field crops (OFC) and potatoes.
- Fruit plant certification and fruit nursery registration
- Selection and registration of suitable mother plants throughout the country.
- Laboratory testing of germination, viability, purity and moisture of local and imported seeds.
- Post -control grow out trials for quality testing of imported and locally produced seeds.
- Conducting tests on Distinctness, Uniformity and Stability (DUS), prior to release of new crop varieties
- Conducting seed health testing.
- Conducting training and awareness programs for Seed growers, Nurserymen, Seedmen and Officers on quality seeds and planting material production in relation to Seed Act.
- Finding out solutions to overcome field and post harvest problems on quality seed and planting material production by conducting applied seed research programs.
- Quality assurance of imported vegetable seeds.
- Seed development and quality promotion activities.
- Database management and monitoring.
- Publishing Fruit Nurserymen’s Directory annually and Seed Producer’s Directory seasonally.

## BUDGET

Allocations received and expenditure incurred under different votes and projects are given in Table 2.1.1.1.

**Table 2.1.1.1: Annual budget - 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	10,230,000	7,930,000	78
Recurrent	23,420,000	15,440,000*	66
<b>Projects</b>			
Seed strengthening and Seed Industry Development	100,000,000	91,000,000	91
Seed Act	20,000,000	19,200,000	96
<b>Total</b>	<b>153,650,000</b>	<b>133,570,000</b>	<b>87</b>

\*0.76 Rs.Mn have to be paid

\*7.2 Rs.Mn expended through Salary II/Financial division

## PROGRESS

### Achievements

- Inspection of 4907 ha of rice, 1088 ha of OFC, 315 ha of vegetables, fruits and 88 ha of potato fields cultivated for seed production.
- Testing of 13003 seed samples representing 120391 MT of seed paddy, 446MT of OFC seeds 69 MT of vegetable seeds and 729MT of seed potato.
- The registered extent of OFC and vegetables increased by 30% and 35% respectively in 2013 when compared to 2012. The registered extent of paddy was decreased due to discontinuation of the contract seed programme. The red onion and big onion cultivators mainly in the northern areas were included in the seed production programme. The registered extent of vegetables increased rapidly during the year.
- Production of OFC, Vegetables and Potatoes also increased by 35%, 59% and 14% respectively with the increase of extent when compared to 2012. However, registered extent of Rice was decreased drastically. But seed production increased by 51% representing 15.2% of the national seed paddy requirement of Sri Lanka.
- Registration and inspection of 335 horticulture nurseries producing certified planting materials and quality assured by labeling of 8,72,472 grafted fruit plants. When compared to 2012, certification of fruit plants increased by 40%.
- Evaluation of 21 rice, 40 OFC, 12 vegetables and 1 root and tuber crop varieties under DUS testing program were undertaken.
- Tested 1268 samples of rice, OFC, vegetables and potato in post control fields situated at Gannoruwa, Seetha Eliya and Mahailuppallama.
- Registration of 1141 and 858 renewals of seed handlers under the seed Act.
- Granting approval for 572 labels used by different seed and planting material producers under the Seed Act.
- Training of 2325 Government and private sector officers, Nurserymen, seed farmers and Seed handlers on Seed Act activities.
- A five year JICA Project on "Enhancement of Production system of Certified Vegetable Seed" commenced since May 2012. Four SCS regional offices and 3 seed testing laboratories are contributing as main counterparts.
- Five newly appointed officers of the Sri Lanka Agricultural Service were attached to the SCS in 2013.
- Construction work of Karadianaru and Labuduwa regional offices, Post control field office at Bata atha, Germination room of Aluththarama STL, twin quarters at Gannoruwa were completed under the projects on SCS Strengthening and Seed Industry Development during the year 2013.
- Essential repairs on vehicles and buildings of all units of SCS were completed.
- Developing a web application for the easy access to SCS officers of the status of the samples submitted to the seed testing laboratories.

## Seed Paddy Certification

During the year 2013, individual farmers as well as several government and private sector organizations such as DOA farms, Cooperative Societies, Provincial Councils, Govi Jana Kendra, Mahaweli Authority, Irrigation Department, Farmer Organizations, Private Companies and NGOs were registered for certified seed paddy production programs.

Total extent registered to produce seed paddy was 4907 ha of which the share of private

sector was 76% percent. Extents registered for certified seed paddy production under different sources and seed classes are given in Table 2.1.1.2. A heavy reduction was observed in extent registered for seed production of rice in the year 2013 when compared to year 2012 due to the discontinuation of paddy contract seed programme of SPMDC.

**Table 2.1.1.2: Extents under Seed Paddy production in 2012 and 2013**

Source	Seed class	2012		2013		Accepted %
		Extent registered (ha)	Extent inspected (ha)	Extent registered (ha)	Extent inspected (ha)	
Research stations	Breeder's	2.5	2.5	4.5	4.1	91
Govt. farms	Foundation I	67	62	55.2	40.51	73
	Foundation II			0.65	0.57	88
	Registered I	770	653	697.47	609.41	87
	Registered II			11.05	11.05	100
	Certified I	145	63	174.39	104.96	60
	Certified II	7	6	38.97	26.42	68
Contract growers	Foundation I	4.6	3.5	9.11	9.11	100
	Registered I	81	52	9.92	3.64	37
	Certified I	736.6	548	159.09	80.77	51
	Certified II	22	20	3.64	0.81	23
Private growers	Registered I	137	75	132.29	101.72	77
	Registered II	13	8			
	Certified I	3734	3156	3265.79	2420.51	74
	Certified II	397	297	323.08	232.49	72
	Commercial			22.06	4.25	19
<b>Total</b>		<b>6116.7</b>	<b>4946</b>	<b>4907.21</b>	<b>3650.32</b>	

During the year 2013, a total of 20391 mt of seed paddy was sampled of which the quality standards of 13700 mt of seed paddy were accepted by laboratory tests (Table 2.1.1.3).

DOA farms with contract grower programme produced 2741 mt and private growers produced 10,959 mt.

**Table 2.1.1.3: Quantities of seed paddy tested and % accepted in 2012 and 2013**

Source	2012		2013	
	Quantity tested (mt)	Accepted %	Quantity tested (mt)	Accepted %
Research stations	6.2	95	4.295	100
Govt. farms	2792	90	2665.0	94
Contract growers	1105	87	402.9	58
Private growers	7443	75	17319.1	63
<b>Total</b>	<b>11346.2</b>		<b>20391.3</b>	

### Certification of Other Field Crops (OFC) seeds

The total registered extent under OFC seed production was 1088 ha of which contract growers accounted for 89%. Maize, Green gram, Ground nut, Sesame, Cowpea, Finger

millet, Black gram and Soybean were included in the OFC seed production programme. Extents registered for seed production under different sources and classes are given in Table 2.1.1.4. There was a 30% increase in registered extent for OFC seed production when compared to 2012.

**Table 2.1.1.4: Extents under OFC seed production 2012 and 2013**

Source	Seed class	2012		2013		Accepted %
		Extent registered (ha)	Extent inspected (ha)	Extent registered (ha)	Extent inspected (ha)	
Research stations	Breeders	3.9	3.9	3.47	3.05	88
Govt. farms	Foundation	26	19	14.53	7.63	53
	Registered I	58	24	32.7	20.66	63
	Registered II	3	3			
	Certified I	12	9.5	3.04	3.04	100
	Certified II	1	0.8	2.91	2.73	94
	Hybrid	3.03	0.2	1.42	1.01	71
	Commercial			1.82	1.82	100

Source	Seed class	2012	2013	2012	2013	Accepted %
		Extent registered	Extent inspected	Extent registered	Extent inspected	
		(ha)	(ha)	(ha)	(ha)	
Contract growers	Foundation	5.3	3.5	3.4	1.98	58
	Registered I	97.2	74.7	128.59	87.43	68
	Registered II	6.2	6.2			
	Certified I	463	358	706.25	459.53	65
	Certified II	77.6	71.4	117.31	82.59	70
	Hybrid			1.42	1.42	100
	Commercial I			16.92	8.62	51
	Commercial II			3.64	2.63	72
Private growers	Foundation	2.1	1.2			
	Registered I	35.3	9			
	Certified I	38.2	24.8	38.87	38.5	99
	Certified II	2	1.4	0.4	-	-
	Commercial I			11.48	5.71	50
<b>Total</b>		<b>833.8</b>	<b>610.6</b>	<b>1088.17</b>	<b>728.35</b>	

In the year 2013, total OFC seed production was 446 mt and 77% of the production was certified. Quantities tested and percentages

accepted from different sources are given in Table 2.1.1.5.

**Table 2.1.1.5: Quantities of OFC seed tested in 2012 and 2013**

Source	2012		2013	
	Quantity tested (mt)	Accepted (%)	Quantity tested (mt)	Accepted (%)
Research stations	0.2	100	0.9	100
Govt. farms	35.5	88	27.0	85
Contract growers	289.6	95	408.2	76
Private growers	4.8	77	11.5	100
<b>Total</b>	<b>330.1</b>		<b>446.7</b>	

## Certification of vegetable seeds

### production

Registered extent for vegetable seed production was 315 ha of which private and contract growers accounted for 69.5%.

Registered land extents under different sources and seed classes are given in Table 2.1.1.6.

tomato, okra , chillie, red onion, big onion, snake gourd, bean, brinjal, bitter gourd, radish, luffa, capsicum, yard long bean, cucumber, pumpkin, amaranthus, vegetable cowpea, winged bean, water melon, and papaya were included in the seed production program.

**Table 2.1.1.6: Summary of vegetable seed production extents (ha) by class and source in 2012 & 2013**

Source	Seed class	2012		2013		Accepted (%)
		Extent registered	Extent inspected	Extent registered	Extent inspected	
		(ha)	(ha)	(ha)	(ha)	
Research stations	Breeders	1.5	1.5	1.34	1.14	85
Govt. farms	Basic	17	12	26.32	26.28	99
	Standard I	26.7	20.5	34.42	30.35	88
	Hybrid	1.5	1.5	0.61	0.4	67
Contract growers	Basic	3.8	2.7	1.14	1	87
	Standard I	43.7	35.4	142.82	112.16	79
	Standard II	1.6	0.9	12.98	9.74	75
Private growers	Standard I			92.89	58.82	64
	Standard II	40.3	33.8	2.53	1.92	76
	Commercial			0.65	0.65	100
<b>Total</b>		<b>136.1</b>	<b>108.3</b>	<b>315.7</b>	<b>242.5</b>	

During the year, 69 mt of vegetables were certified. Quantities tested and percent

accepted from different sources are given in table 2.1.1.7.

**Table 2.1.1.7: Quantities of Vegetable seed production in 2012 and 2013**

Source	2012		2013	
	Quantity tested (mt)	Accepted (%)	Quantity tested (mt)	Accepted (%)
	Research stations	0.02	99	0.5
Govt. farms	8.4	92	6.0	95
Contract growers	26.4	98	32.4	94
Private growers	8.7	84	30.1	80
<b>Total</b>	<b>43.52</b>		<b>69.0</b>	

## Seed Potato Certification

Extents of different seed potato classes cultivated are given in the Table 2.1.1.8. The total extent of land cultivated with seed potato was 88 ha and a total amount of 730 mt of seed potato of 1 popular potato variety (Granola) was certified. The private seed potato

production program on pre-basic class was started by Heyles Company and Galpalama farm during the year. Also, 3,19,500 mini tubers produced under this special seed potato program in poly tunnels were certified.

**Table 2.1.1.8: Extents under seed potato production in 2012 and 2013**

Source	Class	2012		2013	
		Extent registered (ha)	Extent accepted (ha)	Extent registered (ha)	Extent accepted (ha)
Govt. farms	Pre-basic	0.25	0.21	0.05	0.05
	Basic	52.46	48.0	36.1	36.1
	Certified	11.51	11.42	29.6	29.0
Private growers	Pre-basic			0.04	0.04
	Basic			0.2	0.2
	Certified	22.06	22.06	22.9	22.9
<b>Total</b>		<b>86.28</b>	<b>81.69</b>	<b>88.89</b>	<b>88.29</b>

## Seed Testing

An amount of 13003 seed samples were tested for quality certification at the DOA seed testing laboratories at Peradeniya, Mahalluppallama, Aluttarama and Batata.

## Seed Health Testing Unit

### Highlights

- Paper towel technique was developed for indexing bean seeds for anthracnose disease caused by seed borne pathogen *Colletotrichum lindemuthianum*.
- *Alternaria padwickii*, *Helminthosporium oryzae* and *Pyricularia oryzae* are seed borne pathogens of rice. It has been

observed that these three fungi are located mostly on the seed coat and pericarp.

- Purple staining of soybean seeds reported from Anuradhapura area was identified as purple seed stain disease caused by seed borne fungus *Cercospora kikuchii*.

## Research Programme

- Assessment of seed discolouration on germination, seedling vigour and seed health in rice.
- Studies on effect of seed borne pathogens on seed health of stored vegetable seeds.

- Development of seed health detection techniques for seed borne pathogens of rice.
- Studies on efficacy of eradication treatments of seed borne pathogens of rice.
- Detection of seed borne fungal pathogens in major crops.

### Special Projects

- Collaboration in the Construction of Epidemiology Information Interchange System for Migratory Disease and Insect Pests in Asia Region (IPM), AFACI, Korea.

### Certification of Planting Material

A total of 8,72,472 fruit plants produced in government nurseries and private nurseries were certified and labeled (Table 2.1.1.9) which is a 40% increase when compared to the year 2012.

**Table 2.1.1.9: Number of grafted fruit plants certified in 2012 and 2013**

Species	No. of plants certified	
	2012	2013
Mango-grafted	263745	4,14950
Rambutan-grafted	105640	1,35698
Orange-grafted	236014	3,12075
Avacado	7233	950
Durian	1716	1271
Jak	7513	5368
Pears		2160
<b>Total</b>	<b>6,21,861</b>	<b>8,72,472</b>

### Registration of nurseries

Total number of nurseries registered in the year 2013 was 350.

### Mother plant certification

Also during the year 2013, a total number of 346 Mango, Rambutan, Citrus, and Jak mother plants were selected and registered.

**Table 2.1.1.10: Number of mother plants registered in 2012 and 2013**

Species	No. of plants registered	
	2012	2013
Mango-grafted	242	08
Rambutan-grafted	43	269
Citrus	75	66
Jak	26	03
<b>Total</b>	<b>386</b>	<b>346</b>

### Post Control Testing

Post control tests were conducted to evaluate 1268 seed samples. These include DOA-certified seed samples and imported seeds of different crop varieties and seed potato. Number of post control tests conducted, under different crop categories are given in Table 2.1.1.11.

**Table 2.1.1.11: Number of post control samples tested**

Crop group	No. of lots tested
Rice	109
OFC	317
Vegetables	523
Potato	318
Fruit	1
<b>Total</b>	<b>1268</b>

### Distinctness, Uniformity, and Stability (DUS) Testing

Twenty one rice varieties, (At 676,Ld 3-6-12, Bg 3R, At 06-631, Pokuru samba, Ld 1-5-15, CIC 3-1, Bg 5-15-31, Bg 4-2236,Bg 11-

139, Bg 5-110, At 4-186, At 5-1382, Bw 5-1621, Bg 465, Ld 8-6-7, Bg 4-91, SUDURU, Bg 96-741, Bw 452, At 7-800) were tested for DUS at post control field at Gannoruwa. Twelve vegetable varieties, 40 OFC varieties and 1 root and tuber crop were also tested. DUS testing of 15 Rice, 8 vegetables, 11 OFC were completed during the year concerned.

**Table 2.1.1.12: Number of DUS Tests Conducted**

Crop Group	No. of tests conducted	No. of tests completed
Rice	21	15
OFC	40	11
Vegetables	12	8
Root and Tuber	1	1
<b>Total</b>	<b>74</b>	<b>36</b>

### Implementation of Seed Act

Seed Act No. 22 of 2003 has been implemented beginning from year 2008 with the objective of safeguarding the farmer as well as the seed handler from malpractices that would harm the seed industry of the country which is a vital sector of the country's agriculture. Nearly 5700 Seed handlers have been registered under the Seed Act since 2008. 1141 Seed handlers have been registered and 858 renewals made under the Seed Act during the year. The amount collected from registration and renewal of registration was Rs.Mill.1.127

Twelve complaints were received; inquired and remedial actions were taken to safe guard the farmers.

Seven hundred and seventy three random inspections of seed handler premises were carried out in order to assess the present situation and to advise them on proper handling of seed and planting material prior to market. A workshop was held to discuss repealing of Seed Act and make provisions for a new act with the participation of all Stake holders of seed industry. New proposal was handed over to the Ministry of Agriculture in three languages to present at the cabinet meeting. Also the new proposal has been displayed in the DOA website to consider public response. A few workshops were held to prepare draft regulation for the proposed seed and planting material Act.

Media programmes were conducted on implementation of Seed Act in Kandurata Sevaya and Wayamba Sevaya. Appointed 68 numbers of competent officers as Authorized Officers to implement the Seed Act.

### Vegetable production training by Enhancement of production system of certified vegetable seed project 2013 - JICA

Training programmes were conducted to impart proper knowledge and teach techniques on vegetable seed production & certification from the quality perspectives mainly implemented through "on Job training " in the field. (Table 2.1.1.12)

**Table 2.1.1.12: Participation for training programmes conducted under vegetable seed project**

Trainings	No. of participants		
	Government Sector	Private Sector	Total
Seed Testing procedures	134	-	134
Field inspections & sampling			
13 Yala	176	111	287
13/14 Maha	179	63	142
Seed Health Testing	01 (foreign)	-	01

Field practical trainings were conducted through JICA, VSP in 2013 mainly at Kudasale and Aluththarama (2013Yala). Nikawaratiya region joined to these programmes in 2013/14 Maha season. Certification process of vegetable seed improved as a result.

Also a Seminar was conducted on seed production and certification in 2013 August with 69 participants.

During the year 2013 laboratory equipments and laboratory chemical items were received by JICA for STL Peradeniya, Aluththarama, & Mahailuppallama. (Total value was about Rs. 6 million)

### Research and Development

Research studies were conducted in the following areas;

- To find out scientific solutions for day to day field problems of the fruit plant certification program.
- Determination of the best pick range for seed production of Okra.
- Influence of steckling size and sowing time for the seed yield and seed quality components of Radish.

### Training Programs

SCS continued to conduct training programs to enhance the knowledge of officers and seed handlers on production of quality seeds and planting materials. A total of 1867 training programmes were conducted for Seedfarmers/Nursery men, Govt. Sector Officers, Private Sector Officers and seed handlers.

### Foreign Training

One officer had trained in Japan for Seed health testing in collaboration with JICA

### SCS Data Base Management System

A new PC based database was created from MySQL with Java system for analyzing monthly working load of SCS regional offices.

### PLAN FOR 2014

- Empowering seed certification service to achieve the objective of supplying 30% of the national seed paddy requirement by certified seeds.
- Establishment of seed research unit to conduct seed research pertaining to the post harvest problems encountered by seed handlers specially on seed packaging, storage and expiry dates.

- Designing SCS website for public awareness, to improve information dissemination on seed certification program and for efficient and easy access to our service.
- Implementation of the Seed Act to regulate the seed production process among state and private sector seed handlers to make available high quality seeds and planting materials in the country while avoiding malpractices in the seed industry.
- Preparing and publishing of crop guidelines on quality seed and planting material production to distribute among the all seed handlers.
- Preparation and distribution of Seed Producer's Directory and Planting Material Producer's Directory in each growing season.
- Finalizing and making public the newly amended Seed Act and regulations.
- Completing the construction of SCS regional office buildings in Kundasale,
- Construction of new seed testing laboratory and office complex in Paranthan, SCS regional office buildings in Matara, and Jaffna.
- Creation of new data base system for identification of seed lots from breeder seed lots to certified seed lots
- Strengthening all SCS units with staff and equipments is essential.
- Establishment of a Biotechnology unit for Seed Research and Seed Health Testing Unit.
- SCS is a complex administrative structure consisting 23 regional offices, four seed testing laboratories and four post control fields scattered island wide and launching

three main national programs namely seed certification, fruit plant certification and seed act. It should be restructured so as to be administrated by a Director/Additional director under the direct supervision of the DGA.

## STAFF LIST

Designation	No.
Deputy Director (RO)	01
ADA (Research)	03
ADA (Development)	14
Agricultural Monitoring Officer	06
Programme Assistant	02
Development Officer	03
Agricultural Instructor	112
Research Assistant	01
Research Sub Assistant	05
Govt. Management Assistant	09
Driver	19
Electrician	01
Watcher	37
Labourer	48
Seed Technician	10
Seedman	30
Storemen	03
Circuit Bungalow Keeper	01
Tractor Operator	03
Technician	03
Sanitary Labour	01
<b>Total</b>	<b>312</b>

## 2.1.2. PLANT PROTECTION SERVICE (PPS) - GANNORUWA

Plant Protection Service was first established in 1919 and the main objective is to promote an environment friendly, economical and practical pest management system to ensure plant health of agricultural importance.

Our core activities are fulfilled through implementation, monitoring and evaluation of field level Integrated Pest Management (IPM) programs while upgrading the existing pest management techniques, Permanent Crop Clinic Program (PCCP), rearing and releasing of biological control agents to control alien invasive aquatic weeds, control of pest/disease outbreaks, managing pests in bulk seed storage through fumigation and doing research in pest management and pesticides. Furthermore,

minimizing the impact of undesirable vegetation including aquatic weeds and other invasive flora on agricultural habitats, training of officers and farmers and evaluation of new pesticides at pilot scale and assessment of recommended pesticides for their consistent efficacy to ensure plant health are also important mandatory functions assigned to the Plant Protection Service.

Above activities encompass all regulatory functions with respect to plant protection within the country as declared by the Plant Protection Act No: 35 of 1999 and support implementing certain provisions of pesticide Act of 1981 through evaluation of new herbicides at pilot scale in farmer fields.

## BUDGET

**Table 2.1.2.1: Annual budget – 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Recurrent	2,039,840	1,902,172	93
Capital	2,150,000	1,524,140	71
Permanent Crop Clinic Program (PCCP)	500,000	471,103	94
<b>Total</b>	<b>4,689,840</b>	<b>3,897,415</b>	<b>83</b>

## PROGRESS

### Implementation of the Plant Protection Act No 35 of 1999

Sixty five authorized officers were newly appointed to replace the retired and transferred authorized officers who have been appointed in the previous years. Out of these 65 new authorized officers 36 were directly appointed

to control the Weligama Coconut Wilt Disease. All the 65 officers were trained on

- Legislative background of the Plant Protection Act No 35 of 1999.
- Implementation of Plant Protection act at field level.
- New pests of quarantine significance in Sri Lanka.

## **Permanent Crop Clinic Program (PCCP)**

Permanent Crop Clinic Program (PCCP) was assigned to PPS since March 2013 by Director General of Agriculture. It is a collaborative program of the Center for Agricultural Bio Science International (CABI) in United Kingdom and Department of Agriculture (DOA).

The program aim to strengthen national plant health system through developing local capacity to establish and manage PCCP. The partnership with CABI will promote sustainable agricultural practices that enhance productivity, improve the livelihood of small farmers and protect biodiversity.

PPS has been given the responsibility as the National Responsible Organization (NRO) to liaise with national partners in managing crop clinics. The Deputy Director (Plant Protection) is functioning as the National Coordinator of PCCP.

Some of the highlights of PCCP are mentioned below.

Twenty senior level officers selected from Research and Extension divisions were trained as “master trainers” through Modules 1,2,3 and 4 on the following aspects.

- How to become a “plant doctor”.
- Managing plant health problems.
- How to become a technical writer and preparation of green and yellow lists (Pest management decision guide).
- Monitoring and evaluation of crop clinics

Two hundred and twenty nine officers (all) were trained as plant doctors and 254 permanent crop clinics were established in ten districts (Kandy, Anuradhapura, Hambantota, Rathnapura, Polonnaruwa, Killinochchi, Mannar, Jaffna, Mullaittivue and Vauniya).

A review and way forward workshop on this Permanent Crop Clinic Program (PCCP) was held in the Topaz Hotel, Kandy, with the participation of Additional Secretary, Director General of Agriculture, Directorate, Provincial Directors and all other Deputy Directors in the agricultural extension system.

## **Promotion of Integrated Pest Management (IPM) and Good Agricultural Practices (GAP)**

This was conducted to improve the knowledge of extension officers and farming communities on IPM and GAP giving special attention to minimize the use of pesticides as well as to promote non chemical pest management strategies. Three major crop categories namely rice, vegetables and leafy vegetables were selected for this activity.

### **• Rice IPM / GAP program**

Twenty one extension officer trainings were conducted at various locations in which 680 officers were trained. Two farmer field schools (FFS) were also established in Anuradhapura and Mullaittivu districts. These FFS were mainly based on the season long training which comprises 14 training days during the season. Those were aimed at identifying pest species at each growth stage and managing their population by applying different environment friendly practical strategies which can be applicable under farmer field conditions. It was also focused on conserving of natural enemies in the agro-ecosystem and managing the pest population below economic injury level.

- **Vegetable IPM / GAP program**

This was implemented to develop low cost, environment friendly and practicable IPM packages for vegetables and to promote them among extension officers and farmers. Eleven extension officer trainings were conducted in various locations where 518 officers and 658 farmers were trained by organizing eight farmer training programs. Two radio programs were also broadcasted to promote this technology.

- **Leafy vegetable IPM / GAP program**

This program was mainly concentrated to the Western Province and organized by Bombuwala wing of the PPS. Two hundred and forty five relevant farmers were trained.

### **Pilot scale testing of weedicides**

Six new weedicides were evaluated under farmer field conditions for their bio-efficacy, which performed better than the already recommended weedicides in relation to their target specificity and lower application rates. Four recommended weedicides were re-tested for their efficacy.

### **Biological control program for**

#### **Aquatic weeds**

Cultures of bio-control agents *Cyrtobagous salviniae* for salvinia (*Salvinia molesta*) and *Neochetina bruichi* and *Neochetina eichhorniae* for water hyacinth (*Eichhornia crassipes*) are maintained by PPS. Introduction of these bio-control agents was conducted as per requests made by government, private or non government organizations. In each of

these occasions awareness programs were conducted at the site for stakeholders about the life cycle of released bio control agents and the interaction with the targeted weed. Under this program bio-control agents were introduced to 14 infested reservoirs in Ampara, Anuradhapura, Rathnapura, Polonnaruwa, Kurunagala and Matale districts.

About 10,000 leaflets on biological control on the above weeds were distributed at “Deyata kirula” exhibition at Ampara and “Govi Sathiya” exhibition at Wariyapola.

### **Technical Assistance in Fumigation of Seed Storages of DOA Farms**

898.4 MT of seed material was fumigated to control storage pests in the following government farms (in Ambalantota, Pelwehera, Polonnaruwa, Kantale, Murunkan, Kilinochchi, Maha Iluppallama, Nikaweratiya, Aluttarama). 140 officers were trained on “Stored Pest Management” to enhance the effectiveness of fumigation, for the officers attached to the farms of Seed and Planting Material Development Center. Household pest control program was conducted for Land Clearing Dept. on their request.

### **Technical guidance to manage termites in DOA premises**

Three training programs on the management of termites were conducted at Gannoruwa, Mahailuppallama as well as Angunakolapelessa and 140 officers participated from various divisions of the DOA.

## **Technical guidance to manage rice field rats**

20 DOA officers and 303 farmers were trained to manage rice field rats in Kandy district.

## **Technical Assistance to Control Invasive Weeds**

Control programmes for invasive weed such as Parthenium (*Parthenium hysterophorus*), Alligator (*Alternanthera philoxeroides*), Giant mimosa (*Mimosa pigra*), Lantana (*Lantana camara*) and Arunadevi weed were technically assisted in many areas. 75 ha Parthenium control in Northern province was the most prominent case in 2013. Three hundred posters and 1000 leaflets were also distributed in exhibitions.

## **Technical guidance to manage dangerous agricultural pest problems**

Three control programs of spotted locust (*Aularches miliaris*) in Kegalle and Monaragala districts were technically guided. 150 farmers in NW province were trained to manage Guava root knot nematode & papaya mealy bug.

## **Pest surveillance programs**

Paddy pest infestation data were collected from extension officers of all the districts and utilized to prepare a summary with graphical presentation, which was distributed among them. In addition, short messages on current incidences of pest situation were frequently broadcasted through the radio to alert farmers on present pest problems.

## **Promotion of the use of herbal pesticides**

1600 farmers from various districts were trained to promote the use of herbal pesticides as an alternative to the high use of synthetic pesticides.

## **Control of pest / diseases in sacred “Bo” trees**

Nine sacred “Bo” trees belonging to several historic temples were treated to protect them from some pest / disease infections such as termites, fungal diseases, etc.

## **Exhibitions**

Eco-friendly pest management technologies and other activities of PPS were demonstrated for public in Deyata Kirula exhibition in Ampara and Govi Sathiya exhibition in Wariyapola.

### **PLAN FOR 2014**

- Implementation of Plant Protection Act No 35 of 1999.
- Promotion of permanent crop clinic program
- Promotion of Integrated Pest Management (IPM) and Good Agricultural Practices (GAP) for rice, vegetables and leafy vegetables.
- Pilot scale testing of weedicides.
- Biological control program for aquatic weeds.
- Technical assistance in fumigation of seed storages of DOA farms.
- Technical guidance to manage termites in DOA premises.
- Technical guidance to manage rice field rats.
- Technical assistance to control invasive weeds.

- Technical guidance to manage dangerous agricultural pest problems.
- Promotion of pest surveillance programs.
- Promotion of the use of herbal pesticides.
- Control of pest / diseases in sacred “Bo” trees.
- Live participation in agricultural exhibitions.

## STAFF LIST

Designation	No.
Deputy Director	01
Research Officer	02
Agriculture Officer	04
Programme Assistant	03
Agricultural Instructor	08
Public Management Assistant	04
Driver	04
Labourer	05
Sanitary Labourer	01
Lorry Cleaner	01
<b>Total</b>	<b>33</b>

## 2.1.3 OFFICE OF THE REGISTRAR OF PESTICIDES (ROP) – PERADENIYA

The registration of pesticides is the legal mandate of the Office of the Registrar of Pesticides under the Control of Pesticides Act No. 33 of 1980. The registration and post-registration activities were significantly harmonized in multiple ways to achieve composite targets to safeguard the human health and the environment. To strengthen the legal aspects of registration, a new registration numbering system was introduced by capturing the individual identity of the pesticide product and the respective registrant. Although the legal control system of pesticides under the Act has effectively been implemented, illegal pesticide products are still significant in the market which necessitated extensive vigilance on market activities. The Office of the Registrar of Pesticides has been restricting the uses of the most toxic pesticides in line with the international conventions over the past years. In this respect, several control actions have been taken for strict regulation of pesticides with the help of line authorities. In

particular, four (4) pesticide products were temporarily suspended from importation due to high potential risk to the farming community, which is exemplified by their extensive usage and unscrupulous use practices. The laboratory of the Office of the Registrar of Pesticides has been functioning as the supporting entity for post-registration compliance and monitoring activities including quality control of pesticides. The laboratory has been significantly strengthened during the year and equipped with key analytical equipment and ancillary equipment for pesticide quality control. In addition, the entire laboratory activities are being upgraded for international standards with due consultation of the Sri Lanka Accreditation Board in line with the requirements of the ISO 17025:2005 Laboratory Accreditation System. The stocks of outdated pesticides are quite significant and hence disposal is a serious issue which needs a concerted effort for an environmentally sustainable solution.

## BUDGET

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

**Table 2.1.3.1: Annual budget – 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %	Income (Rs.)
Capital	2,020,000	1,978,989	98	
Recurrent	2,960,000	2,703,493	91	
Registration & Re- registration fees				3,565,900
Dealer Certification fees				719,400
Pest Control Service registration fees				140,000
Pest Control Service renewal fees				105,000
<b>Total</b>	<b>4,980,000</b>	<b>4,682,482</b>	<b>94</b>	<b>4,530,300</b>

## PROGRESS

Item	Sub Activity	Total Annual Physical Target	Achievement up to End of the Year	%
01	Acceptance of applications for registration after screening & allocation of application numbers	150	99	66
02	Evaluation of original registration applications	30	68	227
03	Evaluation of third- party registration applications	140	149	106
04	Evaluation of re-registration applications	140	116	83
05	Evaluation of data for local trials	30	49	163
06	Issue of import approvals	1400	1069	76
07	Evaluation of Pesticides Quality Certificates	1400	402	29
08	Screening of labels for approval	750	327	124
09	Screening of advertising material for approval	250	226	90
10	Inspection of factories	12	4	33
11	Inspection of approved repacking facilities and stores	02	0	0
12	Inspection and certification of premises for fumigation and household pest control operators.	30	13	43
13	Registration of pest control services.	30	30	100
14	Approval of obtaining CH <sub>3</sub> Br for quarantine & pre- shipment treatment on accountable basis	60	126	210
15	Dispatch of samples to MRI & ITI for obtaining test reports on suitability for acceptance of applications	25	17	68
16	Issue of packing clearance as per the quality analysis of samples on consignment basis.	800	330	41
17	Inspection of sales outlets	140	138	99

<b>Item</b>	<b>Sub Activity</b>	<b>Total Annual Physical Target</b>	<b>Achievement up to End of the Year</b>	<b>%</b>
18	Publishing revised guidelines for registration of pesticides/Biocides/...and guidelines for new pesticide importers	02	02	100
19	Media Programs (TV /Radio/Print)	12	08	67
20	Training/Certification of Agrochemical sales and technical Assistance.	750	565	75
21	Awareness Exhibitions	3	07	233
22	Dealer training classes	15	23	153
23	Issue of dealer Training Certificates	450	624	139
24	Issue of dealer certificates	2000	1308	65
25	Field Complaints	06	15	250
26	Legal Prosecutions	04	01	25
27	Technical Advisory Committee meeting	06	06	100
28	Meetings with industry representatives to inform PeTAC decisions.	06	02	33
29	Pesticides Sub Committee meetings of three Sub committees	18	11	61
30	Formulation analysis	800	914	114
31	Random checking of pesticides impurities	12	05	42
32	Development and Implementation of programs for empty container disposal	02	02	100
33	Service or participation as technical Experts/Members/resource persons for intra and inter Departmental organization meetings.	33	41	124
34	Participation as resource persons on invitation from other institutes	10	25	250
35	Collection, compilation & dissemination of import statistics (Central Bank, Universities, Researches, Govt. Institutes etc.)	40	12	30
36	Other activities such as field surveys	04	01	25

## REGISTRATION OF PESTICIDES

### Status of Registration

During the year 2013, 68 new registration applications were completed. In this process, relevant information and documents are evaluated upon submission by the Registrant. During the year 2013, the total revenue collected from this activity was Rs. 3,565,900.00. Proposals have been presented to the Legal Draftsman's Department through the Ministry of Agriculture for increasing the fee structure for registration of pesticides. By the Control of Pesticides Act No. 33 of 1980, Registrar of Pesticides must register all pesticides that contain pesticide active ingredients not withstanding the nature and/or the composition of the pesticide product. Hitherto, applications for pesticide formulations that would be identical or substantially similar to currently registered products were registered separately along with the consent of the original registrant. This process of registration was referred to as "third-party registration". Due to legal ambiguity in the above process, acceptance of applications of "third-party registration" was discontinued since April 2013, and emphasis was given to treat all applications as original submissions. The originality of the application was maintained upon submission of a declaration by the proprietary data submitter. Accordingly, from June 2013, a new registration numbering system was introduced in order to capture the product's identity.

During the registration of pesticides, the proven reports of the safety, quality, efficacy and the identity of products are evaluated for the product's performance and consumer safety. In addition, a clear and concise product labeling in all three languages is a mandatory

requirement under the above Act. All pesticide consignments and/or products imported by overlooking the requirements of the Control of Pesticides (COP) Act are devoid of this vital information, and in most situations the consumer is misled on the efficacy and safety aspects. Therefore, there is a serious danger to the general public in the country due to the activities of unscrupulous traders. The Office of the Registrar of Pesticides has taken steps to implement certain regulatory determinations that are required to make the registration of pesticides as safe as possible.

As usual, in order to streamline the registration aspects, and also to accommodate a wide participation in decision making, expertise from relevant ministries and institutions who are involved with pesticides are being consulted before registration of pesticides. For example, pesticides of dermal application were referred to the Cosmetic Devices and Drug Control Authority (CDDA), while the pesticides used on food items and/or in settings of food processing units and the pesticides used for veterinary purposes were referred to the Food Regulatory Committee of the Ministry of Health and Veterinary Drug Control Authority (VCDA) of the Ministry of Animal Production and Health, respectively.

As required by the Law, some pesticide preparations of dermal application are registered under the CDDA and a certificate is to be issued. Also, pesticides used in the veterinary sector are separately registered under the VDCA and a certificate is issued. Although such complementary registration schemes are not considered as superceding the requirements of the Control of Pesticides Act No. 33 of 1980, there have been instances in the past to deviate from legal requirements

under the Control of Pesticides Act. In May 2013, the matter was referred to the Controller of Imports and Exports of the Department of Imports and Exports and respective authorities for stricter compliance.

#### **Product assessment and registration of new molecules**

Safer and environment friendly pesticides were identified and promoted during the pre-evaluation of products for local trials, which facilitate the phasing-out of hazardous products available in the market. Four agricultural (4) formulations were evaluated during the year and one (1) product was registered for use under following crop/pest categories.

Frutariafol 25% SC: a Fungicide for banana sigatoka leaf spot disease and powdery mildew in zucchini.

#### **Removal of high risk pesticides**

In February 2013, on advice of the Pesticides Technical and Advisory Committee (Committee) a regulatory decision was taken to temporarily suspend the importation of four conventional pesticides, i.e. chlorpyrifos, carbaryl, carbofuran and propanil, which may pose high risk to human health. In making this determination, the Committee has considered the potential toxicity under prevailing exposure scenarios and their high tonnage of use in the field.

#### **Stricter vigilance on illegal import of pesticides**

All import requests must be prior approved by the Registrar of Pesticides on consignment basis. During the registration of pesticides, the proven reports of the safety, quality, efficacy and the identity of products are evaluated for

the product's performance and consumer safety. In addition, a clear and concise product labeling in all three languages is assured on every pesticide before marketing for consumer understanding on product use and safety. In June 2013, the Office of the Registrar of Pesticides issued a complete list of pesticides under three categories (i.e. registered pesticides, banned pesticides and the pesticides that had been registered in Sri Lanka but do not have active registration status as of June 2013, so-called "watch list") to the Department of Import and Export Control in order to facilitate screening and custom regulation of pesticides during importation and exportation.

### **RE-REGISTRATION OF PESTICIDES**

The registration of a product is valid only for 3 years after which the product status is reassessed based on new standards, findings and safety issues. During the year, 116 applications were processed for this purpose. Total revenue realized under this category was Rs. 580,000.00. Under this scheme, product safety, quality and the performance will be assessed from freshly generated toxicity and product quality tests.

**Table 2.1.3.2: The overall status of the evaluation of pesticides for registration during the year 2013**

Category	Status of registration	Number
New pesticides	Evaluations completed	10
	Registration granted	07

Category	Status of registration	Number
Conventional pesticides	Evaluations completed	64
	Alternate sources registered	46
	New formulations registered	02
	Registration for label expansion	07

## THE FUNCTIONS OF THE ANALYTICAL LABORATORY

The analytical laboratory of the Registrar of Pesticides has been functioning for the compliance monitoring activities in pesticide management in Sri Lanka. It is one of the laboratories authorized by the Control of Pesticides Act No. 33 of 1980 (Ref. Government Extraordinary Gazette No. 1293/21 of 19.06.2003) for legal purposes. Besides, it renders services for outside agencies, e.g. universities and research institutions upon request.

The strengthening of laboratory management was undertaken towards accreditation based on international laboratory standards. In October, 2013, an application was submitted for the Sri Lanka Accreditation Board in order to obtain ISO 17025:2005 Laboratory Accreditations.

- **The required procedures have been developed with the following scope:**

- Testing method development and validation for key pesticide formulations by GC and HPLC
- Testing for pesticide residues in water for chlorpyrifos, diazinon and profenophos by GC and GC-MS

- Testing of pesticide residue levels in fruits and vegetables by QuChERS method by GC and HPLC
- Testing of heavy metal contamination in pesticide formulations and environmental samples by ICP-MS
- **Key program components successful during the year:**
  - Acquiring laboratory instruments and equipments
    - a. Inductively Coupled Plasma-Spectrophotometer (ICP-MS) for heavy metal analysis
    - b. Centrifuge
    - c. Spectrophotometer
    - d. Conductivity meter with electrode for cyanide analysis
    - e. Humidity meters
    - f. Min/Max Thermometers
  - Pesticide formulation analysis for following pesticides by using GC and HPLC
    - a. Chlorpyrifos
    - b. Carbofuran
    - c. Glyphosate
    - d. Bispyribac-sodium
    - e. Chlorothalonil
    - f. Carbosulfan
  - Pesticide formulation analysis for physico-chemical properties
    - a. Emulsion stability
    - b. Persistent forming
    - c. Wettability
    - d. pH
    - e. Density/specific gravity

## FIELD ENFORCEMENT

Office of the Registrar of Pesticides continued to coordinate with the Provincial, Inter

Provincial and Mahaweli Authority field enforcement staff to implement the Pesticide Dealer Certification Scheme. Total revenue realized under this category was Rs. 719,400.00. Twenty three (23) pesticides dealer training classes were conducted during the year and 624 participants were certified.

### **IMPORT APPROVALS**

Importation of pesticides in the country is subjected to regulation by the Control of Pesticides Act No. 33 of 1980. The Registrar of Pesticides issues import approvals valid for a period of 3 months for pesticides on a consignment basis upon receipt of requests from the companies in order to ensure that products are imported from the correct source of supply conforming to the required quality standards while preventing the importation of excess volumes. During the year, 402 Quality Certificates submitted by the importers were assessed for this purpose prior to issue of import approvals.

### **SCREENING OF LABELS AND ADVERTISING MATERIALS**

Label approval procedure enables dissemination of proper information to the end user. To facilitate this process, label templates for all categories of agricultural pesticides were developed to improve the quality of label contents. More than 325 labels and over 225 advertising materials have been screened during the year. The number of corrective attempts placed on label approvals was significantly strengthened during the year due to the new policies introduced on trade names/brand names on pesticides marketed in Sri Lanka.

### **TRAINING AND AWARENESS PROGRAMS**

Awareness of the public through radio and print media programs on pesticide-related issues were conducted in several occasions, especially on the new system of recruiting personnel for pesticide dealer outlets.

#### **Training program of Agrochemical Sales and Technical Assistants (ASTA)**

For the year 2013, Rs. 2.13 million was granted by the Ministry of Agriculture for the continuation of necessary training programs in collaboration with the National Apprentice and Industrial Training Authority, island wide. In the year 2013, 815 new applicants were selected by interviews for the training by the regional officials of the DOA & NAITA covering the districts of Gampaha, Kalutara, Moneragala, Badulla, Matale, Nuwara Eliya, Galle, Kegalle, Rathnapura, Anuradhapura, Kurunegala, Puttalam, Kegalle and Jaffna. 565 new applicants commenced training while 250 old recruits successfully completed the training program during the year.

### **SPECIAL ACTIVITIES**

#### **Risk mitigation in rodenticides**

Chemical substances used in rodenticides by nature may be potentially hazardous to a variety of non-target animals, including people. Unintentional exposure is preventable by taking adequate risk mitigation measures during marketing and use of rodenticides. By recognizing the risks involved with 2<sup>nd</sup> generation anticoagulants, the following risk

mitigation measures were introduced for compliance by the end of the year 2013.

- Restricting the sale and distribution to licensed pesticide shops.
- Requirement of bait stations for use in households and their immediate vicinity.
- Tamper-resistant packaging.
- Mandatory inclusion of aversive agents.

### **Initiatives to regulate transport of pesticides**

Pesticide transport has been identified as a thematic mandate under the Control of Pesticides Act No. 33 of 1980 as amended by the Act No. 06 of 1994. While there are ample amount of evidence on possible hazards associated with the transport of pesticides, the country is considerably lagging behind on necessary legal and implementation aspects in comparison to other countries. By considering the risk of transportation of pesticides, under the directives of the Pesticides Technical and Advisory Committee, a sub-committee was appointed in December 2013 to propose necessary laws, regulations and/or suitable guidelines.

### **Integrating environmental enforcement programs**

In August 2013, the Office of the Registrar of Pesticides organized an awareness workshop for 55 Officers In-Charge of Environmental Division, Department of Police covering three districts of the country, namely Anuradhapura, Pollonnaruwa and Matale to help curtail the environmental pollution through pesticide trade and use. The present human resources in this office are barely sufficient for finding the

perpetrators of the Act and it is alleged that environmental pollution due to pesticides is rampant in the country. The move strengthens the Office's robust regional enforcement program by integrating its enforcement team regionally. It is hoped that the investigators will be better positioned to strategically target inspections and investigations, provide better coordination for regional enforcement staff (i.e. Authorized Officers), and collaborate more effectively on enforcement matters under the Act. The Ministry of Environment and Renewable Energy facilitated the workshop by providing necessary funds for conducting the workshop.

### **Regional shop inspections revealed illegal sale of pesticides**

Control of Pesticides Act No. 33 of 1980 bans all pesticides manufactured, formulated, sold and used in the country unless they are registered a valid licence is obtained. During recent field investigations, the officers of the Office of the Registrar of Pesticides found many illegal pesticides in the market. Recent attempts to track down some illegal pesticide manufacturers through market information were unsuccessful. The Office of the Registrar of Pesticides is aware of counterfeit pesticides designed to look like legitimately registered pesticide products, as well.

Examples of significant enforcement actions over the past year include:

- In September 2013, a pesticide seller at Wellawaya area was found to be selling a fake product of a legitimate product of Mospilan (acetamiprid). Further investigations are underway.
- In October 2013, a distributor of a fake pesticide of a legitimate pesticide of

Roundup (glyphosate) was convicted and paid a penalty of Rs. 50,000.00 at the Nuwara Eliya Magistrate's Court. The investigation was carried out in collaboration with the Dimbulapathana Police.

- In December 2013, a pesticide seller at Kuliypitiya paid penalties at the Kuliypitiya Magistrate's Court totaling Rs. 100,000.00 for selling illegal pesticides.

### **Alert on illegal pesticides on sale**

Most of the illegal pesticides are intended for household use on pests such as rats, cockroaches, ants, houseflies, geckoes, etc. and they also include some pests of agricultural importance. The common nature of most of those illegal manufacturers is to refrain from disclosing their true identity, address and contact information, hindering proper investigations. Recent investigations conducted by the officers from this office in sales outlets in some parts of the country have discovered the real scale of the business. Not only importing, manufacturing, selling or distributing these products are illegal, they may also make the public, especially children at risk of being poisoned. These illegal products pose potential risks to the consumer due to lack of information on the active ingredient(s), lack of proper leak-proof packaging, lack of precautionary statements, and medical advice. And, there is a potential for the pesticide itself to be other than what is indicated on the label. The Office of the Registrar of Pesticides routinely inspects retail marketplaces selling illegal pesticides and take appropriate legal actions as required. In May 2013, a circular was issued to give a wider

publicity on illegal and counterfeited pesticides among pesticide sales personnel.

### **Initiatives on proper disposal of obsolete pesticide stocks**

In March 2012, Office of the Registrar of Pesticides received requests for disposal options of outdated stocks of pesticides and laboratory chemicals accumulated in some of the regional agricultural stations of the Department of Agriculture. An estimated sum of 1,083 kg of solid and 508 L of liquid pesticides/chemicals were amongst the concerned requests. In July 2013, the Office of the Registrar of Pesticides took part in a safe disposal of outdated stock of technical malathion stored in one of the regional Health Department stores at Nachchaduwa, Aunuradhapura, benefitting environmental and human health risk reduction. A group of trained personnel from M/s Plantchem (Pvt.) Ltd. helped to collect and secure the stock from further deterioration until disposed of by proper means. The Office of the Registrar of Pesticides will continue to work with the M/s Holcim Geo Cycle in order to dispose of outdated stocks of pesticides in an environmentally friendly manner.

## **PLAN FOR 2014**

### **Pesticide Registration**

- Acceptance of 150 applications for registration after screening & allocation of application numbers.
- Evaluation of 30 original registration applications.
- Evaluation of 140 third-party registration application.

- Evaluation of 140 re-registration applications.
- Preparation of 280 registration certificates for approval.
- Evaluation & Preparation of 30 data for sub committees.
- Preparation of 1400 import license for ROP approval.
- Issue of 1400 import approvals.
- Evaluation of 1400 pesticides quality certificates.
- Screening of 750 labels for approval.
- Screening of 250 advertising material for approval.
- Inspection of 12 factories.
- Inspection of 12 approved repacking facilities and stores.
- Inspection & certification of 30 premises for fumigation & house hold pest control operators.
- Registration of 30 Pest Control services.
- Approval of obtaining CH<sub>3</sub>Br for 30 quarantine & pre- shipment treatment on accountable basis.
- Inspection of 140 sales outlets.
- Dispatch of 25 samples to MRI & ITI for obtaining test reports on suitability for acceptance of applications.
- Issue of 800 packing clearance as per the quality analysis of samples on consignment basis.
- Media Programs
  - TV - 02
  - Radio - 06
  - Print Media - 04
- Training / Certification of 25 Agrochemical sales and Technical assistants.
- Conducting 04 awareness exhibitions.
- Conducting 02 awareness programmes for authorized officers.
- Issue of 2000 dealer certificates.
- Handling of 06 field complaints.
- Handling of 04 Legal prosecutions.
- Conducting 04 Technical Advisory & Committee meetings.
- Conducting 06 meetings with industry representatives to inform PeTAC decisions.
- Conducting 18 Pesticides Subcommittee meetings of three Subcommittees.
- Conducting 800 formulation analyses.
- Conducting 12 random checkings of pesticide impurities.
- Risk assessment on pesticide impurities including Heavy metals.
- Effect non-target organism in the environment by pesticides.
- Programme for the monitoring of resistance development of pesticides.
- Establish a regulation scheme to assure the levels of pesticides residues in vegetables and fruits.
- Evaluation of house hold pesticides to find their field effectiveness.
- Development and Implementation of 02 programs for empty container disposal.
- Service for participation as technical Expertise/Members/resource persons for 27 intra and inter departmental organization meetings.
- Participation as resource personal for 10 invitations from other institutes.
- Collection, compilation & dissemination of 40 import statistics (Central Bank, Universities, Researches, Govt. Institutes etc.)
- Publishing revised guidelines for registration of 02 pesticides / Biocides and

guidelines for new comers for the pesticides dealing who needs to import pesticides.

- Other activities (such as field surveys) – 04.

## STAFF LIST

<b>Designation</b>	<b>No.</b>
Registrar of Pesticides	01
Research Officer	05
Agricultural Officer	04
Agricultural Instructor	06
Research Assistant	05
Agriculture Monitoring Officer	02
Programming Asst. (Agriculture)	02
Research Sub Asst.	01
Public Management Asst. Service	05
Driver	03
Watcher	02
Contract Laborers	02
KKS	01
Labour	02
<b>Total</b>	<b>35</b>

## 2.1.4 PLANT GENETIC RESOURCES CENTER (PGRC) – GANNORUWA

The Plant Genetic Resources Centre (PGRC) is committed to implement programmes and activities to conserve country's Plant Genetic Resources (PGR) of food crops and to promote their utilization, for the benefit of present and future generations. To achieve this, the PGRC explores, collects, introduces, conserves, evaluates and documents the genetic diversity of food crops and their related species. The exploration activities of the PGRC made a

remarkable achievement during the year by collecting germplasm in Northern and Eastern districts and Mahaweli Project impact area. Total of seven hundred and sixty seven samples were collected through field explorations. The gene bank of the PGRC has 13,188 germplasm accessions as conserved materials. Utilization of germplasm by research institutes, universities, NGO and farmers has increased.

### BUDGET

**Table 2.1.4.1: Annual budget - 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Recurrent	13,321,134	12,322,005	92
Capital	3,345,000	3,070,197	92
Projects			
Asian Food and Agriculture Cooperation Initiative (AFACI)	1,300,000	822,739	63
National Agriculture Research Plan (NARP)	586,900	586,900	100
<b>Total</b>	<b>18,553,033</b>	<b>16,801,840</b>	<b>91</b>

### PROGRESS

#### Germplasm Exploration and Collection

Exploration unit of the Plant Genetic Resources Center (PGRC) has made notable achievement in collection of Plant Genetic Resources (PGR) from different districts

(especially from northern and eastern districts). It has undertaken five exploration missions in Kaluthara, Vavuniya, Batticaloa and Kilinochchi districts in year 2013 (Table 2.1.4.2).

**Table 2.1.4.2: Number of samples collected from Kaluthara, Vavuniya, Batticaloa and Killinochchi districts**

Crop Group	Number of samples collected from districts			
	Kaluthara	Vavuniya	Batticaloa	Killinochchi
Rice	05	06	12	11
Coarse Grain	02	20	03	16
Vegetable	44	35	61	60
Grain legumes	-	15	-	06
Oil crops	-	06	01	08
Condiments	14	04	06	16
Root and tubers	09	02	07	07
Fruits	01	-	08	08
<b>Total</b>	<b>75</b>	<b>88</b>	<b>98</b>	<b>132</b>

In addition, a special germplasm collection program was initiated as a response to a request by the Mahaweli Authority. Germplasm of different crops were collected

from Moragahakanda and Kaluganga project impact area. Three exploration missions were made in year of 2013 (Table 2.1.4.3).

**Table 2.1.4.3: Number of samples collected from Mahaweli System-C area, Moragahakanda and Kaluganga Project area**

Crop Group	Number of samples collected from Mahaveli Authority project area		
	Mahaweli system-C	Moragahakanda	Kaluganga
Rice	11	01	09
Coarse Grain	47	08	25
Vegetable	84	26	72
Grain legumes	15	04	10
Oil crops	10	11	04
Condiments	05	-	06
Root and tubers	05	-	03
Fruits	-	-	02
Others	-	06	10
<b>Total</b>	<b>177</b>	<b>56</b>	<b>141</b>

## Crop Germplasm Received from Research Stations

Twenty eight seed samples of rice and okra were received from Rice Research and Development Institute, Bathalagoda and Field Crop Research and Development Institute, Maha Illuppallama during the year of 2013. Fifty five seed samples of okra crosses done by the evaluation unit were received in 2013.

## Conservation of Seed Materials

During the year 2013 we have been able to conserve 208 new accessions in the gene bank. The total number of gene bank holdings up to the end of the year 2013 is 13,188 (Table 2.1.4.4).

**Table 2.1.4.4: Conservation status of the gene bank**

Crop Group	No. of Accessions
Rice and related spp.	4560
Other cereals and related spp	1670
Grain Legumes	2088
Vegetable Legumes	1408
Solanaceous vegetables & Condiments & related spp.	1245
Cucurbit vegetables	795
Brassicaceae vegetables	31
Alliums	20
Other vegetables	378
Leafy vegetables	170
Root and Tubers	09
Mustard and related spp.	124
Oil crops	434
Fiber crops	66
Medicinal plants	27
Fruits	163
<b>Total</b>	<b>13,188</b>

## Distribution of germplasm

One thousand one hundred and sixty accessions of different crop varieties were distributed during the year to local research institutes, NGOs, and Universities on their request.

## Research on seed behavior

A series of experiments were conducted to monitor the viability of accessions of okra and maize conserved in the active collection of the gene bank from the year 1989-2007. Three hundred and seventy five okra samples and five hundred and thirty two maize samples were tested. The results of active collection revealed that there was no drop in viability of accessions of Okra and Maize.

## Germplasm multiplication

The following crop germplasm were multiplied for conservation: Rice (33 accessions), Maize (03 accessions), Finger millet (02 accessions), Sorghum (02 accessions), Little millet (02 accessions), Foxtail millet (02 accessions), Common bean (07 accessions), Yard long bean (07 accessions), Winged bean (02 accessions), Jack bean (01 accessions), Sword bean(01 accessions), Tomato (28 accessions), Brinjal(112 accessions), Luffa (21 accessions), Bottle gourd(05 accessions), Snake gourd (01 accessions), Okra (105 accessions), Amaranthus (22 accessions), Alanga (03 accessions).

## Characterization and Evaluation

Some promising accessions of okra and chili were identified after characterization of ninety nine okra, eighteen chili and sixty one horse gram accessions. Twenty three different red

onion accessions have been multiplied and these accessions have been handed over to RARDC, Aralaganwila for evaluation.

Twenty five accessions of banana collected from farmers' fields were characterized. One promising "Seeni Kesel" accession was identified.

## **BIOTECHNOLOGY**

### **Phenotypic and molecular characterization of rice germplasm for drought tolerance**

Phenotypic and molecular characterizations for drought tolerance were done using selected rice accessions conserved at PGRC. Forty eight selected accessions were phenotypically characterized and very good drought linked upper ground and below ground traits were identified in some accessions. Molecular characterization using SSR markers is underway to identify drought linked markers.

### **Identification of genetic variation in different seed potato stocks from variety Granola**

The DNA level variation in different seed potato stocks of Granola were done using RAPD primers and high level of polymorphism was observed among Granola eco-population types. Based on analysis, it was possible to group these eco-populations into four clusters. This shows the genetic variation among cultivated Granola populations in the country

### **Genetic purity testing of hybrid vegetable varieties of tomato**

Two SSR markers were developed to identify purity of tomato hybrid variety Bhatiya.

### **Study of genetic relationship among exotic and locally developed maize inbred lines**

Molecular characterization was done using 23 maize inbred lines including exotic and locally developed lines. Based on the analysis, it was revealed that there is a high genetic diversity present within the tested inbred lines. This genetic distance information obtained in this study will be useful to select better parents for development of maize hybrids with good performances.

### **Conservation of PGR of Dioscorea, Sweet Potato, Potato and Banana species, under *in-vitro* and plant house conditions**

Seventy accessions of Dioscorea species have been maintained both under *in-vitro* and *in-vivo* form in planthouse. Hundred and nine accessions of sweet potato under *in-vitro* and, hundred and fourteen accessions under potted form in plant house conditions have been maintained. Fifteen potato accessions have been maintained under *in-vitro* form.

### **Identification of long passage period for *in-vitro* conservation of banana**

This study was done to identify better passage period for local banana accessions under *in vitro* conditions. Three banana accessions (Rathambala, Ambon, Pulathisi) are being tested under nine different combinations of *in*

*in vitro* conservation media and the experiment is in progress

### Plant Genetic Resources (PGR) Information Management System

Presently database contains passport data of 13,109 accessions and characterization data of 25 crops including rice, maize, finger millet, foxtail millet, sorghum, cowpea, mung bean, black gram, soybean, pigeon pea, ground nut, bean, winged bean, yard long bean, brinjal, tomato, capsicum, okra, pumpkin, snake gourd, bitter gourd, *Amaranthus*, smooth luffa, mustard and sesame.

### Training and awareness programme

Awareness programmes are conducted by the Exploration Unit of the centre. These programs were organized mainly on requests made by school teachers, university lectures, farmers and government officers, to develop knowledge of training groups. Most of them were one day training programs while some university students and diploma holders attended one month to six month in-plant training programs.

**Table 2.1.4.5: Number of trainees**

Training groups	Number of trainees
Schools	3508
Universities	1012
Agricultural schools	303
Teachers	152
Farmers	306
Other (SLAS, Wild Life , Foreigners etc.)	1304
<b>Total</b>	<b>6585</b>

### PLAN FOR 2014

- Exploration and collection of Plant Genetic Resources of traditional varieties, recommended varieties, other genetic stocks and crop wild relatives.
- Continuation of activities for conservation of Plant Genetic Resources.
  - Conservation and maintenance of sweet potato, potato and banana under *in vitro* and plant house conditions.
  - Conducting research on storage behavior.
- Characterization, evaluation and multiplication of Plant Genetic Resources.
  - Selection of crop accessions suitable for home gardens.
- Molecular and phenotypic characterization of rice accessions for drought tolerance.
  - Molecular characterization of the accessions of traditional rice variety –Suwandel.
- Tagging of yellow mosaic virus resistance genes in wild okra species.
- Study of genetic relationship among exotic and locally developed maize inbred lines.
- Hybridity testing of mango.
- Identification of long passage period for *in vitro* conservation of banana by slow growth induction.
- Identification of optimized conditions for *in vitro* tuberization of Dioscorea.
- Maintenance and improvement of the data management system.
- Maintenance of the National Information Sharing Mechanism.
- Distribution of Plant Genetic Resources.
- Conducting awareness programme on PGR conservation and management.

## STAFF LIST

<b>Designation</b>	<b>No.</b>
Deputy Director	01
Research Officer	08
Agriculture Instructor	03
Research Assistant	04
Program Assistant	02
Development officer	02
Research Sub Assistant	04
Public Management Assistant	07
Storeman	01
Peon	01
Driver	04
Lorry Cleaner	01
Tractor Operator	01
Electrician	03
Watcher	05
Labourer	16
Labourer (Contract)	22
<b>Total</b>	<b>85</b>

## 2.2 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 were given to both research and service oriented quarantine activities.

Phytosanitary certification, inspection and treatment of import and export plants and plant

products, testing of detained samples, dissemination of knowledge on all aspects of plant quarantine via training and awareness programmes for interested groups are the main activities of NPQS. Furthermore, NPQS collaborates frequently in its activities with national research institutes, universities and institutes and centers of DOA.

### BUDGET

Allocation given and expenditure incurred under recurrent, capital and projects are given in Table 2.2.1.

**Table 2.2.1: Annual budget – 2013**

Vote	Allocation (Rs.)	Expenditure(Rs.)	Expenditure %
Capital	7,033,000	3,696,354	53
Recurrent	8,974,325	8,142,538	91
NARP project	2,620,700	2,493,308	95
<b>Total</b>	<b>18,628,025</b>	<b>14,332,200</b>	<b>77</b>

### PROGRESS

#### PLANT QUARANTINE

#### OPERATIONS

Activities carried out by the Plant Quarantine Operations division within the year 2013 are listed in the Table 2.2.2.

**Table 2.2.2: Activities carried out in 2013**

Activity	Achievements
Registration of interceptions	346
Number of interceptions reports sent	326
Registration of inspections	1444

Activity	Achievements
Number of inspection reports sent to entry points	1375
Registration of coir products for testing	503
Reports for tested coir products	492
Registration of submitted samples for testing	19
Issue of phytosanitary certificates	06
Number of questionable consignments destroyed	953
Number of import permits issued	3292

Except for these activities which are related to the plant quarantine operations, the division has coordinated and carried out 10 comprehensive training programmes on plant quarantine activities and procedures.

## ENTOMOLOGY

### Testing for pathogens in export and import consignments

- **Exports**

- 12339 export foliage plant samples were collected from 16 export foliage nurseries and tested for plant parasitic nematodes. 532 samples has been identified as contaminated with plant parasitic nematodes.
- 18498 export foliage plant samples were tested for insect pests and mites. No contaminations were recorded.
- 413 export coir samples collected from 17 coir factories were tested for insect pests, mites, soil contaminants and plant parasitic nematodes. Six contaminations were recorded.
- 26 other special samples submitted by the foliage exporting nurseries were tested for plant parasitic nematodes and insect pests for the facilitation of their pest monitoring program.

- **Imports**

- 33 imported seed potato consignments were inspected at the sea port. These samples were collected and tested for insect pests and plant parasitic nematodes. No contaminations were recorded.
- 255 imported plant materials including hybrid maize, ground nut,

beetle nut, cashew nut, *Sphagnum* peat moss, *Lilium* bulbs, fermented cocoa beans etc. were tested for insect pests, mites and plant parasitic nematodes and 08 samples were found to be contaminated with common stored pests. Further a betel nut sample imported from Indonesia was found to be infected with *Cryptolestess* spp.

### Trainings

A large number of students from the universities, technical colleges and schools were trained in the Entomology division. Many awareness programs were conducted for the staff of export foliage nurseries.

## PATHOLOGY

### Testing for pathogens in export and import consignments

- **Export consignments**

- **Foliage**

Export foliage plant samples of 11138 were tested and following pathogens were found; *Mucor* sp., *Aspergillus* sp., *Fusarium* sp., *Colletotrichum* sp., *Macrophomina* sp., *Penicillium* sp., *Rhizopus* sp., *Xanthomonas* sp. and *Erwinia* sp. *Pestalotia* spp. *Curvularia* sp. *Enterobacter cloea*, *Enterobacter cancerogenus*

- **Coir**

114 export coir samples collected from coir factories were tested for plant pathogens. *Mucor* sp., *Aspergillus* sp., *Penicillium* sp., *Rhizopus* sp. *Thalaviopsis*

*paradoxa* were found on the collected coir samples.

Out of these pathogens *Thalaviopsis paradoxa* is considered as an important pest in quarantine.

#### **Tissue culture plants**

1,139,331 plants were examined during 115 inspections. Contaminated containers with samples were rejected during inspections and necessary instructions were given to improve the quality of products. Contaminations were lowered to a considerable extent after the instructions.

#### • **Import Consignments**

##### **Seed potatoes**

Eighty seed potato samples were tested and following diseases were found, Silver scurf, Common scab, Soft rot, Black scurf, Netted scab and Dry rot. No quarantine pathogens were found. Other pathogens found in the samples were *Geotricum candidum.*, *Colletrotricum altramentarium* and *Curvularia* sp.

##### **Seeds and other plant materials**

Two hundred and seventy six (276) samples were tested and no quarantine pathogens were found.

#### **Testing of submitted samples**

Six samples were checked and suggestions/findings were given to the responsible parties.

#### **Trainings**

- Seven training programs and two awareness programs were conducted.

- 43 undergraduates and diploma students were supervised.

#### **Research programs**

- Research programmes were carried out on molecular identification of *Ralstonia solanacearum* (E. F. Smith) in Seed Potato for detecting the causal agent of infected *Draceana sandreana* leaves using molecular technology and finding a suitable control method.
- Identification of causal agent and control of oily leaf spot in *Draceana sandreana*.
- Identification of Causal Organisms of Stem Rot in *Cordyline fruticosa glauca* .
- Detection of maize streak virus, Maize strip virus and Maize dwarf mosaic virus by ELISA technique - 53 samples were tested and no viruses were detected.
- Detection of Potato Virus A, Potato Virus M, and Potato Virus S in imported seed potatoes using Serological Method-75 samples were tested and no viruses were detected.

#### **WEED SCIENCE**

##### **Testing for pathogens in export and import consignments**

###### • **Exports**

Samples of 743 export coco peat consignments were tested and out of those 17 were found to be contaminated with viable seeds and 109 were contaminated with sand.

###### • **Imports**

Samples of 97 vegetable consignments were tested for weed seeds and 04 consignment of Cumin seeds, 02

consignment of Onion seeds, 04 consignment of carrot seeds and 01 consignment of Coriander seeds were contaminated with weed seeds and the following were of quarantine significance: *Euphorbia dentata*, *Sorghum halpens*, *Convolvulus arvensis*, *Chenapodium album*, *Polygonum* spp. and *Rumex* spp.

### Trainings

A large number of students from the universities, technical colleges and schools were trained under the weed science division.

### Research programs

Nearly one month period is required to complete the grow-out test (The universal standard testing procedure) which is carried out to test the presence of viable seeds in coco peat products. Several treatments were tested to break the dormancy of weed seeds found in coco peat products. Hot water treatment (80-90<sup>0</sup>C) was able to break the weed seed dormancy and thereby, the time taken for the grow-out test could be reduced by 10-15 days.

**Post quarantine study:** *Fallopia convolvulus* is a noxious weed and it is not found in Sri Lanka. The growth parameters and Ecology (Allelopathic effects and competition) of the above weed were studied and final report will be prepared later.

### Maintenance of reference collection

- 04 new weed species were collected preserved and mounted.
- 15 new weed seed species were collected and preserved.

## TREATMENT TECHNOLOGY

### Commercial fumigations

**Table 2.2.3: Commercial fumigations done at NPQS Katunayake during 2013**

Commodity type	No. of fumigations
Coir & coir products	16
Wood & wooden items	12
Flowers	04
Spices	01
Fruits	02
Other (Gatton calamus)	07
Plants (Strawberry)	01
Cut Leaves	01
<b>Total</b>	<b>44</b>

### Supervision of quarantine treatments

281 fumigations for wood packaging materials and other plant and plant products were conducted by private fumigators were supervised by the officers of treatment technology division for certification purpose upon request by exporters.

To join the Australian Fumigation Accreditation Scheme, audit programmes were conducted during March and September 2013.

## PLAN FOR 2014

- Promotion of export of quality plants and plant products.
- Ascertaining the quality of imported seed potato.
- Ascertaining the quality of imported plant and plant products.
- Ascertaining the quality of imported seeds, fruits and vegetables.

- Prevention of imports without fulfillment of phytosanitary requirements.
- Post Entry Quarantine.
- Treatment for eradication of pests found in export and import plants and plant products.
- Maintenance of reference collections.
- Training and awareness programmes for stake holders.
- Quarantine related research.
- Registration of plant nurseries.
- Evaluation of facilities available with treatment providers.
- Issuing phytosanitary certificates.
- Issuing Import Permits (Plants and plant products).

## STAFF LIST

### NPQS, Katunayake

Designation	No.
Additional Director	01
Research Officer	05
Agricultural Officer	02
Administration officer	01
Agricultural Monitoring Officer	02
Programme Assistant	05
Research Assistant	06
Development Officer	02
Agricultural Instructor	15
Seed Technician	01
Technical Assistant	01
Laboratory Sub Assistant	01
Management Assistant	06
Driver	05
Electrician	01
KKS	02
Laborer	04
Laborer- Contract	07
Watcher	06
<b>Total</b>	<b>73</b>

### PQS, Seaport

Designation	No.
Research Officer In Charge	01
Agricultural Officer	04
Agricultural Monitoring Officer	03
Programme Assistant	01
Research Assistant	06
Agricultural Instructor	11
Management Assistant	01
Labourer ( Permanent)	01
<b>Total</b>	<b>28</b>

### PQS, Airport

Designation	No.
Agricultural Officer In Charge	01
Agricultural Officer	01
Research Assistant	02
Agricultural Instructor	13
Management Assistant	01
Labourer	02
<b>Total</b>	<b>20</b>

### PQS, Gannoruwa

Designation	No.
Research Officer In Charge	01
Labourer	01
<b>Total</b>	<b>02</b>

## 2.3 SEED AND PLANTING MATERIAL DEVELOPMENT CENTRE (SPMDC) – PERADENIYA

High quality seed and planting material are the most important inputs to increase the yield, quality of output and minimize unit production costs. The Seed and Planting Material Development Centre (SPMDC) plays a vital role in producing, distributing & marketing seeds and planting materials effectively and efficiently throughout the country. Production, distribution & marketing of basic seeds of all locally recommended crop varieties of Paddy, Other Field Crops, Vegetables, Potatoes and quality planting materials of Fruits and Vegetables are the main challenges faced by the SPMDC. The SPMDC has 20 seed farms under its purview to produce above basic seeds & certified planting materials. However, certified seeds of rice, other field crops and standard seeds of vegetable crops are produced through selected contract growers by 13 regional Deputy Director of Agriculture (seed) units scattered in the country. The SPMDC, at present, operates its functions through above mentioned DDA (Seed) at regional level, under the guidance and monitoring of the Director (SPMD), Additional Director (Paddy and OFC), Additional Director (Vegetable & Planting Material), Additional Director (Potato), Head quarter Deputy Directors and Assistant Director of Agriculture. Mission of the SPMDC is to provide an assured supply of

quality seed and planting material at competitive prices to the farming community of Sri Lanka. Production of basic and certified/standard seeds and certified planting materials in government farms, supply of basic seeds to seed producers, multiplication of certified seeds through contract growers and supply for commercial cultivators, management of government farms, seed enterprise development and co-ordination, maintenance of buffer stocks of seed, co-ordination of seed and planting material supply are the major activities of the SPMDC.

### **Objectives:**

To ensure production, processing, storage and distribution of basic and certified seed and planting materials.

To provide technical assistance and support for developing a seed and planting material industry in the state and the private sector.

To provide necessary training facilities and information on all aspects of seed and planting material to stakeholders.

To achieve seed and planting material security in the country

The following activities were conducted during the year 2013, which includes Maha 2012/13 and Yala 2013 seasons in order to fulfill the objectives of the centre.

## BUDGET

**Table 2.3.1: Annual budget – 2013**

Vote	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure %
Capital	65.775	44.70	68
Recurrent	79.8	157.6	197
Seed Production Program	250.0	223.47	89
JICA	29.4	13.6	46
Accelerated Seed Farm Development Program	200.0	193.81	97
<b>Total</b>	<b>624.98</b>	<b>633.18</b>	<b>101</b>

## PROGRESS

### PRODUCTION & SUPPLY OF SEED PADDY

#### Basic seed paddy production and Certified seed paddy production in government seed farms

Foundation seed paddy (FSP) and registered seed paddy (RSP) of 25 recommended rice varieties were produced in ten government seed farms. Foundation seed paddy was produced using breeder seeds supplied by Rice Research and Development Institute (RRDI), Batalagoda, and its sub stations namely Regional Agricultural Research and Development Centre (RARDC), Bombuwala, Rice Research Station (RRS), Ambalantota and Agricultural Research Station (ARS), Labuduwa. Registered Seed Paddy is produced using the foundation seeds produced and is

used for the production of CSP which in return is used for the production of consumption paddy.

The Production of RSP in the year 2013 is about 122,156 bu and it is well over the need (40,000 bu) for the production of planned seasonal supply of 25% (1,600,000 bu.) of national CSP requirement. However, the amount of RSP produced (122,156 bu) is sufficient for the production of 76% (4,864,000 bu) of the total annual national requirement (6.400,000 bu) of CSP.

The production of FSP is 7844 bu it exceeds the national FSP requirement (4000 bu). In addition 11,154 bu. of CSP has been produced mainly as a result of down grading at the process of production of FSP & RSP.

The farm wise basic seed paddy production during Maha 2012/13 and Yala 2013 has been shown in the table 2.3.2.

**Table 2.3.2: Basic Seed Paddy Production in government seed farms during 2013 (mt)**

Farm	2012/13 Maha			2013 Yala			Total		
	FSP	RSP	CSP	FSP	RSP	CSP	FSP	RSP	CSP
Aluttarama	4.182	72.98	5.92	9.84	95.65	14.74	14.02	168.63	20.66
Malwatte	4.82	87.88	8.53	12.92	169.43	75.32	17.74	257.31	83.85
Polonnaruwa	13.71	331.61	0	12.81	348.00	0	26.52	679.61	0
Bata-Atha	2.58	60.84	13.97	0	38.34	18.27	2.58	99.18	32.24
Ambalantota	3.34	84.46	4.78	3.22	57.11	0	6.56	141.57	4.78
MI	33.89	349.18	56.92	24.33	213.28	18.35	58.22	562.46	75.27
Kantale	6.36	169.29	0.08	17.63	222.52	4.08	23.99	391.81	4.16
Murunkan	3.16	57.60	11.30	0	0	0	3.16	57.60	11.30
Paranthan	4.88	69.99	10.95	3.14	24.17	22.79	8.02	94.16	33.74
Karadiyanaru	0	17.12	9.72	0	34.75	22.92	0	51.87	32.64
<b>Total (mt.)</b>	<b>76.92</b>	<b>1300.95</b>	<b>122.17</b>	<b>83.89</b>	<b>1203.25</b>	<b>176.47</b>	<b>160.81</b>	<b>2504.25</b>	<b>298.64</b>
<b>Total (bu.)</b>	<b>3752</b>	<b>63461</b>	<b>5960</b>	<b>4092</b>	<b>58695</b>	<b>5194</b>	<b>7844</b>	<b>122156</b>	<b>11154</b>

Although SPMDC produced certified seed paddy through contract seed paddy production programme during the previous years, CSP production programmes were not carried out in year 2013 on a decision taken by the Ministry of Agriculture.

### Issue of Seed Paddy

The total amount of seed paddy issued by SPMDC for seed production and commercial cultivation in 2013 is given in Table 2.3.3. Foundation seed paddy, produced from breeder

seeds, in the previous season is used to produce registered seed paddy. Registered seed paddy and some amount of foundation seed paddy is supplied to the certified seed paddy producers. Certified seed paddy is produced mainly by private sector companies, farmer cooperatives and other farmer organizations, individual farmers and by some Mahaweli and provincial agricultural farms. During 2013, total supply of registered seed paddy was 2215.92 mt. (108,094 bu) and supply of certified seed paddy was 320.63 mt (15,640 bu).

**Table 2.3.3: Quantities of Seed Paddy Issued by the DOA (mt)-2013**

Season	Program	Foundation	Registered	Sub Total	Certified	Grand Total	
						mt.	bu.
2013 Yala	Farm	25.91	5.35	31.26	0.57	31.83	1553
	Cont. Growing	0	0	0	0	0	0
	Private	3.67	290.0	293.67	11.42	305.09	14882
	Extension	5.95	641.28	647.23	72.88	720.11	35127
	Sub Total (mt.)	35.53	936.63	972.16	84.87	1057.03	
	Sub Total (bu.)	1733	45689	47422	4140		51562

Season	Program	Foundation	Registered	Sub Total	Certified	Grand Total	
						mt.	bu.
2013/14 Maha	Farm	34.5	3.94	38.44	0.94	39.38	1921
	Cont. Growing	0	0	0	0	0	0
	Private	8.53	319.51	328.04	5.55	333.59	16273
	Extension	17.55	955.84	973.39	229.27	1202.66	58666
	Sub Total (mt.)	60.58	1279.29	1339.87	235.76	1575.63	
	Sub Total (bu.)	2955	62404	65359	11500		76859
Issues for the year 2013	Farm	60.41	9.29	69.70	1.51	71.21	3474
	Cont. Growing	0	0	0	0	0	0
	Private	12.20	609.51	621.71	16.97	638.68	31155
	Extension	23.50	1597.12	1620.62	302.15	1922.77	93793
	Sub Total (mt.)	96.11	2215.92	2312.03	320.63	2632.66	
	Sub Total (bu.)	4688	108094	112782	15640		128422

### Production and Distribution of Seeds of Other Field Crops

Thirty three varieties of twelve Other Field Crops were used to produce four different classes of seeds (Foundation, Registered, Certified and Commercial seeds) during year 2013. Total production is 615 mt., which is nearly 20% higher than that of the year 2012 (514 mt.)

### Basic seed (Foundation and Registered seeds) production

In this year total basic seed (Foundation and Registered), production is 99,816 kg, and it is 41 % higher than that of the previous year (70,750 kg.). Basic seed production was significantly increased in crops like Greengram, Soyabean and Groundnut due to the high demand of seeds of the accelerated OFC crop production program. Lower production of maize seeds was due to the availability of sufficient buffer stocks in hand.

Total quantities of Foundation seed produced during this year in Government seed farms and registered seed produced in Government farms and contract seed farms are given in Table 2.3.4.

### Certified Seed production

Certified seeds of OFC were mainly produced through contract seed farms. However, hybrid seed of Maize variety “Sampath” was produced in Government Seed farms at Maha Illuppallama, Alutharama and Bata Atha. Higher production is achieved in both farm and contract programmes conducted during the year. Total amount of certified seeds produced was 515 mt which is a 16% increase over the year 2012 (Table 2.3.5). It is mainly due to the expansion of contract programme of Greengram, Soyabean and Maize (OPV) seed during this year. Substantial quantity of commercial seeds of sunhemp was also produced for the use in government seed farms and research stations as a green manure crop.

### Issue of OFC seeds

The amount of Basic (Foundation and Registered) and certified seed issued during year 2013 is given in Table 2.3.6. Total amount of seeds of OFC issued during year 2013 is 470.62 mt, which is 14.7% lower than

that of the previous year (551.64 mt.). This significant decrease in supply was mainly due to low demand for Maize, Soyabean and Greengram seed and low supply of Groundnut and Cowpea seeds.

**Table 2.3.4: Basic Seed Production (kg) of OFC– Year 2013**

Crop	Foundation			Registered						Sub Total	Total Basic Production
	Seed Farm		Total	Seed Farm			Contract Programme				
	2012/ 13 Maha	2013 Yala		2012/ 13 Maha	2013 Yala	Total	2012/ 13 Maha	2013 Yala	Total		
Black gram	1498	922	2420	511	997	1508	953	5938	6891	8399	10819
Chilli seeds	165	443	607	0	0	0	0	0	0	0	607
Cowpea	289	0	289	3675	2262	5937	1015	1865	2880	8817	9106
Sesame	0	15	15	0	103	103	57	410	467	570	585
Green gram	522	822	1344	275	1358	1633	648	40099	40747	42380	43723
Groundnut	1739	85	1824	351	4675	5026	237	0	237	5262	7086
Finger millet	350	601	951	1559	1026	2584	228	274	502	3086	4037
Maize (OPV)* seeds	1436	0	1436	1275	2854	4129	3905	1263	5168	9297	10733
Soy bean	200	0	200	420	859	1279	0	11642	11642	12921	13121
<b>Total</b>	<b>6198</b>	<b>2887</b>	<b>9086</b>	<b>8066</b>	<b>14132</b>	<b>22198</b>	<b>7043</b>	<b>61489</b>	<b>68532</b>	<b>90731</b>	<b>99816</b>

\*OPV- Open pollinated varieties

**Table 2.3.5: Certified OFC Seed Production (kg) in Govt. Seed Farms and Under Contract Growing-2013**

Crop	Seed Farm							Contract Program							Grand Total
	2012/13 Maha		Total	2013 Yala		Total	Sub Total	2012/13 Maha		Total	2013 Yala		Total	Sub Total	
	Ct/St/F <sub>1</sub>	Com.		Ct/St/F <sub>1</sub>	Com.			Ct/St/F <sub>1</sub>	Com.		Ct/St/F <sub>1</sub>	Com.			
Blackgram	0	0	0	0	0	0	0	25411	1159	26570	18437	1507	19944	46514	46514
Chilli Seed	0	0	0	0	0	0	0	3070	0	3070	5319	0	5319	8389	8389
Cowpea	0	0	0	181	0	181	181	3375	365	3740	14812	3095	17907	21647	21828
Sesame	161	0	161	0	0	0	161	669	108	777	1411	547	1958	2735	2896
Greengram	0	0	0	0	0	0	0	9217	1811	11028	123464	40749	164213	175241	175241
Groundnut	85	0	85	782	9680	1750	1835	11281	13613	24894	27722	33077	60799	85693	87528
Fingermillet	0	0	0	0	0	0	0	1377	56	1433	456	0	456	1889	1889
Maize (OPV)*Seeds	858	0	858	539	0	539	1397	65515	2565	68080	16245	3249	19494	87574	88971
Maize(Sampath) seeds	4154	0	4154	537	0	537	4691	0	0	0	0	0	0	0	4691
Soyabean	0	0	0	265	0	265	265	3958	284	4242	43938	24946	68884	73126	73391
Sunhemp	0	17	17	0	4067	4067	4084	0	0	0	0	0	0	0	4084
<b>Total</b>	<b>5258</b>	<b>17</b>	<b>5275</b>	<b>2304</b>	<b>5035</b>	<b>7339</b>	<b>12614</b>	<b>123873</b>	<b>19961</b>	<b>143834</b>	<b>251804</b>	<b>107170</b>	<b>358974</b>	<b>502808</b>	<b>515422</b>

Ct – Certified seeds St – Standard seeds F<sub>1</sub> – F<sub>1</sub> seeds Com. - Commercial seeds

**Table 2.3.6: Issue of OFC seeds (kg) during 2013**

Crop	2013 Yala (kg)						2013/14 Maha (kg)						Year 2013 (kg)						Grand										
	Br		Fd/Ba		Rg		Ct/St/		F <sub>1</sub>		Cm		Total		Br		Fd/ Ba			Rg		Ct/St/		F <sub>1</sub>		Cm		Total	
	Br	Fd/Ba	Rg	F <sub>1</sub>	Cm	Total	Br	Fd/Ba	Rg	F <sub>1</sub>	Cm	Total	Br	Fd/ Ba	Rg	F <sub>1</sub>	Cm	Total											
Blackgram	75	335	1247	15268	4357	21282	43	123	3085	25648	1637	30526	119	458	4332	40916	5994	51818											
Chilli	2	158	0	162	1999	2321	3	308	0	912	2945	4168	5	466	0	1074	4944	6489											
Cowpea	0	526	4876	4462	203	10067	42	315	1908	8182	1692	12139	42	841	6784	12644	1895	22206											
Sesame	20	35	312	690	231	1288	0	5	199	2684	454	3342	20	40	511	3374	685	4630											
Greengram	84	1446	5762	9934	6119	23345	65	176	24761	126059	19720	170780	149	1622	30523	135993	25839	194125											
Ground nut	168	581	285	7903	15269	24205	97	693	1820	28547	47575	78731	265	127391	2105	36450	62843	102936											
Fingermillet	9	61	678	237	177	1162	4	30	2526	1427	272	4259	13	1475	3204	1664	449	5421											
Maize (OPV)	50	887	6892	716	0	8545	206	588	5247	33422	0	39462	256	0	12139	34138	0	48007											
Maize (Hybrid)	0	0	0	274	0	274	0	0	0	1070	0	1070	0	872	0	1344	0	1344											
Soyabean	80	596	556	2617	3735	7584	172	276	4590	16494	4011	25542	252	3	5146	19111	7746	33126											
Sunhemp	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3											
B.Onion	0	0	0	0	308	308	0	0	0	0	216	216	0	0	0	0	524	524											
<b>Total</b>	<b>488</b>	<b>4627</b>	<b>20608</b>	<b>42263</b>	<b>32398</b>	<b>100383</b>	<b>632</b>	<b>2512</b>	<b>44136</b>	<b>244445</b>	<b>78521</b>	<b>370245</b>	<b>1119</b>	<b>7140</b>	<b>64744</b>	<b>286708</b>	<b>110919</b>	<b>470628</b>											

**Ct** – Certified seeds **St** – Standard seeds **F<sub>1</sub>** – F<sub>1</sub> seeds **Cm** - Commercial seeds **Br** – Breeder seeds **Fd** – Foundation seeds **Ba** – Basic seeds **Rg** – Registered seeds

## PRODUCTION AND SUPPLY OF VEGETABLE SEEDS

### Basic seed production

There are 55 DOA recommended varieties in 18 vegetable crops grown in the country. Production of basic seed of some varieties was carried out in eleven government seed farms (Table 2.3.7). Total seed quantity produced in 2013 was less than that of year 2012 (6213.70 kg) which is mainly due to the low production of Bean.

**Table 2.3.7: Basic Vegetable Seed Production in Government Farms -2013**

Crop	Quantity		Total
	Produced (kg)		
	2012/13	2013	
	Maha	Yala	
Bean	1897.0	590.0	2487.0
Bittergourd	43.3	43.7	87.0
Brinjal	0	37.3	37.3
Bushitavo	423.1	45.0	468.1
Mae	357.5	191.0	548.5
Okra	0	139.1	139.1
Snakegourd	79.1	95.0	174.1
Wingedbean	124.0	49.2	173.2
Tomato	41.3	65.5	106.8
Amaranthus	172.0	0	172.0
Luffa	0	3.6	3.6
Cucumber	19.1	86.1	105.2
Sweet melon	1.2	0	1.2
Radish	300.0	0	300.0
<b>Total</b>	<b>3157.6</b>	<b>1345.5</b>	<b>4503.1</b>

### Standard Vegetable Seed Production

Both public and the private sector organizations were involved in the production of standard seed. The quantities produced by SPMDC in government seed farms and under contract growing program are indicated in Table 2.3.8. The total production in Year 2013 was 50% higher than that of the previous year which was a opposite trend to the basic seed production. Higher production was mainly due to the higher quantity of Bittergourd, Bushitavo, Mae, Snakegourd, Winged bean, Radish and Cucumber seed purchased under the contract growing program.

**Table 2.3.8: Standard Vegetable Seed Production (kg) by DOA-2013**

Crop	Farm Programme			Contract Programme			Grand Total
	2012/13	2013	Total	2012/13	2013	Total	
	Maha	Yala		Maha	Yala		
Bean	0	0	0	18626.5	96.0	18722.5	18722.5
Bittergourd	51.9	126.9	178.8	2257.4	4616.0	6873.4	7052.2
Brinjal	97.8	42.0	139.8	0	84.1	84.1	223.9
Bushitavo	412.3	228.3	640.6	1776.0	6851.7	8627.7	9268.3
Capsicum	70.8	108.6	179.4	1.3	0	1.3	180.7
Cucumber	40.6	0	40.6	381.1	548.9	930.0	970.6
Luffa	248.0	55.1	303.1	959.1	0	959.1	1262.0
Mae	164.8	117.2	282.0	8418.2	1847.1	10265.3	10547.3
Okra	642.0	0	642.0	2459.0	0	2459.0	3101.0
Snakegourd	247.7	200.0	447.7	1897.0	2413.4	4310.4	4758.1
Tomato	123.0	188.0	311.0	78.9	190.2	269.1	580.1
Wingedbean	1030.0	191.0	1221.0	1996.2	2065.5	4061.7	5282.7
Amaranthus	541.3	0	541.3	0	0	0	541.3
Radish	100.0	0	100.0	1779.0	0	1779.0	1879.0
Spinach	25.6	0	25.6	0	0	0	0
<b>Total</b>	<b>3795.8</b>	<b>1257.1</b>	<b>5052.9</b>	<b>40629.7</b>	<b>18712.9</b>	<b>59342.6</b>	<b>64395.5</b>

### Hybrid Vegetable Seed Production

F1 hybrid seeds of one brinjal variety and two tomato varieties were produced successfully in seed farms (Table 2.3.9). Brinjal was produced in Kundasale, Ambepussa and Alutharama while tomato was produced only in Kundasale farm. Production of F1 seeds of both crops were much lower than that of year 2012.

**Table 2.3.9: Hybrid Vegetable Seed Production (kg)- in Govt. Farms - 2013**

Crop	2012/13	2013	Total
	Maha	Yala	
Tomato	1.5	2.3	3.8
Brinjal	21.18	15.0	36.18
<b>Total</b>	<b>22.68</b>	<b>17.3</b>	<b>39.98</b>

### Vegetable Seed Distribution

Vegetable seeds were distributed through the DOA sales outlets and the registered dealer network. These dealers include Agrarian Service Centres (ASCS), Cooperative societies, Farmer organizations, Provincial DOA and private registered seed merchants. Quantities of vegetable seeds supplied by DOA are given in Table 2.3.10.

Supply of Standard seed in 2013 was much lower when compared to the year 2012, where as supply of Basic seed was slightly lower in 2013. However, overall supply in year 2013 is remarkably lower than that of the year 2012.

**Table 2.3.10: Vegetable Seed Supplied by DOA – 2013 (kg)**

Crop	Basic			Standard			Grand Total
	2013	2013/14		2013	2013/14		
	Yala	Maha	Total	Yala	Maha	Total	
Bean	74.3	80.8	155.1	4242.6	2981.4	7224.0	7379.1
Bittergourd	122.8	357.94	480.7	128.6	1974.1	2102.7	2583.4
Brinjal	4.73	3.585	8.3	87.06	410.56	497.6	505.9
Bushitavo	370.3	80.9	451.2	210.2	744.15	954.4	1405.6
Capsicum	3.74	1.0	4.7	79.6	154.13	233.7	238.5
Cucumber	12.4	1.2	13.6	36.65	20.88	57.5	71.1
Luffa	28.8	200.25	229.1	30.6	1020.75	1051.4	1280.4
Mae	146.2	61.0	207.2	671.0	3620.85	4291.9	4499.0
Okra	200.65	168.195	368.8	705.9	2645.75	3351.7	3720.5
Thibbatu	0.005	0	0	0	1.5	1.5	1.5
Radish	5.14	126.5	131.6	60.0	510.45	570.5	702.1
Snakegourd	60.4	40.2	100.6	195.2	476.85	672.1	772.7
Spinach	1.4	0.95	2.4	38.1	73.05	111.2	113.5
Sweet Melon	0	0	0	41.5	11.6	53.1	53.1
Tomato	8.425	71.44	79.9	45.72	752.73	798.5	878.3
Wingedbean	201.2	158.2	359.4	74.6	520.15	594.8	954.2
Amaranthus	100.26	9.2	109.5	31.0	61.05	92.1	201.5
<b>Total</b>	<b>1340.8</b>	<b>1361.31</b>	<b>2702.1</b>	<b>6678.3</b>	<b>15979.95</b>	<b>22658.3</b>	<b>25360.3</b>

### Supply of Vegetable Seed Home Gardening packs for Divi Naguma Programme

Over 1.2 million packs with seeds of 06 crops were supplied for the Divi –Naguma programme during year 2013.

mt. respectively. The target could not be achieved due to unexpected heavy rain prevailed during both 2012/13 Maha and 2013 Yala season. The total quantity of seeds produced in year 2013 was 471.728 mt. (Table 2.3.11 )

### PRODUCTION AND ISSUES OF SEED POTATO

The production of Pre-basic (G0), Basic (G1, G2, G3) and Certified seed of variety Granola were 0.155 mt., 32.065 mt. and 52.86 mt. respectively during the 2012/13 Maha season.

The production of Pre-basic, Basic and Certified seeds of variety Granola, during 2013 Yala were 1.507 mt., 253.726 mt. and 131.415

**3.11: Production of Pre-basic (Go) , Basic (G1, G2 & G3) and Certified (C1 &C2) seed potato (mt) during year 2013 (Variety Granola)**

Season	Pre Basic	Basic	Certified	Total
2012/13 Maha	0.155	32.065	52.860	85.080
2013 Yala	1.507	253.726	131.415	386.648
<b>Total</b>	<b>1.662</b>	<b>285.791</b>	<b>184.275</b>	<b>471.728</b>

The quantity of seeds issued for seed producers in year 2013 was 391.3 mt. (164.7 mt in 2013 Yala and 228.4 mt in 2012/13 Maha)

**PRODUCTION & SUPPLY OF PLANTING MATERIAL**

Planting material production programs were implemented in 20 DOA farms under Farm Advance Account and produced budded plants, rooted cuttings, seedlings and suckers of fruit crops and few other crops were produced.

Total planting material production was 768,045, which is 40% higher than 2012 (547,019). However it includes 261,313 dwarf murunga seedlings produced and distributed for Divinaguma program.

Under the budded fruit plant category 344,941 plants of 17 fruit crops were produced, which is 10.8 % higher than that of year 2012 (311,066).

Total planting material supply was 599,999, which is 160% higher than that of year 2012 (230,895). Total planting material supply was 78% over the production in 2013, which was 42% in year 2012.

**Table 2.3.12: Production and Supply of Planting Material in DOA Farm in 2013**

Crop	Prod.	Issues
<b>Budded Plants</b>		
Avacado	10012	9212
Belifruit	2715	1333
Durian	9753	6183
Wood Apple	1721	1827
Jack	12221	8102
Uguressa	1139	567
Lime	3028	1957
Mango	147705	87766
Mandarine	13522	8528
Jambu	3244	1386
Orange	69852	47166
Rambutan	50550	38834
Sapadilla	1646	1704
Starfruit	4358	4542
Mangosteen	232	52
Pears	4768	4667
Apple	149	133
Super Grade plants	2164	1937
Other	6162	4020
<b>Sub Total</b>	<b>344941</b>	<b>229916</b>
<b>Rooted Cuttings</b>		
Grapes	390	376
Jambu	2021	2323
Pomaganate	704	491
Lemanine	1582	1199
Dragonfruit	2713	1718
Granadilla	200	177
Pepper	3765	3755

Crop	Prod.	Issues
Super Grade plants	6	4
Other	10388	9836
<b>Sub Total</b>	<b>21769</b>	<b>19879</b>
<b>Seedlings</b>		
Amberalla	6765	7394
Starfruit	1257	750
Papaya	9650	6348
Pormagranate	31586	24822
Guava	7060	6763
Sesbania	3534	2875
Drumstick	261313	261313
Curry leaves	95	84
Lime	27506	15407
Nelli	390	331
Anoda	3855	2227
Passion Fruit	3307	4331
Crop	Prod.	Issues
Orange	10000	500
Super Grade plants	1	1
Other	15589	13801
<b>Sub Total</b>	<b>381908</b>	<b>346947</b>
<b>Suckers</b>		
Banana	1427	1457
Pine apple	18000	1800
<b>Total</b>	<b>768045</b>	<b>599999</b>
Vegetable pots	17733	14117

### Performance of the Advance Account

In 2013, the Advance Account for the maintenance of Agricultural Farms and Sale of Seeds has recorded a total revenue of Rs. 424,160,945 and a total expenditure of Rs. 413,984,763. Accordingly, revenue over expenditure stands at Rs. 10,176,182, generating a gross profit of Rs. 138,315,003 and a net profit of Rs 7,899,390. Performance

of the advance account during the year is given in Table 2.3.13.

**Table 2.3.13: Performance of the Advance Account in 2013**

Farm	Profit/ Loss (Rs.)
Aluttarama	-6,269,957
Ambalantota	3,521,201
Ambepussa	563,119
Bataata	-583,337
Kandapola	8,506,046
Kantale	12,133,825
Karadiyanaru	-13,115,232
Kundasale	6,411,842
MahaIlluppallama	4,960,038
Malwatte	5,434,585
Meepilimana	2,593,324
Middeniya	-2,782,333
Murunkan	374,838
Paranthan	4,571,213
Piduruthalagala	16,900,889
Polonnaruwa	19,170,824
Rahangala	3,676,805
Sita Eliya	13,980,511
Uderadella	12,664,226
Others (Sales Centers/ DD Office)	45,602,576
<b>Total</b>	<b>138,315,003</b>

### PLAN FOR 2014

- Continuation of infrastructure development activities under farm development such as land development, development of Irrigation facilities, increasing availability of machineries and agricultural infrastructure, paving way for the high productivity in seed farms and enhancing the production of basic seeds.
- Strengthening of contract seed production programme and increasing the certified

seed production of paddy, OFC and vegetable.

- Contribution in supplying of 50% of vegetable seed packs and planting material for the Divinaguma National Programme in 2014.
- Improvement of seed distribution through opening of new seed sales centres.
- Improvement of seed packing.

## STAFF LIST

Designation	No.
Director	01
Additional Director	03
Deputy Director	17
Assistant Director	03
Agriculture Officer	14
Accountant	01
Agri. Instructor	136
Farm Machinery Instructor	01
Technical Assistant	12
Ag. Monitoring Officer	02
Programme Assistant	03
Development Officer	25
Administrative officer	02
Management Assistant	82
Farm Clerk	30
Driver	66
Tractor Operator	33
Mechanic	03
Electrician	02
Machine Operator	03
Mason	01
Carpenter	03
Budder	32
Curcuit Bunglow Keeper	06
KKS	07
Storeman	24
Watcher	147
Lorry Cleaner	10
Special store labour	01
Sanitary Labour	03
Labour (Grade iii)	304
<b>Total</b>	<b>977</b>

## 2.4 SOCIO ECONOMICS & PLANNING CENTRE (SEPC) – PERADENIYA

The SEPC functions as the major advisory body that supports the DOA and the Ministry of Agriculture in formulating agricultural policies, research and development planning and conducts socio-economic research and agricultural policy analysis. The SEPC maintains a statistical unit to compile agricultural statistical information. The Centre coordinates the activities of local and foreign funded projects of the DOA. In year 2013, socio-economic research and policy analysis was focused on analysis of economic and financial viability of agriculture development programmes, investment in agriculture and

input policies. The centre contributed to streamline various research and development programmes of the DOA by identifying and prioritizing research agenda and guiding policy makers in developing strategies to solve problems concerning food shortage, especially in the context of recent changes in government policies and changes in global and domestic economic environment. The comprehensive programme to build a database on cost and returns of all major food crops on district and seasonal basis was continued.

### BUDGET

The budgetary allocations and expenditure under capital, recurrent and special projects are given in Table 2.4.1.

**Table 2.4.1: Annual budget - 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	2,439,500	2,202,838	90
Recurrent	4,247,378	4,170,873	98
NARP-SEPC research	1,331,600	1,265,855	95
NARP-Capacity Building of Research officers	1,960,300	NIL	0
<b>Total</b>	<b>8,018,478</b>	<b>9,978,778</b>	<b>77</b>

### PROGRESS

#### SOCIO ECONOMIC RESEARCH

Out of thirteen socio-economic research studies, seven studies were completed, one study was abandoned and the balance 5 studies will be continued in year 2014. The studies of impact of climatic change of rice production in

Sri Lanka, farmer perception and adaptation to climatic change, socio economic study of low country wet zone, farmers willingness to accept rice technologies in Sri Lanka, assessment of wild life risk on food crop production and cost of cultivation studies of 2011/12 Maha and 2012 Yala were the socio-economic studies completed.

### **Cost and returns of crop production**

The routine programme of seasonal publication of cost cultivation studies was continued. The costs and returns studies of Maha 2011/2012 and Yala 2012 for paddy and subsidiary food crops, root and tuber crops and vegetables were published, and field data collection and data tabulation is over of 2012/13 Maha study, and field data collection of 2013 Yala study is 85% completed. The publications include average yield, gross and net returns, total and unit cost of production, farm gate prices received and related information for rice, vegetables and other field crops. The data are useful when making decisions on crop production and marketing at the farm level as well as in policy making at national level, and analysis of policy impacts. Provisional study reports of 2013 Yala and 2013/14 Maha seasons were completed.

### **Socio Economic study in the Low Country Wet Zone**

A benchmark survey of the low country wet zone productivity enhancement project to analyze the current status of production, extent and average yield of paddy and to estimate the comparative advantage of paddy production in low country wet zone was conducted. Results revealed that, the average yields and production in the wet zone were more stable compared to dry and intermediate zones. The Domestic Resources Cost (DRC) coefficients ranged from 1.01 in (Matara) to 1.26 (Colombo) depicted a slight comparative disadvantage in rice production in the wet zone.

### **Farmers' perception and adaptation to climatic change in Kurunegala district**

Climate is a key factor influencing agricultural production and its fluctuations largely affect the food security and smallholder farmers are the most susceptible to climate change. Therefore, a study was conducted in the most vulnerable three Divisional Secretariats (DS) in Kurunegala District in April 2013 to examine the impact of climate change on farm income, farmer awareness, adaptation options and determinants and barriers to adaptation. The results indicated that 97% of farmers are affected by adverse climate and drought is the prominent climatic hazard in the area. Further 44% of agriculture income is lost by each of the 4 seasons due to drought.

### **AGRICULTURAL POLICY**

#### **ANALYSIS**

Five agricultural policy analysis studies were conducted during the year. Total factor productivity decomposition of rice farming in Sri Lanka, intensification and diversification of rice cultivation in Sri Lanka, study on seed certification system of the DOA, cost based price estimation of the seed supplied by the DOA and economic impact of research investment on maize sector in Sri Lanka are the studies conducted and all five studies were at the final stage of completion

#### **Impact of trade liberalization of onion subsector in Sri Lanka**

A study was conducted to examine the impact of trade liberalization policies on onion subsector in Sri Lanka. Secondary data for the

time period from year 2000 to year 2010 were used for the study. The results indicated that positive protection and comparative advantage, and for big onion and red onion producers. Estimated overall welfare impacts of trade liberalization are Rs 16 million for big onion and Rs 870 million for big onion.

### **Productive efficiency and farm profitability of rice**

A study was conducted to analyze how raising efficiency of production affects rice farm profitability. Data relevant for Maha 2008/09 and Yala 2009 in irrigated water regime (Ampara, Anuradhapura, Hambantota, and Polonnaruwa districts), and rain fed water regime (Gampaha and Kalutara districts) were analyzed. The study indicated that farm profits could be raised in the irrigated water regime in the tune of 23% to 32% by raising technical efficiency and by 30% to 64% by eliminating both technical and allocative inefficiencies. In the rain fed water regime, profits could be raised within the range of Rs 11900/Ac – Rs 16,200/Ac by eliminating technical inefficiencies and within the range of Rs 21,300 to Rs 26,850/Ac by eliminating both technical and allocative inefficiencies.

### **An analysis in dry chilli production in Sri Lanka**

A study was conducted to examine the possibility of Sri Lanka's prospects of becoming self-sufficient in chilli production. Study results indicated that dry chilli retail price decreased from Rs. 385/kg to Rs. 203/kg in real terms and national yield increased from 0.7 t/ha to 0.92 t/ha during years 1995 and 2011. Raising levels of productivity is needed

to achieve targets of achieving self-sufficiency in dry chilli production in Sri Lanka.

## **PRODUCTION AND MARKETING STUDIES**

Four production and marketing studies: evaluation of potato seed production program of Agricultural Research Station at Seetha Eliya, study on production and marketing aspects of maize, study on the productivity and profitability of Mahailuppallama and Kundasale seed farms and the study on marketing margin of rice in Sri Lanka over last two decades were conducted. Three of the studies were in the data analysis stage and the other study was on data collection stage.

### **Evaluation of farmer level informal seed potato production programme at Nuwara Eliya**

A field survey of 72 farmers in 2012 yala and 2012/13 maha was conducted in Nuwara Eliya District with the general objective of evaluation of informal potato seed production programme of farmers who receives potato mini-tubers from Agriculture Research Station at Sita Eliya. The proportion of G<sub>1</sub> seed remained for cultivating G<sub>2</sub> is 35%. Thus, only a very few farmers have gone through the complete cycle starting from G<sub>0</sub> to Consumption potato. The production ratios of G<sub>0</sub>, G<sub>1</sub> and G<sub>2</sub> are 1:4, 1:7 and 1:10 respectively. Although 80% of the farmers have participated for trainings, more than 50 % of the farmers have used only 4 out of 15 major recommended practices. Major shortcomings of the programme were lack of adequate extension services, high transport distance faced by farmers, lack of timely

supply of potatoes, lack of new technologies and no formal market channel for seed potatoes.

## **AGRICULTURAL DATA MANAGEMENT**

The SEPC continued to provide data for the DOA and clients outside of the DOA facilitating Planning and Research work

### **AgStat 2013**

The booklet on agricultural statistics comprising of salient features of information on food crop sector was compiled and published AgStat 2013. Vol. X contained numerous information such as socio economic data, land use types, extent and production, import and export, per capita availability, wholesale and retail prices. The statistical information provided here is widely used by researchers, policy planners, students, academics, administrators, farmers and entrepreneurs.

### **Crop Forecast**

Crop forecast is a monthly publication of SEPC which provides information related to prevailing situation on crop cultivation, forecast the production, regional distribution of production, harvesting periods, occurrence of extreme weather conditions, pests and diseases, *etc* of paddy, other field crops and vegetables. Twelve crop forecast reports were prepared during the year.

## **PROJECT PLANNING, PREPARATION AND COORDINATION**

The SEPC collected project proposals from various institutes/centers of the DOA and submitted to MOA for perusal with the treasury. The SEPC continued coordination of disciplinary working groups, National Agricultural Research Plan of the DOA, and implementation of the memoranda of understanding.

### **Plans Prepared**

- **Other field crop production plan**

The SEPC was mainly involved in preparations of the production plan for 2013-2015 period for OFC's. Under this production plan, Divisional Sectariat level OFC production target and seed requirement were identified for 2013 Yala and 2013/14 Maha seasons.

## **HUMAN RESOURCES AVAILABILITY AND DEVELOPMENT**

Dr. R.M. Herath, Senior Agricultural Economist was appointed to cover the duties of the Deputy Director position of the institute. Mr. S. Mathangaweera, Agricultural Economist Assistant and Mr. N.L. Sudeera, Programme Assistant were promoted as Agricultural Economists. Mrs. I.U. Sivirathna, Agricultural Economist Assistant, retired from the service. One Agricultural Economist and three Agricultural Economist Assistants were recruited within the year. Two Agricultural Economists were on leave abroad for studies

and employment. The SEPC organized a capacity building workshop on cost of cultivation studies for SEPC technical staff at In-Service Training Institute, Gannoruwa, Peradeniya, 8<sup>th</sup> and 9<sup>th</sup> July 2013.

### PLAN FOR 2014

- Cost of cultivation studies for major food crops.
- Situation analysis of Soya bean production
- Diffusion and Adoption of rice technologies in Sri Lanka-Phase II.
- Modeling profitable farming system for wet zone using APSIM model approach.
- Development of web based crop forecasting system.
- Evaluation of new fertilizer recommendation for paddy.
- Study on the productivity and profitability of Kundasale Seed farm.
- Ongoing evaluation study of Big onion production in Hambantota and Monaragala districts.
- Crop forecasting.
- Compilation of booklet which contain current agricultural information – Agstat.
- Coordinating NARP projects, memoranda of understanding and disciplinary working groups.
- Project/Proposals preparation, handling and directing.
- Evaluation of fruit village programme.
- JICA vegetable Seeds project monitoring and evaluation and COP Analysis.

### STAFF LIST

Designation	No.
Director	01
Addl. Director	01
Deputy Director	01
Agricultural Economist	14
Agricultural Monitoring Officer	01
Economist Assistant	11
Development Officer	03
Agricultural Instructor	02
Administrative Officer	01
Public Management Assistant	07
Driver	05
Labourer	03
KKS	01
<b>Total</b>	<b>51</b>

### 3.1. EXTENSION & TRAINING CENTRE (ETC) - PERADENIYA

The goal of the Extension & Training Centre is to achieve the highest level of productivity in the food crops sector to ensure food security of the country as well as to improve living standards of the farming community. Extension and Training Centre focuses on four main areas: Extension, Training, Agricultural Education and Examination. Following activities are conducted to achieve the objectives of the Extension and Training Centre.

- Direct extension programmes in major irrigation schemes conducted through the 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 Institutes, four District Agricultural Training Centres and Farm Mechanization Training Centre.
- Conduct two-year diploma course in agriculture at Schools of Agriculture Kundasale, Pelwehera, Angunakola-pelessa,, Vavuniya and Karapincha.
- Conduct Young Farmers Club activities.
- Conduct bee keeping development activities at Bindunuwewa Bee Development Unit.
- Popularize environmental friendly agriculture programs in the country by Plant Nutrient and Organic Agriculture Unit.
- Conduct agriculture enterprise development programs, other field crop development programs, micro irrigation & protected agriculture and women's agricultural extension programmes.
- Horticultural crops development and training activities at Bibile Horticultural Crops Training & Development Institute.
- Short term vocational agriculture training courses for farmers, officers, school leavers, school students and general public, at Special Training Centers in Labuduwa, Anuradhapura and Wariyapola.

### BUDGET

**Table 3.1.1: Annual budget – 2013**

Vote	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure %
Capital	54.08	33.18	61
Recurrent	142.62	133.87	94
<b>Special Capital Projects</b>			
<i>Funds Under DOA Vote</i>			
Training and Capacity Building	17.20	17.20	100
Agricultural Training Farms	17.50	16.20	93

<b>Vote</b>	<b>Allocation (Rs. Mn.)</b>	<b>Expenditure (Rs. Mn.)</b>	<b>Expenditure %</b>
<b><i>Funds Under Ministry Vote</i></b>			
Rice Export Zones	5.13	3.42	67
Increasing seed availability of popular traditional vegetables	3.00	2.68	89
Development of locally appropriate GAP programme	1.31	0.59	45
Improving income of rural farmers through establishing a food processing training center and encouraging private sectors on food processing	2.00	0.16	8
Mainstreaming Biodiversity Conservation and Sustainable use for improved human nutrition and wellbeing (BFN project)	2.00	0.04	2
<b>Total</b>	<b>244.84</b>	<b>207.34</b>	<b>85</b>

## **PROGRESS**

### **SPECIAL PROJECTS**

#### **Training and Capacity Building**

This special project was implemented with the view of improving capacity and skills of officers of Department of Agriculture.

Under this project 44 number of local training programmes were conducted and also officers were facilitated to participate 12 foreign training programmes. In addition, 3 officers of the DOA were funded for their post graduate degrees. Also final exam was conducted for 78 number of Agriculture Research & Production Assistants. Crop clinics programme introduced for newly recruited AII by Seed Certification Service was also facilitated under this project.

#### **Agricultural Training Farm Land Development**

Under this project farm lands of five Diploma Schools of Agriculture, three In-Service

Training Institutes, Farm Mechanization Training Centre, Special Training Centres at Wariyapola & Labuduwa and Horticultural Crop Training and Development Institute, Bibile were developed.

Cultivation and maintenance of crops, construction and repair of crop production structures, maintenance of farm animals, purchasing of farm implements, fence & farm road development activities were done under this project.

#### **Rice Export Zones Project**

During the year 2013 this project was conducted with the objective of producing high quality seed paddy for rice export project in Mahaweli system C & B areas. Under this project paddy variety BG 11/65 (Basmathi type) and traditional varieties 'Suwandel' & 'Pachcha Perumal' were cultivated and it was assisted by providing seed paddy, parachute trays and technical guidance. The total extent cultivated for producing seed paddy was 80 ha.

## Increasing Seed Availability of Popular Traditional Vegetables

Under this project 16 number of training centres of Department of Agriculture were funded for producing traditional vegetable seeds. Following amounts of seeds were produced during the year 2013.

**Table 3.1.2: Quantities of vegetable seeds produced**

Vegetable	Amount Produced (kg)
Tomato	7.16
Tibbatu	7.07
Brinjal	13.2
Thalanabatu	46.21
Pumpkin	16.15
Okra	31
Kekiri	198
Long bean	19.25
Bitter gourd	23

To achieve the objective of traditional vegetable seeds availability, it is expected to distribute packets with five types of vegetable seeds among farmers to cultivate at homegarden level.

## Mainstreaming Bio-diversity Conservation and Sustainable Use for Improved Human Nutrition and Well Being (BFN Project)

The main objective of this project was to create an awareness among public in selected areas (Gampola, a site in Kurunegala district, Udukumbura, a site in Kandy district, Ambatenna, a site in Ratnapura district) and establish a market chain.

During year 2013 each area was visited to plan the project and training programs were

conducted at selected areas on home gardening and food nutrition. Also prepared & completed an estimate for sales outlet in Colombo.

## Improving Income of Rural Farmers through Establishing a Food Processing Training Center and Encouraging Private Sectors on Food Processing

The main objective of this project was training farm women entrepreneurs on food processing and assist to increase their income. The project was conducted in the areas of Nuwaraeliya, Matale, Kurunegala, Puttlam, Monaragala, Batticaloa, Gampaha, Galle, Hambanthota, Ampara and all Inter-Provincials.

During the year 2013 eight number of training classes were conducted on food processing technology and entrepreneurship promotion. Also 101 number of beneficiaries were selected. Equipment need to provide for entrepreneurs as a support for initiating the business have been identified and procurement work is on-going.

## EXTENSION ACTIVITIES OF INTER-PROVINCIAL AREAS

Agriculture extension activities of the six Inter-Provincial (IP) areas located in the commanding areas of major irrigation schemes are under the purview of the Extension and Training Centre. Parts of the districts of Ampara, Anuradhapura, Hambanthota, Moneragala, Polonnaruwa and Kandy are demarcated as Inter-Provincial areas.

Total Paddy extents cultivated in IP areas during 2012/13 Maha and 2013 Yala were 1,81,560 ha and 1,37,905 ha respectively. The cultivated extent showed an increase of

13,260 ha during 2013 Yala when compared to 2012 Yala.

Special attention was given to increase the cultivated extents of Other Field Crops during the year. Mainly Big onion, Red onion, Maize, Green gram, Ground nut, Gingelly, Cowpea, Soy bean, Chilli, Finger millet and Black gram were cultivated in six Inter-Provincial areas. The total land extent under Other Field Crops was 35,607 ha in 2012/13 Maha and 16,407 ha in 2013 Yala. When compare to 2011/12 maha and 2012 Yala, cultivation extent had increased by 10,204 ha in 2012/13 Maha and 4702 ha in 2013 Yala. Cultivation of OFC during the third season has helped to increase OFC extent.

Specific information and performance of each inter-provincial area are described below.

## **INTER-PROVINCIAL AREA - HAMBANTOTA**

Hambantota IP area comprise extent of paddy about 15,000 ha under major irrigation, 1400 ha under minor irrigation and 50 ha under rain fed conditions. Lunugamwehera, Ridiyagama and Samanala wewa are the major irrigation schemes which provide irrigation facilities for crop cultivation. The two major cropping seasons, Yala & Maha and a third season between two major seasons are cultivated under above stated three irrigation schemes.

Hambanthota IP area comprises of two segments namely Walawa and Kirindoya. Agricultural extension activities are performed under the guidance of two segments of the extension staff covering two districts namely Hambanthota and Rathnapura. The two agricultural segments cover 06 Divisional Secretariat divisions namely, Ambalantota,

Hambantota, Tissamaharama, Lunugamwehera, Sooriyawewa and Balangoda. Extension activities are performed in 07 Agrarian Service Centres and commanding areas are Ambalantota, Lunama, Badagiriya, Weerawila, Yodakandiya, Beralihela and Kaltota. District Agricultural Training Centre (DATC) situated in Kirindioya agriculture segment which has residential facilities for 25 persons.

## **Achievements during 2012/13 Maha & 2013 Yala**

### **Paddy**

The extent under paddy had decreased due to increase in Banana and OFC cultivation in low lands. However during 2012/13 maha flood situation occurred twice and it adversely affected the paddy crop. The average yield was about 7.1 mt/ha.

The major constraint in paddy was excessive usage of weedicides. Two demonstrations were conducted to introduce transplanters to reduce weedicide application in paddy cultivation.

A special project was conducted to increase the paddy production with the collaboration of Ministry of Economic Development. Financial assistance was provided by the Ministry to cultivate 680 ha of paddy (07 yaya) and technical guidance was provided by the DOA. Several inputs such as seed paddy, tarpaulin etc were provided to farmer groups. IPM and IPNS concepts, proper land preparation techniques were used as a package in the above yaya.

### **Third Season Cultivation of Green gram**

Among the challenges of increasing yield within a limited land area was succeeded by cultivating green gram as a third season crop in paddy lands. 4703 ha was cultivated in the year 2013. About 1600 ha after Maha season and the balance extent after Yala season were cultivated. From this extent farmers produced 3540 mt of green gram and the recorded income was approximately Rs. 780 million. Several inputs such as seeds, tarpaulin etc were provided to farmer groups and the technical support was provided by the DOA. IPM technology was also introduced. Seeds were provided with 50% farmer contribution by the DOA and Ministry of Agriculture.

A special third season cultivation programme was introduced cultivating 1600 ha within the Ambalantota Agrarian Service Centre area soon after Maha season. Production was 1000mt and it's value was Rs.225 million. Forward sales agreement was signed with Plenty Food Company for 358 ha. The original target of cultivating 800 ha was reduced due to late Yala in Lunugamwehera right bank.

### **Off- season Cultivation of Big onion**

Several attempts were made from 2010 to increase the extent of Big onion during Maha season aiming to get the harvest from April to July where there was no production all over the country. Eleven hectares were cultivated during Maha and 4.35 ha during Yala. Several fields were damaged due to flood situations in Maha and some were ended up with a harvest of 10-12 mt/ha. Total production obtained were 60 mt from the off season. Awareness programmes were initiated at officer and

farmer level during 2013 Yala to increase the extent up to 300 ha during the year 2014.

### **Finger Millet Production**

About 400 mt of production was obtained from the cultivation of finger millet during 2012/13 Maha season. Farmers were encouraged to produce "ready to serve" foods with flour. Variety "Oshadha" was cultivated, and farmers were encouraged for seed production.

### **Red onion Seed Production**

This programme was implemented with 16 farmers and 13.8 kg of seeds & 1546 kg of bulbs were produced. This project initiated to encourage farmers to use true seeds and motivate off season cultivation. Apart from seed production 22.6 ha cultivated with Red onion during 2013 Yala. Vernalized "Vedhalen" bulbs were provided freely and the nets and polythene were provided with 50% farmer contribution.

### **Fruits and vegetables**

IPM concept for vegetable cultivation was introduced and technical awareness programmes conducted with the collaboration of Plant Protection Service of DOA.

Increasing extent of banana cultivation was prominent with the extensive cultivation methods in major irrigated areas.

### **Promotion programme for organic fertilizer production and usage**

Rs.24.875 mn was allocated for this project and polythene, a mamoty fork and 25 kg of ERP were given as a subsidy to selected 10,000 farmers to produce compost. They

produced 17 000mt of compost and used for their cultivation. A national level field day was conducted with the patronage of Hon Minister of Agriculture Mr. Mahinda Yapa Abeywardhana.

## **INTER-PROVINCIAL AREA - KANDY**

Inter-Provincial area Kandy includes five Divisional Secretariat divisions in three districts namely Minipe, Wilgamuwa, Kandaketiya, Redeemaliyadda, Mahiyangana in Kandy, Matale and Badulla Districts. Inter-Provincial area comprises of 11,737 ha of major Irrigation low land and 7403 ha of up lands with 22,397 number of farm families. This area has six numbers of irrigation schemes. The farmers cultivate paddy in low land at large scale in both Maha and Yala seasons, and extent of OFC increased during Yala season. The farmers are more preferred to grow white long paddy varieties than other varieties. Maize, Ground nut, Green gram, and Chilli are the main Other Field crops grown higher extent in both seasons.

### **2012/13 Maha**

During 2012/13 Maha season, paddy cultivation target was 13,487 ha. This included 11,737 ha cultivated under major irrigation and 1750 ha cultivated under rain fed. Out of this target, cultivated extent under major irrigation and rain-fed were 11,668 ha and 1854 ha respectively. This shows cultivated extent was higher than the target under rain fed. Yield obtained was 56,337.6 mt from 11,737 ha of major irrigation areas with the average yield of 4.8 mt/ha and rain fed extent with average yield of 3 mt/ha. The commercial

value of paddy produced was Rs.1980.7 million according to the market price. Paddy production in the area was contributed 2.35 % of the national production. Under the OFC cultivation 2058 mt of maize was harvested from 343 ha of cultivation. Commercial value of the maize production was Rs.61.7 million. The ground nut extent was 53.5 ha and value of the production was Rs. 10.43 million. 58 ha of Chilli was cultivated for green chilli production.

### **Special Programmes**

Seed production programme on Big onion was implemented with the extent of 1/10 ha using 1200 kg of mother bulbs. Due to heavy rain the expected target could not be achieved. However 54 kg of Big onion true seeds was produced. The purpose of this programme was to introduce self-seed production method for the Big onion growers.

### **2013 Yala**

Paddy cultivation target for Yala season was 6599 ha under major irrigation scheme but the cultivated extent was 8510 ha exceeding the target. Paddy production was 42,550 mt with an average yield of 5mt/ha. The commercial value of the production was Rs. 1361.6 million. Maize cultivation extent was 2456 ha achieving 15,964 mt of production with a commercial value of Rs.511 million. Cultivation extent of Ground nut was 130 ha and achieved 195 mt of production. Cultivation extent of Chilli and Cowpea were 24 ha and 7 ha respectively. An average yield of 17.5 mt/ha was reported from the 10 ha of Big onion cultivation. During 2013 Yala season Green gram cultivation extent was 607

ha. Average yield was 1500 kg per ha and market price was Rs.220 per kg. Farmers received more income from the green gram cultivation. To fulfill the demand of green gram and to promote the cultivation during third season in other districts a seed production programme was also implemented in 100 ha in Hasalaka Inter-Provincial area. Both commercial and certified seeds were produced by farmers in Hasalaka IP area. Farmers received a profit of Rs.162,500 per ha from the commercial seed production and Rs.300,000 per ha from certified seed production.

### **Achievements under Special Projects**

- Off seasonal Big onion demonstrations was established with 106 number of farmers and the extent of 5.2 ha. The average yield was 15 mt/ha and the profit of 875,000 rupees per hectare at Rs.80 per kg of market price was observed.
- About 80 ha of demonstration level Green gram cultivation was established in Kandaketiya area with 276 farmers and harvested 85 mt. The average yield was 1062.5 kg/ha and farmers obtained Rs.17 million from the cultivation of Green gram.
- Five groups of farmers (80 nos) were trained under the Farmer Business School Programme. Presently 38 members involved in various enterprises such as seed paddy production, ground nut seed production, mushroom cultivation & poultry management.
- An extent of 0.3 ha self seed production programme on Big onion was established in Kandaketiya area with 60 farmers. 3600

kg of mother bulbs were provided from the project.

- Under the Organic fertilizer production and usage, project promotional programme was conducted with 3450 farmers and they produced 6900 mt of compost.

### **INTER-PROVINCIAL AREA - AMPARA**

The Deputy Director of Agriculture (Inter-Provincial) office, Ampara consists of four agricultural administrative segments, viz. Uhana, Damana, Adalchena and Sammanthurai. These four segments include 25 Agrarian Service Centres & 85 Agriculture Instructor ranges, 16 Divisional Secretariat divisions and 430 Grama Niladari divisions.

Main irrigated water source in Ampara district is Senanayake Samudraya at Iginiyagala. It has a capacity of 770,000 acre feet and provide water for 10 small tanks in Galoya left bank and right bank colonies. In addition, there are 13 other small tanks and it strongly support paddy cultivation in Ampara district.

Four special projects funded by Ministry of Agriculture were implemented in the Ampara Inter-Provincial area during the year of 2013 for production of Chilli & Ground nut. Fruit villages & “Thirasara Yaya” (Traditional Paddy) also established. In addition, ‘Galoya Navodaya’ project funded by Department of Irrigation also implemented in the Inter-Provincial area.

### **INTER-PROVINCIAL AREA - MONARAGALA**

Inter-Provincial area of Monaragala includes Siyambalanduwa, Okkampitiya, Ethimale &

Thehulla Agrarian Service Centre divisions. Muthukandiya, Ethimale, Kotiyagala, Sadhathissa, Handapanagala tanks and Kumbukkan Oya Amuna are major irrigation systems of Monaragala Inter-Provincial area.

The total Paddy cultivation extent is about 16,476 ha with major, minor & rainfed irrigation system. Paddy is the main crop grown and Maize is the second largest crop cultivated. The extent of paddy cultivation during 2012/13 Maha season in the Moneragala Inter-Provincial area was 16,585 ha and contribution to the national paddy production was 66,073 mt.

Achievements of the Special programmes other than the routine technical programmes implemented during the year 2013 are as follows,

### **Quality Seed Paddy Production Programme**

Under this programme Certified Seed production programme was implemented in 28 ha with 36 farmers. The total yield was about 28.5mt.

In addition, self seed production programme was also implemented with 90 farmers in 35 ha. They produced 112 mt of seed paddy.

### **Other Field Crop programme**

During 2012/13 maha, Big onion off sesonal cultivation programe was implemented in a extent of 2.75 ha in the Inter- Provincial area . Seeds, polythene and chemicals were provided to those farmers. It was observed that the average yield was 4838 kg/ha. This revealed that Big onion can be grown successfully in this area.

In addition, , Chilli production programme was also implemented. This programme was funded by the Ministry of Agriculture and assisted by District Secratarial by providing 375kg of seeds for the total extent of 375 ha. The contribution for the National production under this was 1875 mt of chilli. Bag culture with a covering of insect proof net was introduced to control narrow leaf disease of chilli. It was observed that under these practices yield was higher and disease incidence was lower than the normal practices. Farmers were financially assisted by providing seeds, tarpouline sheets, and grinding machines for processing of finger millet and black gram.

### **INTER-PROVINCIAL AREA - ANURADHAPURA**

Anuradapura Inter-Provincial area covers 12 major irrigation schemes in Anuradapura Kurunegala, Matale and Puttalam districts. It includes 35 Agriculture Instructor ranges and 175 Grama Niladari divisions. Special programmes other than the routine technical programme implemented during the year 2013 are as follows:

#### **Special Achievements**

#### **Green Gram cultivation in mid season**

Mid season green gram cultivation program was conducted successfully in between 2013 yala and 2013/14 maha seasons. Total extent cultivated under this programme was 873 ha. The main cultivation areas comes under Rajanganaya, Usgala-Siyabalangamuwa, Nuwaraewa and Wahalkada major irrigation schemes. The average yield obtained was 80

kg /ha. The market price of the harvest was about Rs. 200.00 – Rs.220.00 per kg which gave a good profit to farmers. Market linkages also arranged by Deputy Director of Agriculture.

### **OFC Promotion Programme**

In order to reduce the imports of OFC, special promotion program was conducted with the financial assistance from the Ministry of Agriculture. It was mainly focused on Soya bean, Chilli and Gingelly in the area of Inter – Provincial Anuradhapura. Cultivated extents of Soya bean, Chilli and Gingelly were 3078 ha, 441 ha and 3681 ha in Yala season . There was an increase in extent by 1408 ha, 56 ha and 1520ha respectively when compared with previous Yala season.

### **Parachute Method of cultivation in paddy**

In 2012/13 maha and 2013 yala seasons 2400 ha of paddy lands were cultivated using parachute method. Farmers had many benefits by using this technique such as reducing cost of cultivation, increasing yield and profit, reducing seed paddy requirement, controlling weeds etc..

### **Farmer Business School Program**

This program was implemented as a pilot project in Anuradhapura Inter-Provincial area . Farmers were trained and business plans were prepared for their future use to re-orient their present agriculture methodology to a business venture. The project which was funded by Food and Agriculture Organization (FAO) implemented only in 5 Agriculture Instructor ranges with 5 farmer groups.

## **INTER-PROVINCIAL AREA - POLONNARUWA**

IP area Polonnaruwa includes three ADA segments, eight Agrarian Service Centres (ASC) and thirty five Agriculture Instructor ranges. This area comprises of five Divisional Secretariat divisions namely Madirigiriya, Hingurakgoda, Lankapura, Thamankaduwa and Elahara. The total extent of lands in Polonnaruwa IP area is 96,000 ha and it comprises 46,092 farm families, The major irrigation schemes in the area are Parakrama Samudra, Kaudulla, Minneriya and Girithale . Paddy is the main crop grown in this locality and Big Onion, Ground nut and Maize are the OFC,s cultivated in higher extents.

### **Special Achievements**

- Contribution of Paddy from this area was 2.35 % of the National Production. In 2012/13 maha paddy production was 127,800 mt and 165,517 mt in 2013 Yala. This was 6% of the National Paddy Production and compared to the previous year, production has increased by 4.6%. The most popular paddy varieties grown in the area are Bg-352, Bg-366 and Bg-300. During the year agricultural extension activities such as ICM yaya, parachute yaya, mechanization yaya and demonstrations like IPNS, use of leaf colour charts were practiced to increase the average paddy yied upto 6mt/ha. About 1850 of training classes, 74 field days and 76 crop clinics had conducted throughout the seasons.
- Big onion (151 ha) and Groundnut (283 ha) had been the blooming up OFC in the IP area. The extents of cultivation of those

crops had increased 7% and 61% respectively compared to the previous year. In 2013 yala season 71 ha of Soya bean cultivation and 180 ha of 3<sup>rd</sup> season Mung bean cultivation had been initiated. Red onion, cowpea, green gram and black gram cultivation extents had increased compared to the previous year while the rest of the OFC cultivation extents had declined. Three big onion stores (10mt) and 100 Big onion racks (50kg) had been distributed among farmers in the 2012/13 Maha season. In both seasons 879 training classes and 42 of field days were conducted.

- There was a continuous increase in banana cultivation in the IP area. 328 ha of banana, 438 ha of mango, 58 ha of papaw and 130 ha of lime have been cultivated either commercial or homestead level. The low land vegetable crops are mostly cultivated in this region and out of that 103 ha of Pumpkin, 106 ha of Okra, 116 ha of Long bean had been cultivated throughout the year. The total number of 56 training classes and 10 field days on fruit cultivation and 136 of training classes and 2 field days on vegetable cultivation were conducted in both seasons.
- Farmer Business School Project had been launched in the IP area and it was successfully initiated by the trained Agricultural Instructors. There were well established 25 Women's Agricultural Organizations having 456 members. The total number of 148 trainings have been conducted on food and nutrition, local food promotion, kitchen management and entrepreneurship development. With the objective of promoting local foods

among the community, 11 'kolakenda' producing stalls had been established. Also for enhancing the agriculture three electric water pumps, 22 water pumps (two wheel tractor coupling), parachute trays for 55 ha were distributed by PSDG.

## **IN-SERVICE TRAINING INSTITUTE - GANNORUWA**

In-Service Training Institute, Gannoruwa, is the main agricultural training institute at national level which is responsible for improving knowledge skills and attitudes of agricultural officers, entrepreneurs, farmers and others interested in agriculture.

A total of 149 training programmes were undertaken in 2013 (13,460 man days) of which 102 were for officers (10,685 man days), 18 for farmers (969 man days) and 29 of field training programmes (1806 man days). Also 94 numbers of workshops / seminars / meetings / discussions, (10594 man days) were conducted.

## **IN-SERVICE TRAINING INSTITUTE - ANGUNAKOLAPELLESSA**

This is one of the main agricultural training institutes in Department of Agriculture which is located in Southern province. This institute is responsible for improving agricultural knowledge, skills and attitudes of officers, entrepreneurs, farmers and others interested in agriculture. Institute offer In-service training for the above groups in Galle, Matara, Hambantota Districts and Hambantota Inter Provincial area.

During the year, a total of 75 training programmes were undertaken (7528 man days) and this included 58 for officers (2174 man

days) and 4 for farmers (174 man days), 01 field training programmes (35 man days), 12 outdoor training activities (5145 Mandays). And also 7 workshops / seminars /meetings / discussions (491 man days), were conducted.

## **IN-SERVICE TRAINING INSTITUTE - HANSAYAPALAMA, ARALAGANWILA**

The In-Service Training Institute, Aralaganwila has located in Mahaweli System B and conducts training programs for extension staff of Sri Lanka Mahaweli Authority, Department of Agriculture as well as other government and non-government officers. In addition, farmers and entrepreneurs of Mahaweli Block B,C,D,G, Ampara and Polonnaruwa Inter-Provincial areas were trained by this institute.

In year 2013; 60 no of training programmes (1956 man days) were conducted of which 16 No. of programmes (571 man days) were for officers, 15 programmes for farmers (385 man days), and 29 field training programmes (1000 man days) . The institute was strengthened by developing the farm under farm development programme and land development programme.

In addition, traditional vegetable seeds were produced under the special project of 'Traditional Vegetable Seed Production' by this training Centre.

## **FARM MECHANIZATION TRAINING CENTRE**

Farm Mechanization Training Center (FMTC) located in Anuradhapura is the sole national level training institute on farm mechanization. Training mandate of the FMTC mainly focused on the following aspects,

## **Operation and Maintenance courses**

- Operation and maintenance of four wheel tractors- 10 days
- Operation and maintenance of two wheel tractors-5 days
- Operation and maintenance of water pumps-2 days
- Operation and maintenance of sprayers-2 days
- Operation and maintenance of harvesting and threshing machines -2 days
- Operation and maintenance of combine harvesters-2 days

## **Repair courses**

- Repair of two wheel tractors (K75) -5 days
- Repair of water pumps-5 days
- Repair of sprayers-5 days

During the year 2013, FMTC had conducted 61 training programs (6097 man days) and it included 13 programmes for officers (781 man days), 15 programs for farmers (746 man days), 30 training programmes for students from Universities, Schools, Technical colleges, and Agriculture schools (3525 man days).

In addition, FMTC supports the field extension staff to carry out extension activities related to farm mechanization. Apart from that, FMTC provides advisory services on farm mechanization for the necessary institutions.

As an special achievement in the year a trial was carried out in farmers field at Rambewa and Srawsthipura with the assistance of Deputy Director of Agriculture, Anuradhapura to evaluate the performance of Paddy transplanter AP 400. About 16% and 9% yield increment was given by 30cm x 14cm

and 30cm x 22cm planting methods compared to conventional broadcasting.

### **SRI LANKA SCHOOL OF AGRICULTURE - ANURADHAPURA**

Sri Lanka School of Agriculture, Anuradhapura was established on 2<sup>nd</sup> May 1994 as a training institute for conducting two year Agriculture Diploma course. After that the school was converted to Special Training Institute in 2002 and delivered large number of short term training programmes for government officers, farmers and school children etc.

The School of Agriculture offered one year practical agriculture certificate course for 37 number of Mahaweli Field Assistants in 2013.

In addition to that one day training programmes on home gardening (for School children/Farmers), Paddy cultivation and Landscaping (for farmers) were conducted as short term trainings.

### **SRI LANKA SCHOOL OF AGRICULTURE - WARIYAPOLA**

The Sri Lanka School of Agriculture, Wariyapola was started in the year 1994 to provide Agriculture Diploma for youths interested in Agriculture. However, after 2003 the Diploma course was not conducted due to lack of resources at the institute. After that one year training course for Agriculture Research & Production Assistants (ARPA) was conducted from 2005 to 2012.

In 2013 the name of the institute was changed as Agriculture Special Training Centre. This training centre presently conducts agriculture trainings for officers of the DOA, other government institutions and farmers.

Especially collaborative trainings were organized & conducted with the assistance of North Western Provincial Agriculture Department. Home gardening and other demonstrations were maintained with the view of transferring new agriculture technologies.

As a special achievement in this year “Govi Sathiya” exhibition was successfully conducted from 06<sup>th</sup> to 10<sup>th</sup> July 2013 in the premises of School of Agriculture.

### **SRI LANKA SCHOOL OF AGRICULTURE - LABUDUWA**

Sri Lanka School of Agriculture, Labuduwa was started in 1994 with the objective of offering Diploma in Agriculture and continued up to 2000. Later one year Practical Agriculture Training Course was introduced for Agriculture Research & Production Assistants attached to the Department of Agrarian Development.

Final examinations for ARPA students were held in February and October 2013. Also School students, farmers, non governmental organizations and many other people visited the demonstration field of the institute. In addition, short term training programs were conducted for farmers, officers and general public.

### **HORTICULTURAL CROP TRAINING & DEVELOPMENT INSTITUTE - BIBILE**

Horticultural Crops Training and Development Institute was established in 1<sup>st</sup> April 2003 with combination of School of Agriculture Bibile and Research Farm of HORDI Bibile. The institute is situated in Monaragala district at Bibila AGA division.

The main objectives of the institute are as follows,

- Introduction of new technology on Horticulture & maintain as a profitable commercial model farm.
- Large scale production of different type fruit plant with new technology.
- Clone conservation.
- Proceeding training programs with new agricultural technology – for Government officers, NGO officers, farmers, and students (Schools/Universities).
- Establish and maintain training oriented demonstration fields.
- Field experiment on new recommendation.
- Function as an institute of information technology.

The Institute offers trainings on following subjects

- Budded Fruit Plant Production
- Irrigation and Water Management.
- Commercial Fruit Cultivation and Post Harvest Technology.
- Bee keeping
- Organic Agriculture.
- Landscaping and Floriculture.
- Mushroom Production
- Protected Agriculture.
- Cashew Production.

### **Special Achievements**

About 2000 plants of banana (Kolikuttu) were established and a ploytunnel (480 m<sup>2</sup>) was repaired under the special project on land development.

Under farm development programme 7.6 ha of Paddy was cultivated and harvested 5mt of paddy. Out of that 15mt were sold as seed

paddy and the balance supplied to School of Agriculture Kundasale for students' consumption.

In addition, 0.5 ha of Passion fruit and 1.5ha of Orange cultivation were established. Mother plant orchard was also established for Guava, Pomegranate and Mandarin. Stone terraces for soil conservation were established in the demonstration farm (100 ft<sup>2</sup>).

Under Commercial fruit plant production program, Seed & Planting Material Development Centre provided fund for fruit plant production. A total number of 62,000 fruit plants were produced and profit from selling those plants was Rs.1,793,483.

The income earned from the sales of vegetable and fruit production in the year 2013 was Rs.2257,473.

In addition number of trainings have conducted by this unit in 2013 for SLAgS officers (80 man days), department budders (1060 man days), University students (150 mandays), Farmers (250 man days), plant nursery development assistants (NVQ level 3-500 mandays), and others (768 man days).

## **DISTRICT AGRICULTURE**

### **TRAINING CENTRE - WEERAVILA**

District Agriculture Training Center (DATC) is located in the low country dry zone. (DL<sub>5</sub> – DL<sub>16</sub>) This center was established in 1986 under the project of Lunugamvehera human settlement. Objective of this centre is to educate and uplift the knowledge of Agriculture in farmer community, school children, officers of DOA, PDOA, other government institutes and non-government organization.

In the year 2013, this training center conducted 30 farmer trainings (1121 Mandays), 07 officer

trainings (171 Mandays), and 04 workshops (96 Mandays).

## **DISTRICT AGRICULTURE TRAINING CENTRE - WAVINNA**

District Agriculture Training Centre, Wavinna is located in Ampara district in a Coconut Cultivation Colony. This institute provides trainings on Agriculture know-how for farmers, Officers, School students and others. During the year 2013, a total number of 66 training programmes were undertaken (2939 man days) by this Institute. This included 25 for officer trainings, (1490 man days), 11 for farmer trainings (361 man days), and 30 other trainings, (1088 man days). Also 12 workshops (144 man days) were conducted on different aspects.

## **DISTRICT AGRICULTURE TRAINING CENTRE - POLONNARUWA**

Polonnaruwa District Agriculture Training Center is located in Kaduruwela City, in Thamankaduwa Divisional Secretariat division. This unit stands as a model farm and cultivated area about 4.5 ac. The model farm consists of Paddy, OFC, Vegetables, Fruits and other crop (Coconut). It provides technical knowledge and methods of cultivating of each crops to farmers. It also provides knowledge on home gardening, bee keeping, and mushroom cultivation.

During the year 2013, a total of 33 training programmes were undertaken (503 man days) and this included 12 programmes of officer trainings, (482 man days), 14 programmes of

farmer trainings (171 man days), and 7 outdoor training for farmers (103 man days).

Apart from that an exhibition on “Rajarata Krushi Dekma” was conducted during the period from 2013.09.06 to 2013.09.10 at this institute.

## **DISTRICT AGRICULTURE TRAINING CENTRE - PALAMUNAI**

The District Agricultural Training Centre-Palamunai was handed over to the Department of Agriculture on 23<sup>rd</sup> of September 2007 by UNDP.

Objective of the training centre is to provide theoretical and practical training on Agricultural Techniques in Tamil medium to the farmers, related agricultural officers, teachers, school children, samurdhi beneficiaries and several NGOs operating in the area to develop agriculture farming.

During the year 2013, a total of 33 training programmes were undertaken (1193 man days) and this included 14 officer trainings (474 man days), 6 farmer trainings (203 man days), 3 field trainings (82 man days), 4 trainings for school students (123 man days) and 5 trainings for others (228 mandays).

## **WOMEN AGRICULTURE EXTENSION PROGRAMME (WAE)**

Mission of Women’s Agriculture Extension programme is to increase women’s contribution to agricultural development through improvement of standard of living and nutritional level of family units. Objective of this programme is to promote better home environment and initiate income generation activities for households focusing on women.

WAE Programme is implemented at grass root level by WAE officers who are attached to the office of the Deputy Director (Extension) in each agriculture administrative district.

### **Extension Activities**

During the year 2013, thirty six (36) number of district extension officers were trained on Women's Agricultural Extension Programmes. About 403 number of farmer entrepreneurs were trained on food & nutrition and entrepreneurship development. In addition 131 number of women's organizations were established. 1043 number of households were developed through home gardening and kitchen improvement. Also other extension programmes conducted on women's agriculture extension programme were 08 number of articles, 03 television programmes, 04 Radio programmes, 25 field days, and 06 study tours. Furthermore exhibition stalls were conducted at 11 exhibitions .

Other special activities performed by this unit were,

- Under local food promotion programme, 4 sales outlets were organized with the participation of Women Agricultural Entrepreneurs in Ampara district at 'Dayata Kirula' exhibition - 2013.
- A new group of entrepreneurs (26 members) were trained and provided opportunity to join "Hela Bojun Alewi Piyasa" at A' Park Gannoruwa to market their local foods.
- Another sales outlet "Hela Bojun Alewi Piyasa" was opened at Hambanthota, Bataatha "Chamal Rajapakse" park for local foods .

In addition, following two special projects were implemented by this unit

- Improving income of rural farmers through establishing a Food Processing Training Center to encourage private sector on food processing
- Mainstreaming biodiversity conservation and sustainable use for improved human nutrition and well-being

### **AGRO ENTERPRISE DEVELOPMENT & INFORMATION SERVICE**

Mandate of the Agro- Enterprise Development and Information Service (AgEDIS) is to assist in promoting agro based enterprises which lies within the framework of the Department of Agriculture. This institute currently fulfill that by;

- Conducting agro-enterprise related short term awareness and skill development training programs for potential entrepreneurs
- Providing on-farm technical advisory services for agricultural property owners and investors by a team of experts.
- Providing technical information and data as required by the entrepreneurs and linking them with the relevant stakeholders
- Establishing agricultural service centers called "Krushi Sewa Piyasa" which gets the technical collaboration of DOA to provide reliable inputs and services to the farmers.
- Supporting district agricultural extension officers to promote entrepreneurial skills of the farmers by introducing "Farm Business School" (FBS) approach and conducting related trainings with the

technical and financial support of the FAO TCP 3302 pilot project.

### **Special Achievements**

- Ten agro enterprise related training programs were conducted for 266 trainees.
- Four new “krushi sewa piyasa”s were established in Danowita, Hewadiwela, Dambulla and Pothuhera . As well as two technical trainings were conducted for 47 managers of “krushi sewa piyasa” on Basic Agribusiness Management.
- Hundred and seventy extension officers from 12 districts were trained as trainers on “Farm Business School” (FBS). The trained officers have conducted 101 numbers of FBSs for selected farmer groups in 2013 in their districts.

### **BEE DEVELOPMENT UNIT –**

#### **BINDUNUWEWA, BANDARAWELA**

Bee keeping Development Unit is responsible for the development and extension of bee keeping among farmers. In order to disseminate modern apiculture technology following facilities are provided by the unit.

- Training of farmers, officers, students and other interested people.
- Manufacture of bee keeping equipment.
- Training and registration of bee keeping equipment producers and certification.
- Technical support for government and non government institutions to implement bee keeping projects.
- Research work.

During the year 18 number of training programmes were conducted on bee keeping for officers, farmers and university students

and 2 training programmes on production of bee keeping equipment also.

In addition the unit produced 367 kg of bee honey, 240 number of bee colonies, 320 number of bee boxes, 150 number of smokers, 175 number of brood frames, 197 number of honey frames, 775 number of queen guards.

Also a bee keeping village was established in Hennanigala to introduce modern bee keeping practices to ‘Adi vasi’ people.

Training of trainers and establishment of group of Agricultural Instructors as Bee Keeping Trainers were done during the year.

### **YOUNG FARMERS CLUB (YFC)**

Young farmers clubs are the village level institutions of the young farmer’s clubs movement. Other components belongs to the young farmers’ clubs movement are district level primary consultative committee, provincial consultative committee, and national level federation. Relevant activities are planned and implemented by these committees at different levels with the participation of membership.

There are nearly thousand Young Farmers Clubs formed and one third of them are registered at the Head Quarters.

During the year 2013, Island wide programs were conducted to create the participation of young farming generation for agricultural extension.

A total of 9 training programs for officers and 45 training programs for YFC members were conducted. 85 of cultural programs, 78 of religious programs, 30 of educational programs, 27 of social programs were conducted by YFC. In addition, facilities were provided for 18 number of radio quiz

competitions conducted mainly for young farmers.

## **WATER MANAGEMENT & PROTECTED AGRICULTURE UNIT**

The Water management and Protected Agriculture Unit is dealing with following subjects in respect of technology generation & dissemination to the technical staff of the Department of Agriculture and to the farming community in Sri Lanka.

- Irrigation & Irrigation Management
- Micro Irrigation Management and Fertigation
- Controlled environment agriculture (Protected Agriculture- poly tunnels, rainout shelters, net houses)
- Commercial Farming (Advanced planning of commercial farms) for annual & perennial crops.
- Advanced nursery management.

Dissemination of required technical knowledge for the establishment of small and large scale farms also a vital role in this unit.

### **Achievements**

- Dissemination of technological knowledge on water management and protected agriculture for farmers and officers by conducting workshops.
- Providing technical assistance for establishment of a protected house and drip irrigation system for 5 acres at Seed Farm, Kundasale under JICA funded project. Other than that technical assistance was provided for preparation of estimates and designs for micro irrigation systems and protected houses for other

government, semi-government, and private sector institutes.

- Continuation of field survey to find out the existing total land area under the protected agriculture technology and irrigation management and to find out the progress of micro irrigation systems distributed in the previous years.

## **PLANNING & PROGRESS**

### **MONITORING UNIT**

The main responsibility of Planning and progress monitoring unit is preparing action plans for all financial and technical activities of ETC and monitoring the progress of those activities.

During the year 2013, annual action plans of all sub units and centers of ETC were prepared by Planning and Progress Monitoring unit. Preparation of monthly progress reports of capital, recurrent and special projects allocations and technical activities relevant to ETC were also carried out by this unit. The unit also involved in providing information relevant to ETC for the Annual Performance Report of the Department of Agriculture, Central Bank Report & Parliamentary Budget Speech. Proposals received from the sub units of ETC for the annual budget are also compiled by the unit. In addition, information related to Extension & Training Centre on the website of the Department of Agriculture was also updated.

## **AGRICULTURAL EDUCATION & EXAMINATION UNIT**

The Education & Examination Unit consists of three sub units namely Education, Examination & Curriculum development. The

Schools of Agriculture are located at Kundasale, Pelwehera, Angunakolapelessa, Vavuniya and Karapincha function under the sub unit of Education. The Diploma course which was offered previously by the above schools were amended as National Diploma in Agriculture Production & Technology from the year 2013. Five hundred and thirteen students are following National Diploma in Agriculture Production & Technology in the above schools by the end of the year 2013.

The Examination sub unit conducts various examinations for officers of the DOA annually. Fifteen Departmental Examinations & Efficiency Bar Examinations have been held by the Examination Sub Unit and the number of candidates sat for these examinations were 910 by the end of 2013.

The examination for recruitment for the Post of Drivers -2012, the Limited & Opened Examination for recruitment to the Post of Grade iii of Farm Clerk -2012/2013, Open examination for recruitment to the Post of Technical Assistants (Agriculture Research /Extension) – 2013 were held and the number of candidates sat for aforesaid examinations

were 1641, 5058 and 1292 respectively during the period 2013.

In addition, the examination for admission to the Schools of Agriculture for the academic year 2014-2016 was held and the total number of candidates sat for the examination was 2428. Exams regarding one year Practical Training programme was conducted for Agriculture Research & Production Assistants (ARPA) who have been attached to the Department of Agrarian Development since 2005.

The Curriculum Development Sub Unit also carries out various activities. The technical support for the curriculum development for Competency Based Training (CBT) was entirely provided to the Vocational Education Commission by this unit. In addition a new CBT curriculum was introduced to the system of Schools of Agriculture. Coordination of lecturers of the Schools of Agriculture with the CBT based scheme of training and lesson plans were significant activities undertaken by the unit in the year 2013.

The number of students in the different SOA in year 2013 is given in the table.

**Table 3.1.3: No. of students in the Schools of Agriculture by the end of 2013**

Agriculture School	Year	Medium						Total	Grand total
		Sinhala		Tamil		English			
		Boys	Girls	Boys	Girls	Boys	Girls		
Kundasale	1 <sup>st</sup>	45	23	20	07	20	12	127	229
	2 <sup>nd</sup>	29	31	09	08	08	17	102	
Angunakolapelessa	1 <sup>st</sup>	31	21					52	89
	2 <sup>nd</sup>	26	11					37	
Pelwehera	1 <sup>st</sup>	41	15					56	107
	2 <sup>nd</sup>	40	11					51	
Vavuniya	1 <sup>st</sup>			22	8			30	64
	2 <sup>nd</sup>			16	18			34	
Karapincha	1 <sup>st</sup>								24
	2 <sup>nd</sup>	24						24	
<b>Total</b>		<b>236</b>	<b>112</b>	<b>67</b>	<b>41</b>	<b>28</b>	<b>29</b>	<b>513</b>	<b>513</b>

## **One Year Practical Agriculture Training Course for Agriculture Research & Production Assistants**

Target group of this course is ARPA attached to the Department of Agrarian Development. This course was started in eight training centers in 2005 and expected to continue till all the ARPA complete the course. The first group of 676 ARPA completed the training course in 2006, second group of 246 ARPA completed the training in 2008 and the third group of 278 ARPA completed the training in 2011. In March 2013 the final exam was held for 68 number of students of 2012/I batch and 42 number of repeaters of previous years. Ninty nine ARPAs completed their training in year 2013.

As there was no request from Department of Agrarian Development this training was not continued in 2013.

## **ORGANIC AGRICULTURE AND PLANT NUTRIENT MANAGEMENT UNIT**

The major activities conducted by this unit in the year 2013 was implementation of programmes on producing rice for export. Popularizing of traditional rice varieties for export purpose, and popularizing environmental friendly agriculture in the country. With the objective of popularizing environmental friendly agriculture, organic villages have being implemented throughout the country.

### **Achievements**

Providing technical and financial assistance for Cultivation of 80 ha for seed paddy.

Organization and implementation of 5 day programme on “National Farmers’ Week” .

Organization and implementation of four work shops for new agriculture technology dissemination.

Organization of three workshops to improve the VAT programme.

Supervision of extension activities implemented by the Extension & Training Centre.

In addition, national level coordination of soil testing & production of viability tested seeds were carried out by this unit.

## **PLAN FOR 2014**

- Agricultural extension programmes in 6 Inter-Provincial areas
  - The focus for 2014 will be to enhance the productivity of the major crop paddy grown in IP areas to ensure food security of the country. The technical activities and the propaganda programmes will be implemented to achieve this task under major irrigation, minor irrigation and rain-fed conditions in the cropping seasons. It also envisage to produce quality seed paddy by community itself.
  - Cultivation of Other Field Crops in off seasons and during 3<sup>rd</sup> cropping season will be emphasized as a solution to cut down imports & save foreign exchange. Island wide special programme will be implemented for Big onion and Chili cultivation to increase extents, production & productivity. Extension activities will be implemented to increase extents,

- production and to produce quality seeds.
  - Production of fruits will be enhanced through rehabilitation programmes & introduction of agro ecologically suitable fruit varieties. Vegetable production will also be strengthened appropriately by each IP area.
- Agriculture education programme at Schools of Agriculture (SOA)
  - Conduct 2 year Agriculture Diploma Programme at all 5 Schools of Agriculture.
  - Around 248 diplomates will be passed out and a new batch will be recruited for the course.
- Conduct Agriculture Training Programmes for officers and farmers at Three In-Service Training Institutes, four District Agricultural Training Centres, Farm Mechanization Training Centre, and Bee keeping Development Unit.
- Conduct short term Agriculture Training programs at four Special Training Centres, Schools of Agriculture Wariyapola, Labuduwa, Anuradhapura and Horticultural Crop Training & Development Institute Bibile. A special certificate course has been planned to start from year 2014 at School of Agriculture Labuduwa on edible landscaping and urban agriculture. This will be offered for school leavers with in the age group of 18 to 35 years. Also it has been planned to rejuvenate the existing mango cultivation of 10 ha in year 2014 at Horticultural Crop Training & Development Institute Bibile.
- Conduct following exams according to the exam calendar of year 2014.
  - Examinations of two year diploma programme.
  - Repeat examinations of one year training programme for Agriculture Research & Production Assistants.
  - Departmental examination for officers of the Department of Agriculture.
  - Competitive examinations for recruitment of trainees to Schools of Agriculture.
  - Efficiency bar examinations for offices of the Department of Agriculture.
  - Examinations for awarding scholarships for the government officers who will be selected to the Schools of Agriculture.
- Conduct quiz programs and other training programs for Young Farmers Clubs members
- Women Agriculture Extension programme
  - Training of DOA officers, new entrepreneurs for sales centre at Gannoruwa and Head Office, Technology park.
  - Conducting field level local food demonstration by mobile food demonstration unit.
  - Preparation of training aids such as booklets, flip charts.
  - Collaborative project with Food Research Unit on income generation and entrepreneurship development.
  - Dissemination of technology through radio programmes, television programmes and Exhibitions.
  - Establishment of new sales outlet 'Hela Bojun Alevi Piyasa' which markets local food at Head office

premises of Department of Agriculture.

- Agro Enterprise Development programs
  - Introducing “FBS” program to Hambantota and Ampara Inter Provincial areas, and Hambantota, Matara, Galle, Gampaha provincial areas. Program will be conducted in all the other areas where this program is already introduced.
  - Establishing District Agro-Enterprises Development Units to update the web based marketing information system and coordinate other related activities.
  - Implementing public private partnership program linking with business incubator of the University of Peradeniya and other related agencies.
  - Implementing “Krusha Seva Piyasa” program and linking the program to existing agricultural system.
  - Study to be conducted on possible micro financing programs will be introduced for the individual farmers and groups. Implementing promising activities to enhance farmer credit facilities and their savings to empower them.
  - Establishing farmer markets to minimize the middle men interventions. Other objectives of establishing these markets will be to do marketing at low cost, introducing simple value addition methods and giving priority for local items.
  - Advisory services will be given under medium & large scale commercial farm development.

- Agro enterprise based training programs are designed and conducted in order to fulfill the participants needs will be conducted.

- Micro irrigation & protected agriculture
  - Conducting training programs on rain shelters, protected agriculture and micro irrigation. Activities regarding national committee on micro irrigation & protected agriculture will be carried out.

### Special Projects

- Land development activities at Schools of Agriculture, In-Service Training Institutes, Farm Mechanization Training Centre and Bee Keeping Development Unit.
- Training & Capacity Building of staff of the Extension & Training Centre.
- Continuation of the projects on “Construction of a new hostel at Pelwehera School of Agriculture” and “Development of Sri Lanka School of Agriculture for producing competent professionals” which started in year 2013.

### STAFF LIST

Designation	No.
Director	01
Additional Director	03
Deputy Director	21
Assistant Director	28
Agriculture Officer	17
Lecturer	50
Lecturer (Contract )	05
Subject Matter Specialist	01
Agricultural Monitoring Officer	13
Programme Assistant	19
Development Officer	26

<b>Designation</b>	<b>No.</b>
Agricultural Instructor	307
Research Assistant	01
Economist Assistant	01
Farm Machinery Instructor	01
Technical Officer	01
Bee Keeper	06
Mechanic	01
Budder	07
Carpenter	04
Librarian	01
Administrative Officer	02
Management Assistant service	83
Translator (English)	01
Technical Assistant	04
Machinery Attendant	01
Store Keeper	11
Farm Clerk	05
Office Work Assistant	14
Cinema Operator	02
Watcher	43
Steward	03
Cook	18
Watcher	72
Sanitary Labourer	05
Driver	64
Lorry Cleaner	01
Electrician	01
Tractor Operator	14
Earth Mover Operator	01
Water Pump Operator	01
Labourer	205
Labourer (Contract)	167
<b>Total</b>	<b>1232</b>

## 3.2 INFORMATION AND COMMUNICATION CENTRE (ICC) – PERADENIYA

The vision of the centre is to achieve excellence in Information and Communication Technology (ICT) in agriculture for national prosperity.

Mission is to adopt ICTs for agriculture to make food crop sector more efficient and effective, to improve access to DOA information and services and to create more citizen centric governance.

This new centre was established on 01<sup>st</sup> March 2012 and the activities undertaken by the ICC are collection, compilation and dissemination of agriculture information through electronic and print media, and also to conduct

Exhibitions and Agriculture Technology Parks. Centers under the ICC are Farm Broadcasting Service, Audio Visual Centre, Agriculture Publication Unit and Agro Technology Parks at Gannoruwa and Bata-Atha.

Construction of a new building has been started to establish National Agriculture Information and Communication Centre at Gannoruwa, according to the government policy on the exchange of Agriculture Information as envisaged in the "Mahinda Chinthana Future Vision".

### BUDGET

Allocations received and expenditure incurred under different votes are given in Table 3.2.1.

**Table 3.2.1: Annual budget – 2013**

<b>Vote</b>	<b>Allocation (Rs.)</b>	<b>Expenditure (Rs.)</b>	<b>Expenditure %</b>
Capital	27,256,327	22,856,236	84
Recurrent	46,526,530	40,852,761	88
<b>Projects</b>			
Media Programme	20,000,000	19,765,219	99
A-Park	4,500,000	4,166,645	93
Dayata Kirula - 2013	17,000,000	17,000,000	100
Dayata Kirula - 2014	5,000,000	4,965,443	99
Crop Forecasting	1,900,000	1,875,000	99
<b>Total</b>	<b>122,182,857</b>	<b>111,481,305</b>	<b>91</b>

## PROGRESS

### AUDIO VISUAL CENTRE (AVC)

Audio Visual Centre (AVC) is the main information and communication unit of the Department of Agriculture (DOA) under the Information and Communication Centre. Mandate of the center is to cater DOA on information and communication needs and therefore, the centre involves in producing wide spectrum of instructional media materials and implementing Information and Communication Technology (ICT) initiatives for agriculture development in Sri Lanka as follows;

- Production of two TV documentary programmes weekly *Govibimata Arunalu* on Sundays at 6.30 pm and *Mihikatha Dinuwo* on Fridays at 6.15pm on National TV.
- Design and production of Agricultural publications; leaflets, posters, large format prints for hoardings, banners, etc.
- Management of Agro Technology Parks at Gannoruwa and Bata-Atha
- Organizing agricultural exhibitions; Deyata Kirula, Govi Sathiya.
- Operating Agricultural Advisory Service “*Govi Sahana Sarana Sevaya*” (Short Code 1920)
- Developing and Updating websites;  
DOA ([www.agridept.gov.lk](http://www.agridept.gov.lk)),  
*Wikigoviya* website ([www.goviya.lk](http://www.goviya.lk)),  
Rice Knowledge Bank in Sri Lanka
- Interactive Multimedia CD production on various crops and subjects
- Promoting Cyber Extension and AgMIS farmer database

- Conduct training on Audio Visual Teaching Aids and Presentation Technology

### Progress

#### Training

Training programmes - 16

#### Graphic Communication

Technical publications - 07

Leaflets/ Brochures - 63

Hoardings/ Posters - 357

Invitation Cards/ Greeting Cards /Lables/

Stickers Name Boards - 2083

Banners - 55

#### Video/Photography

*Mihikatha Dinuwo* - 51

*Govibimata Arunalu* - 46

Other Documentaries - 19

TV spots - 01

Duplicating Service - 264

Digital Photography - 13,650

#### Information Technology

IMM CD Roms - 04

Updating of websites (DOA /Wikigoviya /RKB /Krushilanka Portal/ AFACI-ATIN) No. of Items - 797

Hardware software maintenance (Jobs) - 873

#### *Govi Sahana Sarana Advisory Service*

No. of queries handled - 37,663

Through Skype (Video calls) - 75

#### Exhibitions

(Deyata Kirula, Govi Sathiya, CHOGM) - 04

#### A Park – Gannoruwa

Number of visitors (School Children) - 60,921

Number of visitors (Adults) - 25,157

Income - Rs. 854,880

## AGRICULTURE PUBLICATION UNIT

Agriculture Publication Unit is publishing and distributing of printed materials of the Department of Agriculture to support field extension activities. Agriculture Press and Information Centre come under the purview of this unit. Agriculture press caters the entire printing requirement of the DOA and in addition, it undertakes the printing requirements of the Ministry of Agriculture too. The Information Centre is responsible for distribution of printed materials for sales and free issues. This unit has earned income nearly Rs. 2.6 million mainly by selling publications and CD at sales centres.

### Progress

During the year 2013 a total of 21 new publications (51,500 copies) were published by this unit. Thirteen books were reprinted (30,000 copies). Nearly 350,000 copies of leaflets on various subjects were printed and distributed among beneficiaries. In addition, 15 new publications of other divisions were also published.

**Table 3.2.2: Details of Reprinted Publications**

Name of the Publication	No. of Copies
Annual Planting of Banana (S)	5,025
Khomba as a Pesticide (S)	1,525
Papaw (S)	500
Bee Keeping (S)	1,000
Mango (S)	2,500
Pineapple Cultivation (S)	2,000
IPM for Vegetable Cultivation (S)	2,000
Production of Banana Suckers (S)	2,010
Vegetable Cultivation (S)	6,000

Name of the Publication	No. of Copies
Chillie (S)	1,750
Organic Manure (T)	500
Organic Manure (S)	5,000
Chillie (T)	150

**Table 3.2.3: Sales of Publications (Rs.)**

Sales Centre	Income (Rs)
No - 01. Galaha Junction	1,246,487.60
No - 02. Gannoruwa	1,300,002.00

**Table 3.2.4: New Books Published in 2013**

Name of the Book	No. of Copies
Rambutan (S)	3,000
Ag - tec Vol. 14 No. 1-2 (T)	500
Ag - tec Vol. 14 No. 3-4 (T)	500
Ag - tec Vol. 14 No. 3-4 (S)	5,000
Pests and Mites of Other Field Crops (S)	3,160
Pests and Mites of Other Field Crops (T)	1,000
Cultivation of Pulses (S)	500
Cultivation of Pulses (T)	250
Budding and Grafting (S)	2,500
Budding and Grafting (T)	1,000
Govikam Sangarawa Vol.43- No.3	5,000
Govikam Sangarawa Vol.44- No.1	5,000
Govikam Sangarawa Vol.44- No.2	5,000
Cultivation in Poly tunnels (S)	5,000
100 Years of DOA (E)	500
Rice Based Products (T)	1,500
Ag - tec Vol. 15 No. 1-4 (S)	4,000
Ag - tec Vol. 15 No. 1-4 (T)	500
Log Book and Diary	5,500
Kamathilil Vilakkam Vol. 51 No. 1	1,000
Kamathilil Vilakkam Vol. 51 No. 2	1,000

**Table 3.2.5: Publications for other requirements in 2013**

Division / Name of the Publication	No. of Copies
<b>SEPC</b>	
Crop Enterprises Budget 2012 (E)	700
Production Plan (Vegetables and Fruits) (S)	100
Cost of Cultivation – 2011 Yala (E)	206
Cost of Cultivation – 2011 Maha (E)	210
Other Field Crops (E)	202
<b>MOA</b>	
Crop Production Programme - 2012/13(E)	300
<b>DOA</b>	
Tropical Agriculturist (E)	700
Annual Performance Report (E)	100
Annual Performance Report- (2011, 2012) (T)	100
Annual Performance Report- (2011, 2012) (S)	200
New Crop varieties (E)	750
<b>AgEDIS</b>	
Farmers' Business School (S)	3,000
<b>Ext. &amp; Tr.</b>	
Technical Booklets (S)	160
Leaflets	60,000
<b>SCS</b>	
Name List of Nursery Men	3,025
<b>RRDI</b>	
New Fertilizer Recommendation for -Paddy (T)	3,000

**Table 3.2.6: Summary of the other printed materials**

Type of Publication	No. of Copies
Leaflets	366,087
Letters	18,195
Information Bulletin	4,450
Receipt Books etc.,	212
Forms	210,576
File Covers	10,833
SCS Books	7,536
Visiting Cards etc.,	3,530
Certificates	5,500
Invitation Cards	4,901
Crop Clinic Books	1,084
Posters	99,850
Question Papers	2,250
Crop Forecasting Program Book	25,000
Crop Forecasting Program Forms	175,000
Student Record Books	600
Audit Reports	100
Parliament act	100
Seed Labels	2,400,000
Seed Labels for Divineguma	1,000,000

## **FARM BROADCASTING SERVICE (FBS)**

Farm Broadcasting Service of the Department of Agriculture undertakes production and broadcasting of Agricultural Radio Programmes to disseminate timely and relevant agricultural information to farming community in order to improve their knowledge and change attitudes.

Objectives of the Service are;

- Create awareness about more productive new agricultural practices among farmers.

- Make aware of problems encountered in farming and possible effective solutions for those problems.
- Create interest in agriculture as potentially profitable income generator.
- Generate positive attitude with respect agriculture among farmers.
- Make farming community aware of environmental and other hazardous consequences related to different agricultural practices.
- Provide platform for farmers to express their views and ideas with respect to agriculture related policies and strategies introduced by the relevant authorities.
- To promote home gardening activities in all homes in the country to ensure food security, nutrition and chemicals free food items.
- To make the agriculture a very attractive carrier to the young men and women in the country.

The main Farm Broadcasting Unit is situated at Narahenpita, Colombo and three sub units at Anuradhapura, Kandy and Matara.

This service broadcast radio programs in both Sinhala and Tamil medium via different radio channels. Many radio programs were able to broadcast in "Sandya Sevaya" special time belt on "Sinhala National Service."

Young Farmer's Club Quiz Program with the coordination of Ministry of Agriculture and Sri Lanka Broadcasting Cooperation, gathered island wide radio programs listeners to introduce "Listeners club" concept. These listeners are awarded with training programs, workshops and field visits to popularize the radio programs and to get feedback.

Krush FM web radio ([www.krushfm.lk](http://www.krushfm.lk)) has been launched as a test transmission towards establishing a live Radio Channel in 2014.

## Progress

**Table 3.2.7: Listeners club training programs & workshops in 2013**

Unit	No of Training & Workshop	
	Target	Progress
Colombo	06	06
Kandy	06	17
Anuradhapura	-	-
Matara	07	06

Other activities performed by the Farm Broadcasting Service during 2013 are given below.

Media coverage and announcing in Field days, Trainings and Ceremonies: - 08

Stalls/Exhibits - 05

Public Addressing System Handling in Exhibitions - 05

Free Advisory Service over the phone – 667

**Table 3.2.8: Radio Programs broadcast in year 2013**

Day	Time	Radio Program	Format	Production Unit	Frequency
Monday	9.00-10.00 a.m.	<i>Govithanata Payak</i>	Live Discussion	Colombo	FM 91.7/91.9
	6.45-7.00 p.m.	<i>Govi Gedara</i>	Magazine Program	Colombo	FM 91.7/91.9*
	7.00-7.09 p.m.	<i>Ranketha Addara</i>	Magazine Program	Anuradhapura	FM 91.7/91.9*
	7.10-7.16 p.m.	<i>Sannasa</i>	Current Agricultural Information	Matara	FM 91.7/91.9*
	7.16-7.30 p.m.	<i>Govisara</i>	Magazine Program	Colombo	FM 91.7/91.9*
Wednesday	6.45-7.00 p.m.	<i>Sara Boomi</i>	Magazine Program	Colombo	FM 91.7/91.9
	7.00-7.10 p.m.	<i>Saruketha</i>	Magazine Program	Anuradhapura	FM 91.7/91.9*
	7.10-7.20 p.m.	<i>Liyasaraniya</i>	Magazine Program	Colombo	FM 91.7/91.9*
	7.23-7.30 p.m.	<i>Thirasara</i>	Environmental Friendly cultivation	Matara	FM 91.7/91.9*
	7.00-7.30 p.m.	<i>Kurinchi Malahar</i>	Magazine Program	Kandy	FM
Thursday	8.30-9.00 a.m.	<i>Wayamba Gewatta</i>	Live Program	Kandy	FM 90.1
	9.00-9.30 a.m. Last Thursday 9.00-10.00 a.m.	<i>Ruhunu Gewatta</i>	Live Program	Matara	FM 107.3/107.5
	6.35-7.30 p.m.	<i>Govijana Madala</i>	Live Discussion	Colombo	FM 91.7/91.9*
	7.00-8.00 a.m.	<i>Veettu Thottam</i>	Live Discussion	Colombo	FM
Friday	8.00-9.00 a.m.	<i>Aswanna</i>	Live Discussion	Kandy	FM
	7.00-7.15 p.m.	<i>Krusha Charika</i>	Magazine Program	Kandy	FM 91.7/91.9*
	7.15-7.30 p.m.	<i>Lady Bird</i>	Drama	Matara	FM 91.7/91.9*
	7.00-7.15 p.m.	<i>Muhaduhhal</i>	Feature	Kandy	FM
	6.45-7.00 a.m.	<i>Krusha Charika</i>	Magazine Program	Kandy	FM
Saturday	8.00-8.15 a.m.	<i>Govibima</i>	Magazine Program	Kandy	FM
	6.35-6.45 p.m.	<i>Seilama</i>	Recorded Program	Colombo	FM 91.7/91.9*
	6.45-7.00 p.m.	<i>Kada Malla</i>	Magazine Program	Matara	FM 91.7/91.9*
	7.00-7.30 p.m.	<i>Koratuwa</i>	Magazine Program	Colombo	FM 91.7/91.9*
	7.30-8.00 p.m.	<i>Thunaththa</i>	Discussion	Anuradhapura	FM104.4/105.7
	7.30-7.45 p.m.	<i>Wanna Marudam</i>	Magazine Program	Colombo	FM
	9.15-9.30 p.m.	<i>Ulavar Illum</i>	Magazine Program	Colombo	FM
	9.45-10.00 a.m.	<i>Boradiya Mankada</i>	Magazine Program	Kandy	FM 107.3/107.5

\* Broadcast in Sandya Sevaya

**Table 3.2.9: Radio programs broadcast in 2013**

Unit	Radio Program	Target	Progress
Colombo	<i>Govithanata payak</i>	52	47
	<i>Govi Gedara</i>	52	48
	<i>Govisara</i>	52	39
	<i>Sara Boomi</i>	49	44
	<i>Koratuwa</i>	52	50
	<i>Seilama</i>	52	49
	<i>Govijana Madala</i>	40	42
	<i>Liyasaraniya</i>	52	39
	<i>Veettu Thottam</i>	52	43
	<i>Ulavar Illum</i>	52	28
	<i>Wanna Maruadam</i>	52	41
Kandy	<i>Aswenna</i>	52	48
	<i>Govibima</i>	52	51
	<i>Kalavita</i>	120	120
	<i>Krusha Charika</i>	41	35
	<i>Aththama</i>	120	120
	<i>Kurinchi Malahar</i>	52	52
	<i>Muhaduhala</i>	52	51
	<i>Boradiya Mankada</i>	52	51
	<i>Govijana Madala</i>	04	03
	<i>Wayamba Gewatta (1hr)</i>	12	10
	<i>Wayamba Gewatta (1/2hr)</i>	40	40
	Short Messages	1000	988
Anuradhapura	<i>Kethbima</i>	52	50
	<i>Ranketha Addara</i>	43	40
	<i>Thunaththa</i>	52	48
	<i>Govijana Madala</i>	04	03

Unit	Radio Program	Target	Progress
Matara	<i>Ruhunu Gewatta</i>	50	50
	<i>Ruhunubimai-Govidathai</i>	26	22
	<i>Asvadduma</i>	77	77
	<i>Salupaliya</i>	09	09
	<i>Thirasara</i>	43	40
	<i>Kadamalla</i>	51	50
	<i>Hathadiya</i>	07	07
	<i>Sannasa</i>	42	40
	<i>Govidathata Ape Saviya</i>	504	504
	<i>Lady Bird</i>	42	38

## AGRO TECHNOLOGY PARK BATA - ATHA

The main objective of this park is the capacity building of various stakeholders in the agricultural sector, farmers, university students and entrepreneurs etc. School children become major target recipients who are provided with the opportunities to learn agriculture science while gaining a sound practical knowledge.

This is a paradise not only for farmers, school children and general public to learn agriculture; Promoting agro-tourism is another dimension of the park; A unique selling point to encourage tourists to visit Sri Lanka. This is a new concept to promote tourism in Sri Lanka other than its historical sites, wild life, sand and sea.

Therefore, Bataatha is a paradise for agriculture enthusiasts. Summer huts with decks overlooking Lakes, Paddy fields, Fruit garden are common in the park for reality and enjoying scenic beauty.

Bataatha has different demonstration sites such as Rice garden, Leafy vegetable garden, Fruit orchards, underutilized fruit garden, Medicinal garden, Chena, Spice garden, Banana garden etc. in an aesthetically pleasing edible landscaping environment. Arched two hands, is the gateway to the park; a symbol of the shared labour.

The park is abundant with numerous vegetable plants; a live Agro biodiversity; a live agriculture crop museum in an aesthetically pleasing environment; known as edible landscaping; now a days. Two sides of the road are hedged with a dragon fruit belt; a plant ideally suited for the dry zone conditions; belongings to the cactus family. The fruit is edible and considered to be very expensive in Sri Lanka; a message for visitors on a high valued crop.

One other important aspect of this garden is the facilitation provided for agricultural education. There are 15 facilitators within the ground to guide visitors. Unlike other normal gardens and parks in the world, service of

facilitators (Agriculturists with Diploma in Agriculture) are provided to make aware farmers, school children, and other general public on each section of the park.

Another facility made available is this park is the self explanatory instructional technical board in all three languages; Sinhala; Tamil and English.

## Progress

**Table 3.2.10: Financial Progress during 2013**

Description	Income (Rs)
School Students	69,705.00
Other Students	34,180.00
Adults	426,820.00
Tourists' Childrens	600.00
Adult Tourists	26,800.00
Vehicle Parking Charges	47,880.00
Auditorium	3,000.00
Farm Products	168,360.00
<b>Total</b>	<b>777,345.00</b>

## STAFF LIST

Designation	No.
Director	01
Additional Director	01
Deputy Director of Agriculture	02
Assistant Director of Agriculture	03
Subject Matter Specialist	01
Agriculture Officer	08
Lecturer	02
Development Officer	14
IT Officer	01
Programme Assistant	03
Media Assistant	03
Audio Visual Assistant	03
Artist	02

Designation	No.
Agricultural Instructor	46
Public Management Assistant	14
AV Technician	01
Photographer	02
Press Book Binder	01
Machine Minders	04
Compositor	02
Farm Clerk	02
Office Work Assistant	01
Driver	17
Tractor Operator	02
Cinema Operator	01
Videographer	01
Video Editor	02
Video Editing Assistant	01
Video Lighting Assistant	01
Video Assistant	01
Sound Reorder	02
Exhibition Assistant	01
Storeman	04
Watcher	30
Lorry Cleaner	01
Carpenter	01
Welder	01
Electrician	01
Electrical Assistant	01
Technician	02
Mechanic	01
Painter	01
Labourer (Permanent)	19
Labourer (Contract)	191
<b>Total</b>	<b>399</b>

## 4.1 ADMINISTRATION DIVISION - PERADENIYA

The role of the Administration Division is to deal with the various matters related to establishment of state officers in the DOA. These matters vary from obtaining approval to fill vacancies, calling of applications in terms of specified criteria, conduction of relevant written tests/ interviews, selection of most suitable applicants for appointment, recruitment dealing with all areas pertaining to promotions, efficiency bar exams, disciplinary matters and communications related to policy decisions of the state and the department. The division also

communicates with organizations such as Public Service Commission, Human Rights Commission, Attorney General's Department, Parliamentary Advisory Committee and the office of the Commissioner of Parliamentary Affairs regarding various appeals and also with the other ministries and departments on administrative matters. Coordination of this overall process in accordance with the guidance and instructions of the Ministry of Agriculture is vested with the Administration Division.

### BUDGET

Allocations given and expenditure incurred under capital and recurrent are given in Table 4.1.1.

**Table 4.1.1: Annual budget – 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	11,149,004	10,137,338	91
Recurrent	17,830,567	15,995,518	90
<b>Total</b>	<b>28,979,571</b>	<b>26,132,856</b>	<b>90</b>

### PROGRESS

#### Appointments

The highest No. of staff recruitment in year is witnessed in 2013 in the history of DOA. It led to overcome the dearth of staff prevailed for years considerably. Details of recruitments made are given in Table 4.1.2.

**Table 4.1.2: Appointments made during 2013**

Designation	No. of appointments
Director General	01
Additional Director General (Development)	01
Additional Director General (Research)	01

Designation	No. of appointments
Additional Director General (Administration)	01
Agricultural Officer	91
Research Officer	17
Lecturer	11
Agricultural Economist	03
Economist Assistant	07
Driver	100
Technician	19
Machinist	09
Video Editor	02
Mechanic	12
Machine Minder	01
Audio Recorder	02

Designation	No. of appointments
Video/ Photographer's Assistant	02
Waiter	04
Demonstrative Assistant	02
Video Assistant	02
Video Editing Assistant	02
Video Lighting/ Electrical Assistant	04
Bee Keeper	07
Cook	13
Watcher	29
Budder	02
Technical Assistant	89
Research Sub Assistant	13
Research Assistant	01
Farm Clerk	46
<b>Appointments made by the Director General of Combined Services</b>	
Development Assistant	209
<b>Total</b>	<b>858</b>

## Promotions

**Table 4.1.3: Promotions made during 2013**

Designation	No.
Sri Lanka Agricultural Service II/I	03
Sri Lanka Agricultural Service Class I	04
Agricultural Instructor (Special) I/II	18
Economist Assistant	03
<b>Promotions made by Director General of Combined Service`s</b>	
Driver II e/I	10

## Absorption in to Grades

Laborer - 200

## Retirement from the service

**Table 4.1.4: Retirements during 2013**

Designation	No.
SL Agricultural Service	14
SL Accounting Service	01
Agricultural Instructor	27
Agricultural Instructor (Special)	03
Research Officer	12
Research Assistant	04
Research Assistant (Special)	01
Research Sub Assistant	05
Composer	01
Lecturer	03
Subject Matter Specialist	02
PMAS (Supra)	01
Economist Assistant	02
Public Management Assistant	27
Farm Clerk	01
Driver	08
Electrician	01
Storeman	01
Machinist	01
Welder	01
Tractor Operator	01
Mechanic	01
Plant Yard Operator	02
Mason	01
Fitter	01
Carpenter	01
Special Store Labourer	02
Watcher	15
Labourer	66
Sanitary Labourer	05
Steward	01
Cook	01
Budder	01
Special Labourer	01
Circuit Bungalow Keeper	01

## Deceased while in service

**Table 4.1.5: Deceased While in service during 2013**

Designation	No.
Agriculture Instructor	01
Research Assistant	01
Tractor Operator	01
Budder	01
Circuit Bungalow Keeper	01

## Release of officers to other posts

Agricultural Officer	01
Economist Assistant	02
Tractor Operator	02
Watcher	03

## Vacation of Service

Circuit Bungalow Keeper	02
Watcher	22
Agriculture Instructor	01
Economist Assistant	01

## Resignation from Posts

Agriculture Instructor	23
Research Assistant	14
Farm Mechanical Instructor	02

## Officers released to Provincial Council

Agricultural Instructors	07
Research Assistant	03
Work Inspector	01
Programme Assistant	01

## Disciplinary Inquiries

**Table 4.1.5: Disciplinary Inquiries during 2013**

Category	Number of inquiries pending at the beginning of the year 2013	Number of inquiries initiated during the year -2013	Number of inquiries completed during the year -2013	Number of inquiries pending as at 2013.12.31
Formal Disciplinary Inquiries Preliminary investigations	38	28	25	41
Government/ Internal Audit	19	13	08	24
Inquiries of petitions	43	50	14	79
<b>Total</b>	<b>100</b>	<b>91</b>	<b>47</b>	<b>144</b>

**Table 4.1.6: F.R.104 Inquiries**

Number of inquiries pending at the beginning of the year 2013	Number of inquiries initiated during the year 2013	Number of inquiries completed during the year 2013	Number of inquiries pending as at 2013.12.31
486	185	135	536

### Amount of loans granted and types of salary advance

**Table 4.1.7: Details of loans and salary advances**

Type of loan	No. of vouchers Approved	Amount paid (Rs.)
Distress	1128	124,138,283
Bicycle	31	186,000
Property	65	76,052,260

### Agrahara Insurance Scheme

- Number of Applications submitted for reimbursement of hospital charges and Spectacles - 1050
- Value of bills- Rs. 11,045,432
- Number of Accident claims submitted – 06
- Value of accident claims –06 applications were recommended and submitted to N.I.T.F
- Number of natural death claims submitted - 12
- Value of natural death claims - Rs. 1,200,000

### Security Deposits

- Number of persons whose security deposits were released after retirement - 100
- Amount released - Rs:2,796,073.80

- Credited to the Government Account - Rs.4, 822,713.85

### Pensions

The Files received by the pension branch are as follows

- For payment of pensions - 235
- For death gratuity - 11
- For ex-gratia payment - 29
- For reversion of pensions - 50
- For Released of minority receipts - 07

### No. of officers gone abroad for Post Graduate Degree

#### PhD

Research Officers 01

### No. of officers returned after completing post-graduate Degree

#### M.Sc.

Deputy Directors 01

#### M.Phil.

Research Officers 01

#### Ph.D.

Deputy Directors 01

Research officers 03

### Release of officers to study within the island

#### Ph.D. Degree

Agricultural Officers 08

#### M.Phil. Degree

Research Officers 09

<b>M.Sc. Degree</b>	
Accountant	01
Mechanical Engineer	01
Research Officer	02
Agriculture Officer	01
Lecturer	03
<b>MBA Degree</b>	
Accountants	01
<b>B.Sc. Degree</b>	
Agriculture Instructors	10
<b>Diploma Course</b>	
Administrative Officers	02
Senior Librarians	01

### Completing Degree within the island

<b>M.Sc. Degree</b>	
Deputy Directors	01
Lecturers	01
<b>B.Sc. Degree</b>	
Agriculture Instructor	11

### Overseas visits abroad for training, workshops and other conferences

Table 4.1.8: Oversease visits during 2013

Designation	No.
DGA	03
Addl. DG (Admin./ Res./ Dev.)	02
Director	18
Chief Engineer	02
Chief Accountant	01
District Director of Agriculture	04
Registrar of Pesticides	02
Accountant	06
Additional Director	17
Deputy Director	25
Asst. Director of Agriculture	05
Unit Head	01
Engineer	05

Designation	No.
Research Officer	58
Agricultural Economist	06
Lecturer	02
Agriculture Officer	04
Administrative Officer	01
Agricultural Instructor	43
Agricultural Monitoring Officer	02
Programme Assistant	02
Research Assistant	02
Budget Assistant	01
Finance Assistant	01
PMA	01
Farm Mechanical Instructor	01
Audio Visual Assistant	02
Electrician	01
Cinema Operator	01
Labourer	02

### Local Training

Table 4.1.9: Local trainings conducted during 2013

Training	No. of Officers Attended
Training on Store keeping (Officers who have engaged in the duties of stores)	46
Training on Disciplinary Action for PMA	117
Workshop on Pension file updating for PMA	137
Training on F.R.104 Inquiries for PMA	134
Data base Analysis Course for PMA (four steps)	80

## Officers Participated in local conferences

Training Conducted By Sri Lanka Institute of Development Administration

- Applications Forwarded by non- Staff grade Officers - 783
- Non- Staff grade Officers Attended for trainings - 10
- Application Forwarded by Staff Officers - 25
- Non- Staff grade Officers Attended for trainings - 10

## Recoveries

- Total amount recovered by the government during the year 2013 from the officers who are already in the service and have breached the agreements is Rs: 145,289.40
- Total amount recovered by the government during the year 2013 from the officers who have vacated the post and have breached the agreements is Rs: 2,062,664.44

## STAFF LIST

Designation	No.
Director General	01
Additional Director General	01
Director (Admin)	01
Deputy Director (Admin)	01
Assistant Director (Admin)	02
Administrative Office	06
Translator	03
Legal Assistant	02
Development Officer	17
Public Management Assistant	86
K.K.S.	21
Driver	08
Watcher	06
Sanitary Labourer	02
Unskilled Labourer	20
<b>Total</b>	<b>177</b>

## 4.2 ENGINEERING DIVISION – PERADENIYA

The main task of the Engineering Division is to provide quality infrastructure facilities promptly to attain the objectives of Department of Agriculture.

Engineering Division is facilitated with Farm Machinery Research Centre (FMRC) at Mahailuppallama & four Regional Engineering work shops.

The main functions of the Engineering Division can be categorized as follows:

- Procurement of Capital Assets :
  - Civil engineering work
  - Procurement of Machinery, vehicles and Office Equipment
- Maintenance of infrastructure facilities:
  - Buildings and structures
  - Vehicles and Machinery
  - Office Equipment
- Farm machinery research

- Provide engineering advisory services to all divisions of DOA
- Operation and Maintenance of the drinking water supply scheme at Kundasala

In order to improve and expand the service of the division, regional mechanical workshops have been established in four locations (Kundasala, Seetha Eliya, Polonnaruwa and Angunakolapelessa). The main activities carrying out in these workshops are repairing and servicing of vehicles and farm machinery. In addition, Engineering Assistants were stationed in three regional offices in order to attend civil engineering requirements efficiently.

### BUDGET

The budgetary allocations and expenditure under capital and recurrent votes in year 2013 are given in Table 4.2.1.

**Table 4.2.1: Annual budget – 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	4,221,000	3,366,951	80
Recurrent	10,243,180	9,576,077	93
<b>Total</b>	<b>14,464,180</b>	<b>12,943,028</b>	<b>89</b>

### PROGRESS

#### Progress of Civil Engineering Works

The activities carried out can be categorized as follows:

- New construction and repairs carried out by the Division – This includes preparation of estimates , tender management and awarding contracts,

work supervision and approval of payments

- Because of the limitations of human resources, specially shortage of technical staff, only the estimates were prepared by the Engineering Division on requests of the Directors.

The summary of the Civil Engineering works carried out by the division in 2013 are given in Table 4.2.2.

**Table 4.2.2: Summary of civil engineering work carried out in 2013**

Activity	Requests received	Total work carried out
New Constructions	147	
Repairs	302	
Estimates Sent		233
Tender Called		0
Minor Repair in Maintenance		250
Estimates Prepared		339

**Table 4.2.3: The value of the civil Engineering works (Division wise summary) carried out during the year**

Division/ Description	No. of Activities	Awarded Value (Rs)
Administration	07	6,430,639.10
Finance	02	540,883.00
RRDI	01	757,150.00
SCPPC	13	4,852,395.50
ETC	14	19,246,734.00
SEPC	04	1,295,310.00
HORDI	08	7,957,165.63
SPMDC	25	27,148,389.95
NRMC	02	2,564,834.41
FCRDI	01	875,532.00
Engineering	07	5,684,840.10
FCRDC	03	1,472,175.00
ICC	-	0.00
<b>Total</b>	<b>87</b>	<b>78,826,048.69</b>

### Progress of Mechanical & Electrical Engineering works

The activities carried out in the year 2013 are as follows:

- **Procurement of works**
  - Registering garages & Service stations
  - Registering of suppliers

### • Vehicle repairs and maintenance 2013

The details of vehicle repairs are given in Table 4.2.3.

**Table 4.2.3: Vehicle repairs and recommendations given**

Location of workshop	Major Repairs	Minor Repairs	Recommendations	Work in Progress	Total
Head Office	30	421	451	03	905
Kundasale	06	90	8	-	104
Polonnaruwa	03	59	88	-	150
Angunakolapelessa	13	130	170	-	313
Seetha Eliya	15	139	140	01	295
<b>Total</b>	<b>67</b>	<b>839</b>	<b>857</b>	<b>04</b>	<b>1767</b>

- Procurement of Machinery and Equipment**

The total values of the goods procured by Engineering Division for the Divisions of DOA are given in Table 4.2.4.

**Table 4.2.4: Value of Goods Procured by the Engineering Division in 2013**

Division	Total (Rs.)
Engineering Division	741,202
Administration Division	924,472
Finance Division	1,433,616
ETC	4,649,789
SEPC	363,310
SPMDC	16,673,949
NRMC	1,439,712
HORDI	3,692,412
SCPPC	1,285,488
FCRDI	7,462,942
RRDI	3,392,826
PMEU	232,072
ICC	850,894
Additional Director	
General of Agriculture	510,489
ASDA Office	174,302
NPQS	343,288
FRDI	3,327,130
<b>Total</b>	<b>39,553,879</b>

**Table 4.2.5: Quantities of items purchased during 2013**

Item	Quantity
Desktop Computer	47
Laptop Computer	33
Laser Printer	50
Dot Matrix Printer	04
Refurbished Computer	74
Digital Photocopy Machine	20
UPS	145
Digital Camera	52
Rider	05
Rotavator	09
Finger Scan Machine	15
Chain Saw	33
Portable PA System	01
Knapsack Sprayer	121
Harrows	02
Small Cultivator	04
Multimedia Projector	16
Fax Machine	10
Digital Duplicator	05
Bush Cutter	24
4W Tractor Coupled	08
Water Pump	05
Tablet PC	03
Colour Laser	04
Tine Tiller	05
Seed Fertilizer	02
<b>Total</b>	<b>697</b>

**Table 4.2.6: Value of total capital works handled by the Engineering Division**

Activity	Value (Rs.)
Civil Engineering Constructions	78,826,049
Procurement of Equipment	39,553,879
Procurement of Tyres	223,200
<b>Total</b>	<b>118,379,927</b>

### Water Supply Scheme at Kundasale

This scheme pumps approximately 200 000 gallons of water from the Mahaweli river daily. The pumping station works 18 hours per day and the power consumption is 60Kw approximately.

This water is supplied to the various institutions under DOA as well as non-DOA premises. Chlorinated water is supplied for drinking and domestic usage throughout the year while non chlorinated water is supplied to the lake of the agriculture farm during drought period according to the requirement.

### Other Services

The Engineering Division assisted many institutes, Centers and Units of the DOA by preparing estimates for building construction and repairs, supervising the work and scrutinizing and recommending of estimates for repair of vehicles, equipment and machinery. Inspection and valuation of condemned vehicles, machinery and equipment also carried out by the division. The division actively participated in technical evaluation and provided advisory services to the tender boards.

### Staff 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. Number of vacancies in the cadres of technical staff were not filled. Owing to this constraint, numerous difficulties have been encountered in carrying out new civil engineering work as well as routing work such as operation of water supply scheme, Kundasala etc. At present, the division does not have a sufficient number of Engineering Assistants, Building Overseers and Draughtsmen to handle the work load in the Civil Engineering section.

### STAFF LIST

Designation	No.
Chief Engineer	01
Mechanical Engineer	02
Civil Engineer	02
Electrical Engineer	01
Engineering Assistant	08
Administrative Officer	02
Public Management Assistants	13
Development Officer	05
Drivers	06
Mechanic	18
Electrician	03
Carpenter	02
Mason	02
Technician	07
Machinist	05
Storeman	03
KKS	01
Watcher	08
Labour	10
<b>Total</b>	<b>99</b>

## 4.2.1 FARM MACHANIZATION RESEARCH CENTER (FMRC) - MAHAILLUPPALLAMA

Farm Mechanization Research Center is located within the Mahailuppallama agricultural complex, about 35km from Anuradhapura. FMRC has been established to promote appropriate farm mechanization in Sri Lanka by introducing farm mechanization technology to reduce cost of production, improve qualities enhance productivity & increase volume of agricultural products.

The major objective of FMRC is to introduce effective agricultural mechanization technologies compatible with the socio economic & field conditions in different parts of the Sri Lanka. The activities carried out by FMRC are as follow.

- Identification of mechanization needs according to priorities & constraints in different farming systems
- Selection & testing of promising machinery & implements with regard to their construction, functions, safety and socio-economic factors.
- Development, modification & adaptation of agricultural machinery & implements to suit local condition.

- Prepare technical drawings, test reports & instruction manuals for selected implements
- Transfer technology to local manufactures & enhance their capabilities in production of appropriate agricultural machinery & implements.
- Helping agricultural extension & other agencies to popularize agricultural mechanization, technologies among farmers & other users.

The center has 5 sections

1. Research & development section
2. Testing & evaluation section
3. Agricultural & industrial extension section
4. Farm Machinery maintaining & Repairing section
5. Administrating section

### BUDGET

The allocation and expenditure for 2013 given in table 4.2.1.1.

**Table 4.2.1.1: Annual budget – 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Recurrent	8,160,371	7,703,659	94
Capital	3,616,000	3,537,021	98
<b>Total</b>	<b>11,776,371</b>	<b>11,240,680</b>	<b>95</b>

## PROGRESS

### Four Wheel Tractor Coupled Injector Planter with Fertilizer Applicator

Reduces the time, fuel and man power requirement of maize cultivation by introducing a Fertilizer Applicator to 4W tractor coupled Injector planter while seeding.

### Two Wheel Tractor Rotary Attached Seeder- Walking Type

Reduces the time, fuel and man Power requirement of highland cultivation by introducing a seeder attached to 2W tractor rotary both seeding and rotavating together. This can be used for Maize, Soya, Green gram, Black gram and Cowpea.

### Two Wheel Tractor Rotary Attached Seeder- Riding Type

Reduces the time, fuel and man power requirement of highland cultivation by introducing seeder attached to 2W tractor rotary for both seeding and rotavating together.

### Four Wheel Tractor Rotary Attached Seeder

Reduces the time, fuel and man power requirement of highland cultivation by introducing a seeder attached to 4W tractor rotary for both seeding and rotavating together for large scale farmers.

### Finger Millet Threshing & De-husking Machine

Reduces the time, fuel and man power requirement of finger millet threshing &

dehusking by introducing a electric motor driven machine instead of manual practices.

### Four wheel Tractor Coupled Axial Flow Water Pump

Increase the capacity of the existing pump to cater large scale farmers.

## AGRICULTURAL & INDUSTRIAL EXTENSION

Actively participated the Deyata Kirula, Govi Sathiya, TECHNO 2013 exhibitions held in 2013. TV programs were broadcast about Maize and OFC mechanization packages. Field demonstrations on paddy and Maize cultivation packages were conducted successfully.

**Table 4.2.1.2: Extension programs during the year 2013**

Type of program	Number of programmes
Field demonstration	28
TV programmes	3
Radio programmes	1
Exhibitions	5
Internal training	9

## TESTING & EVALUATION SECTION

Farm Mechanization Research Center is the sole government institutes which established to test and evaluate locally manufactured or imported agricultural machinery in Sri Lanka. Following machines were tested during 2013.

**Table 4.2.1.3: Testing of machinery during 2013**

Machine Type	No. of Machines Received	No. of Test Reports Issued
Four Wheel Tractor	4	4
Two Wheel Tractor	1	1
Power Spray	-	3
Hand Spray	2	1
Cultivator	1	1
Thresher	-	1
Combine Harvester	-	1
Mamoty	1	2
Tine Tiller	-	1
Rotavator	3	1
Rotoshlasher	-	1
Transplanter	1	-
Power Weeder	1	-
<b>Total</b>	<b>14</b>	<b>17</b>

## FARM MACHINERY

### MAINTAINING & REPAIRING

#### SECTION

Following recommendations, repairs and services were done during year 2013.

**Table 4.2.1.4: Repairs & services conducted during 2013**

Activity	No.
Repairs	
Engine	06
Gear Box	08
Other	51
Recommendations	174
Services	18

## STAFF LIST

Designation	No.
Deputy Director	01
Mechanical Engineer	03
Engineering Assistant	02
Public Management Assistant	02
Agricultural Instructor	02
Driver	04
Store man	01
Tractor Operator	02
Plant Helper	01
Mechanic	03
Machinist	03
Technician	04
Welder	01
Tinker	01
Blacksmith	01
Carpenter	01
Watcher	03
Unskilled Labour	07
Contract Labour	29
<b>Total</b>	<b>71</b>

## 4.3 FINANCE DIVISION – PERADENIYA

The main objective of the finance division are establishment and operation of a sound financial management system to achieve the objectives of the Department of Agriculture.

This includes:

- Preparation of annual revenue and expenditure estimates.
- Maintenance of Bank accounts.
- Allocation of Departmental and Ministry provisions.
- Collection and accounting of revenue of the Department.
- Make all recurrent and capital expenditure including personal emoluments.
- Performing internal audit activities.
- Preparation of financial progress reports and evaluation.
- Co – ordination of financial activities with local, and foreign, government and non-government organizations
- Foreign payments.
- Implementation of farm advance account activities.
- Preparation of final accounts including Appropriation and Revenue accounts.
- Conducting Annual Board of Survey.
- Payment of loans to employees.
- Training of personnel on computer application, financial management and store management.

## PROGRESS

### Capital Expenditure

Table 4.3.1: Capital expenditure – 2013

Project	Project Description	Revised Estimate (Rs Mn.)	Expenditure (Rs Mn.)	Progress %
285 – 1 – 1	Administration & Establishment Services	34.460	27.897	81
285 – 2 – 2	Agriculture Research & Development	466.638	334.569	72
285 – 2 – 3	Agriculture Extension & Training	321.462	225.393	70
285 – 2 – 4	Seed Certification & Plant Protection	710.000	555.617	78
<b>Total</b>		<b>1,532.560</b>	<b>1,143.476</b>	<b>75</b>

The anticipated financial progress of capital projects was unable to achieve as imprest was not enough in 2013.

## Recurrent Expenditure

**Table 4.3.2: Recurrent expenditure during 2013**

Project	Project Description	Revised Estimate (Rs Mn.)	Expenditure (Rs Mn.)	Progress %
285 – 1 – 1	Administration & Establishment Services	290.149	289.825	99
285 – 2 – 2	Agriculture Research & Development	854.602	854.371	99
285 – 2 – 3	Agriculture Extension & Training	626.914	626.338	99
285 – 2 – 4	Seed Certification & Plant Protection	496.040	495.643	99
<b>Total</b>		<b>2,267.704</b>	<b>2,266.176</b>	<b>99</b>

## Operation of Advance Account

### Activities

**Table 4.3.3: Operation of advance account – 2013**

Description	Approved limit (Revised) (Rs Mn.)	Actual Amount (Rs Mn.)
<b>1. Maintenance of Agricultural Farms</b>		
Maximum limit of Expenditure	416.000	413.170
Minimum limit of receipts	416.000	422.781
<b>2. Public Officers Advance Account</b>		
Maximum limit of Expenditure	185.000	110.691
Minimum limit of receipts	135.000	159.005

The observations of the Auditor General with respect to the accounts in 2012 were made in 2013. Accordingly, the Auditor General has

made the following opinion on the Farm advance account 28502. “ I am in the opinion that with respect to the financial status of the farm advance account activity of the Department of Agriculture as at 31.12.2013, out of the financial statement, the financial operation of it for the year ended as at 31.12.2012 is depicted an exact and reasonable state according in the generally accepted accounting principles except the influence resulted from the facts stated in the paragraph 2.2” that has ever been received favourable comment for any advance account of the Department of Agriculture.

The Auditor General has made the following observations regarding the appropriation and revenue accounts of the DOA as well. “ It is observed that appropriation account, income account and reconciliation statements of the DOA has been prepared satisfactorily according to the financial records and books as at 31.12.2012 except the general observations from (a) to (g) and main audit findings”. This also a good observation received by DOA for the first time.

## Collection of Revenue

**Table 4.3.4: Collection of revenue during 2013**

Revenue Heads	Category	Actual Receipts (Rs Mn.)
20 - 02 - 02 - 99	Loan Interest	13.928
20 - 03 - 99 - 00	Other receipts	99.454
20 - 02 - 01 - 01	Rent and others	19.295
20 - 03 - 02 - 18	Department Sale & Other charges	181.639
20 - 04 - 01 - 00	W & O.P	62.422
20-06-02-00	Sale of capital Assets	8.123
<b>Total</b>		<b>344.861</b>

## STAFF LIST

Designation	No.
Chief Accountant	01
Chief Internal Auditor	01
Deputy Director ( Finance)	03
Assistant Director ( Finance)	04
Budget Assistant	02
Translator	01
Development Officer	20
Public Management Assistant	87
K.K.S	13
Driver	05
UnSkilled Labourer	10
<b>Total</b>	<b>147</b>

## 4.4 PROGRESS MONITORING AND EVALUATION UNIT (PMEU) – PERADENIYA

The PMEU is responsible for monitoring and evaluation of activities and programmes conducted by all institutes and centers of DOA. In addition it holds the responsibility of preparing Annual Action Plans, Annual Performance Report, monthly progress

reports and other relevant reports for the Ministry of Agriculture and other institutes. Progress review meetings are also convened by the PMEU in order to streamline the activities of the DOA.

### BUDGET

**Table 4.4.1: Annual budget - 2013**

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	1,850,000	922,783	50
Recurrent	1,934,150	1,679,406	87
<b>Total</b>	<b>3,784,150</b>	<b>2,602,189</b>	<b>69</b>

### PROGRESS

#### Compilation of Action Plans

Action plans for the year 2013 were compiled under following categories.

- Capital expenditure
- Recurrent expenditure
- Special projects funded through DOA
- Special projects funded through the Ministry of Agriculture
- Technical programme of the DOA

- Procurement plan of the DOA

#### Progress Monitoring of Capital and Recurrent expenditure

Monitoring the physical and financial progress of capital work and recurrent expenditure was continued during 2013. Monthly progress reports for Capital and Recurrent expenditure were prepared and submitted to the Ministry of Agriculture.

**Table 4.4.2: Summary of progress of DOA during 2013**

Vote	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure %
Capital	550	374	68
Recurrent	2267	2266	100
Projects under DOA votes	982	796	81
Projects under Ministry of Agriculture votes	81	65	79
Projects under Ministry of Economic Dev. votes	97	92	95
Projects under Ministry of Environment and Renewable Energy votes	0.069	0.058	84
<b>Total</b>	<b>3977</b>	<b>3593</b>	<b>90</b>

## Progress Monitoring of Special Projects

### Special Projects under DOA votes

Progress of 14 special projects under DOA votes were monitored and monthly

reports including physical and financial progress were submitted to the Ministry of Agriculture. Financial progress of special projects under DOA votes is given in Table 4.4.3.

**Table 4.4.3: Progress of special projects under DOA votes during 2013**

Project	Institute	Allocation (Rs. Mn.)	Revised Allocation (Rs. Mn.)	Expen diture (Rs. Mn.)	Expen diture %
1. Seed Production & Purchasing Programme	SPMDC	250.00	297.99	223.31	75
2. Accelerated Seed Farms Development Programme	SPMDC	200.00	157.01	96.57	62
3. Infrastructure Development RRDI	RRDI	75.00	72.94	54.28	74
4. Development of new hybrids & open pollinated varieties of other field crops	FCRDI/ MI	100.00	85.80	44.24	52
5. Establishment of 100 Fruit Villages	FCRDC	30.00	30.00	29.76	99
6. Production of quality planting material of important crops through tissue culture	HORDI	30.00	30.00	29.17	97
7. Increasing seed availability of popular traditional vegetable seeds	HORDI	5.00	5.00	4.38	88
9. Implementation Soil Conservation Act	NRMC	14.00	14.00	6.99	50
10. Establishment of quality seed and planting material production through implementation of Seed Act	SCPPC/ SCS	20.00	20.00	16.80	84
11. Strengthening of Seed Certification activities	SCPPC/ SCS	100.00	100.00	91.99	92
12. Minimized potential adverse effects of Agro chemical on human health and environment	SCPPC	40.00	40.00	0.82	2
13. Media program	ICC	20.00	20.00	19.08	95
14. Land Development at SOA	DOA	61.00	61.31	44.58	73
15. Training & Capacity Building	ETC\ ICC	20.60	27.77	26.79	96

Project	Institute	Allocation (Rs. Mn.)	Revised Allocation (Rs. Mn.)	Expen diture (Rs. Mn.)	Expen diture %
16. Construction of testing lab	FMRC- MI	5.00	5.00	0.11	2
17. NARP projects	DOA	60.00	54.45	49.45	91
18. Research office and Laboratory at Bandarawela	HORDI	25.00	25.00	0	0
19. Agro technology parks	ICC	4.50	4.50	4.17	93
20. Construction of new building AVC	ICC	125.00	125.00	106.60	85
21. Construction of new hostel at SOA Pelwehera	ETC	50.00	50.00	0	0
22. School Development at SOA	ETC	100.00	2.06	2.06	100
23. Small Scale Project	DOA	10.00	22.85	22.85	100
<b>Total</b>		<b>1,345.10</b>	<b>1,250.68</b>	<b>874</b>	<b>70</b>

#### Special Projects under Ministry votes

DOA received allocations from Ministry of Agriculture, Ministry of Economic Development and Ministry of Environment and Renewable energy for different projects.

The financial progress of those projects are given in tables 4.4.4, 4.4.5 and 4.4.6 respectively.

**Table 4.4.4: Progress of Special Projects under Ministry of Agriculture Votes**

Project	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure %
1. Development of an eco-friendly ecosystem at Mahinda Rajapakse sports complex, Diyagama	10.00	4.70	47
2. Expenditure for field coordination – Red onion	0.10	0.09	99
3. Special Development Programme - 2013	0.05	0.05	100
4. Two day Seasonal meeting – May 2013	0.29	0	0
5. Payment for fruit plants received from Weerapana Farm	0.01	0	0
6. Senior citizens' economic development programme at Ingiriya	0.80	0.44	56
7. Programme for enhancing potato consumption	19.50	18.35	94
8. Young Agricultural Entrepreneurs' programme, Galle	0.10	0.10	100

<b>Project</b>	<b>Allocation (Rs. Mn.)</b>	<b>Expenditure (Rs. Mn.)</b>	<b>Expenditure %</b>
9. Land development – Deyata Kirula, 2013	17.00	16.99	100
10. Fruit crop promotion & development – Deyata Kirula, 2013	0.50	0.49	99
11. Cultivation of leafy vegetables and tuber crops – Deyata Kirula, 2013	0.55	0.37	68
12. Regional Agricultural Research Centre, Makandura – Deyata Kirula, 2013	1.12	0	0
13. Inter Provincial Area, Anuradhapura – Deyata Kirula, 2014	0.28	0	0
14. Land development – Deyata Kirula, 2014	5.00	4.49	90
15. Promotion of production & use of organic manure	5.95	5.38	90
16. Collection of data & printing of formats	1.90	1.87	99
17. Production of Red onion seeds	5.00	4.95	99
18. Rice Export Programme	5.13	0.62	12
19. Seed Farm Programme, Paranthan, Murunkan	6.92	5.08	73
20. Seed Farm Programme, Paranthan, Murunkan	1.05	0.51	48
21. Awareness programme for Audit & Finance Officers	0.07	0.02	31
<b>Total</b>	<b>81.30</b>	<b>64.51</b>	<b>79</b>

**Table 4.4.5: Progress of Special Projects under Ministry of Economic Development Votes**

<b>Project</b>	<b>Allocation (Rs. Mn.)</b>	<b>Expenditure (Rs. Mn.)</b>	<b>Expenditure %</b>
1. Awareness programme for trainers of Agriculture section of the Divi Neguma Programme	0.099	0.099	100
2. Providing dwarf Drumstick plants for Officers of the Ministry of Finance	0.112	0.112	100
3. Divi Neguma Programme, Phase 5 – Providing dwarf Drumstick plants	97.326	92.418	95
4. Settlement of bills of 2012	0.083	0.082	99
<b>Total</b>	<b>97.620</b>	<b>92.711</b>	<b>95</b>

**Table 4.4.6: Progress of Special Projects under Ministry of Environment & Renewable Energy**  
Votes

Project	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure %
1. Awareness programme for Police Officers on disposal of pesticide containers after use	0.069	0.058	84

### Achievements of DOA

Achievements of DOA in the year 2013 were compiled and submitted to the Ministry of Agriculture and the Central Bank for inclusion in the progress report for the parliamentary budget speech and the Annual Report of the Central Bank.

### Annual Performance Report

Annual Performance Report of the DOA for the year 2012 was prepared and tabled in the Parliament. It was also distributed among relevant Ministries, Universities, libraries and other relevant institutions.

### Other Reports

Progress reports of activities under ‘Mahinda Chintanaya’ and projects of which the total estimated cost exceeds Rs. 50 million were prepared and submitted to the Ministry of Agriculture.

### Human Resources Availability

Mr. H.M. Ranathunga Bandara, Senior Lecturer was appointed to cover the duties of the Deputy Director position of the unit. Three Development Officers were recruited within the year. One Programme Assistant and one Development Officer were transferred to Finance division.

### PLAN FOR 2014

- Preparation of Action Plans for DOA programmes.
- Monitoring progress of capital and recurrent work and special projects.
- Conducting monthly physical and financial progress review meetings.
- Compilation of the Annual Performance Report of the DOA.
- Providing information for the Central Bank report and the budget speech.
- Compilation of progress reports for projects over 50 million.

### STAFF LIST

Designation	No.
Deputy Director	02
Translator	03
Programme Assistant	01
Agricultural Instructor	01
Development Officer	03
Public Management Assistant	02
Driver	03
KKS	01
Labourer	03
Watcher	02
<b>Total</b>	<b>21</b>

## 5. WEATHER REPORT

Meteorological data collected from 12 agro-meteorological stations representing different agro-ecological regions in Sri Lanka during 2012/2013 Maha (September – February) and 2013 Yala (March – August) seasons have been summarized in this report. This report has been compiled by the Climatology Division, 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 total rainfall and corresponding 10-year averages of 12 stations are given in Tables 1.2 and 1.3, respectively. Monthly mean values of other important agro-meteorological parameters, namely, potential evapotranspiration (estimated from open pan evaporation), temperature, relative humidity, bright sunshine hours and wind velocity are given in Tables 1.4, 1.5, 1.6, 1.7 and 1.8, respectively.

In general, rainfall of 2012/2013 Maha season was above the expectations in almost all regions of the country. Compared to the monthly average, it was favorably distributed throughout the season. Meanwhile, amount and distribution rainfall during 2013 Yala season was remained closer to the usual pattern.

### Low Country Wet Zone

#### **Bombuwela (WL1b)**

The cumulative seasonal rainfall of this region during 2012/2013 Maha season was about 14% increase compared to its long term average of 1,510 mm. This was mainly attributed to the increased rainfall received in every month of

season except November, and January. Monthly cumulative potential evapotranspiration values remained below the cumulative rainfall of respective months, except in January.

The recorded negative anomaly of cumulative seasonal rainfall of 2013 Yala season was only about 9 percent and it is mainly due to the reduction of rainfall during the months of April and August compared to its long term average. At the same time, the monthly cumulative potential evapotranspiration value of August was above the cumulative rainfall of the month. However, cumulative potential evapotranspiration of all other months of the season was well below the cumulative rainfall of respective months, and thus, hardly any chance of developing soil moisture stress conditions in upland crops grown in the region.

### Mid Country Wet Zone

#### **Peradeniya (WM2b)**

In this region, the cumulative seasonal rainfall of 2012/2013 Maha season was about 1,848 mm, an 80 percent increase compared to the long-term average. This positive anomaly in the Maha season rainfall is a result of above normal rainfall in every month of the season except in September and November. Increase of rainfall during conventional dry months of the region, namely January and February was well over 150 per cent and thus, it should have affected the crop yields with increased post harvest losses. This, situation would have deprived flower setting of tree-fruit crops in the region.

The rainfall during 2013 Yala season was a 37% increase compared to its long term average due to receipt of above normal rains during the period of May to August. Even though rainfall during first intermonsoon season (March – April) was below the long term average, it was sufficient to meet the evapotranspiration demand. A cursory examination of previous weather records reveals that, the Yala season of last two years was agriculturally dry. Hence due to well established south west monsoonal wind stream, this 2013 Yala season experienced the usual weather pattern of the region. The received rainfall during each month of the season was well in excess of the potential evapotranspiration throughout the season.

### **Up Country Wet Zone**

#### **Sita Eliya (WU3)**

Cumulative seasonal rainfall of 2012/2013 Maha season in this region was about 1,590 mm, which is about 42% increase compared to its long-term average. This increase was mainly attributed to above normal rains experienced during the period of October through February in the central hills. The increase of cumulative monthly rainfall in February was about 200% compared to its long-term average. The potential evapotranspiration throughout the season was well below the rainfall received during each month of the season. The maximum temperature during the season was ranged from 15 °C to 23 °C while the minimum temperature was in the range of 6 °C to 15 °C.

The Yala season in this region experienced about 1,279 mm of rainfall, a 64% increase over the long-term average. This positive

anomaly in the Yala season rainfall is a result of above normal rainfall received in every month of the season, especially during the period of June to August due to hyper active southwest monsoons. The received rainfall during each month of the season was well in excess of the potential evapo-transpiration of respective months. The maximum temperature during the season was ranged from 16 °C to 24 °C while the minimum temperature was in the range of 7 °C to 15 °C.

### **Low Country Intermediate Zone**

#### **Batalagoda (IL1a)**

The recorded cumulative seasonal rainfall of 1,558 mm during 2012/2013 Maha season in this region was about 44% increase compared to its long-term average. This is due to receipt of above normal rains experienced during October December and January. The increase of cumulative monthly rainfall in December and January was about 200% and 170 % respectively. There were hardly any water deficit conditions throughout the season in this region.

This region experienced about 17 % increase of rainfall during Yala season compared to its long-term average. Fairly good rains received during the months March, May and June made the season to become a successful one, a phenomenon which did not realize during recent past in this region.

#### **Monaragala (IL1c)**

Contrary to wet areas of the country, this region experienced about 5% decrease in the cumulative seasonal rainfall during 2012/2013 Maha season compared to its long term average. It was mainly attributed the fact of

below normal rainfall received during the period of September to December. Nevertheless, the potential evapotranspiration remained well below the rainfall during each month of the season, except September assuring a favorable soil moisture conditions for rainfed upland crops.

The cumulative seasonal rainfall of the 2013 Yala season in this region was 571 mm, which was about 8% decrease compared to its long-term average. This decrease was mainly attributed to the below normal rains experienced in the months of April, May and June. The rainfall of the months of June and July was much below the evapotranspiration demand of the atmosphere.

### **Mid Country Intermediate Zone**

#### **Kundasale (IM3a)**

The cumulative rainfall of 2012/2013 Maha season was about 83% increase compared to its long-term average of 869 mm. The recorded positive anomaly of the season was mainly attributed to the above normal rainfall received during every month of the season except September. The increase of cumulative monthly rainfall in October alone was about 200 per cent.

The seasonal cumulative rainfall of Yala season was 897 mm and it was a 56 % increase compared to its long-term average. April was the only month which did not experience positive anomalies of rainfall during the season. The increase of cumulative monthly rainfall in May and June was about 70% and 200 % compared to its long-term average of 81 mm and 72 mm, respectively. However, the potential evapotranspiration in July and August was in excess of cumulative rainfall.

### **Up Country Intermediate Zone**

#### **Bandarawela (IU3c)**

In line with other parts of the central highlands, this region experienced 49 % increase of rainfall during 2012/2013 Maha season compared to its long-term average. Distribution of seasonal rainfall was also conducive for conventional agricultural practices receiving above normal rains during each month of the season except in September. The potential evapotranspiration remained well below the rainfall of each month during the season. The maximum temperature during the season was ranged from 19 °C to 29 °C while the minimum temperature was in the range of 9 °C to 19 °C.

Cumulative rainfall of 2013 Yala season was about 8% below its long-term average of 661 mm. This negative anomaly was mainly attributed to the below normal rainfall experienced during the first inter-monsoon rainy season of March and April. However, monthly cumulative potential evapotranspiration values were remained below the cumulative rainfall of respective months. The maximum temperature during the season was ranged from 22 °C to 30 °C while the minimum temperature was in the range of 13 °C to 20 °C.

### **Dry Zone**

#### **Maha-Illuppallama (DL1b)**

The cumulative Maha season rainfall in the north-central part of the DL1b agro-ecological region was 1,372 mm, a 34% increase over the expected amount. This increase in cumulative rainfall was mainly attributed to the positive anomaly of rains experienced in most months of the season except September and

November. Potential evapotranspiration values remained well below the monthly rainfall during each month of the season except in September.

There was a 5% decrease of cumulative seasonal rainfall during 2013 Yala season compared to its long term average of 402 mm. This reduction was mainly attributed to the below normal rains experienced in April to June. Meanwhile, monthly cumulative potential evapotranspiration values exceeded the cumulative rainfall in the months of April to July. Hence, rainfall upland crops grown without supplementary irrigation would have suffered from soil moisture stress.

#### **Angunakolapelessa (DL1b)**

As in the case of other parts of the Dry zone, increase of the cumulative seasonal rainfall of 2012/2013 Maha season in the southern part of the DL1b agro-ecological region was about 71 percent compared to its long term average of 780 mm. This positive anomaly was due to the receipt above normal rains in each month of the season with a good distribution. Meanwhile, cumulative monthly potential evapotranspiration of the season remained below the monthly rainfall in each month assuring a stress free crop growth even in rainfed upland farming.

The cumulative Yala season rainfall of 2013 in this region was almost equal to its long term average of 488 mm. A slight reduction of it about 6% was mainly due to the below normal rainfall received during conventionally dry months of August. Except in March and May, the potential evapotranspiration was in excess of the cumulative rainfall every month of the season. Hence, rainfed upland crops may have

suffered soil moisture stress conditions during their growth phase where supplementary irrigation was not provided.

#### **Aralaganwila (DL2b)**

Eastern part of the Dry zone has experienced a significantly higher rainfall during 2012/2013 Maha season receiving about 2,334 mm of cumulative rainfall, a 48 % of positive anomaly compared to its long term average. This was mainly attributed to the above normal rainfall received during every month of the season except September and November. Evaporative demand of the atmosphere also remained well below the cumulative rainfall of each month during the season except September. Hence, there was hardly any chance of developing soil moisture stress conditions in crops grown on highlands.

As usual, Yala season was fairly dry in this region with about 10% reduction in cumulative seasonal rainfall compared to its long term average. During the month of June there was no rainfall at all, a typical feature of the season in the area. The Yala season usually does not exist in this region and it remained true for the current season as well.

#### **Weerawila (DL5)**

Recorded cumulative seasonal rainfall of 1,232 mm was about 50% increase compared to its long-term average of 815 mm in this region. Meanwhile, received rainfall was well distributed throughout the season except in November. Moreover, cumulative potential evapotranspiration during the season was well below the cumulative rainfall of respective months of the season assuring a moisture-stress free growth in highland crops.

The cumulative seasonal rainfall of the season was 392 mm, a 22% increase compared to its long term average. Although every month of the season except April received above normal rainfall, none of the month except April failed to record a rainfall of 100 mm or more, the threshold value to designate any month as a Wet month. The cumulative potential evapotranspiration of each month of the season except March and May was much in excess of the cumulative rainfall of respective months. A high temperature regime prevailed throughout the season along with intense radiation and high-speed winds. However, being the driest region of the country it is not an exceptional weather condition for the region during this time of the year.

**Table 5.1: Total rainfall (mm) of 2012/2013 Maha & 2013 Yala seasons**

Agro-met Station	Agro Ecological Zone	Maha 2012/13 Sep-Feb	Maha Ten Year Average (2002-11)	Yala 2013 Mar-Aug	Yala Ten Year Average (2002-11)
Bombuwela	WL <sub>1b</sub>	1722.0	1510.2	1433.5	1569.3
Peradeniya	WM <sub>2b</sub>	1847.9	1025.4	1341.0	978.0
Sita-Eliya	WU <sub>3</sub>	1589.9	1121.8	1278.9	778.3
Bathalagoda	IL <sub>1a</sub>	1558.5	1080.9	883.0	753.3
Makandura	IL <sub>1a</sub>	1412.9	1086.1	1158.6	966.8
Moneragala	IL <sub>1c</sub>	1280.0	1343.7	570.8	623.4
Kundasale	IM <sub>3a</sub>	1590.5	869.3	897.4	574.1
Bandarawela	IU <sub>3c</sub>	1623.1	1087.7	612.4	661.0
Maha-Illuppallama	DL <sub>1b</sub>	1371.7	1026.3	381.8	401.8
Angunakolapellessa	DL <sub>1b</sub>	1335.1	780.0	455.7	487.8
Aralaganwila	DL <sub>2b</sub>	2333.4	1572.2	383.3	420.1
Weerawila	DL <sub>5</sub>	1232.0	815.2	392.5	322.0

**Table 5.2: Monthly total rainfall 2012/13 (mm)**

Agro-met station	2012			2013								
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwela	427.9	528.7	325.5	217.9	36.5	185.5	211.6	155.6	467.8	302.9	231.1	64.5
Peradeniya	21.8	764.5	269.7	381.1	254.6	156.2	165.5	287.4	200.8	347.3	165.9	174.1
Sita-Eliya	68.2	440.9	271.2	391.0	235.7	182.9	162.0	170.1	171.9	378.7	233.7	162.5
Bathalagoda	21.6	410.1	249.0	545.8	235.7	96.3	148.8	138.6	321.0	154.5	72.7	47.4
Makandura	60.3	698.5	240.7	268.2	76.3	68.9	220.7	95.1	335.1	338.4	77.6	91.7
Moneragala	80.0	247.1	332.9	221.7	277.6	120.7	130.6	176.3	95.1	7.4	43.3	118.1
Kundasale	22.4	563.6	262.9	375.5	267.4	98.7	132.3	163.5	137.7	214.3	78.6	171.0
Bandarawela	79.7	470.8	314.5	321.8	261.6	174.7	102.3	182.6	135.3	54.9	70.8	66.5
Maha-Illuppallama	14.7	551.9	162.3	373.1	188.7	81.0	165.0	36.4	30.0	9.1	32.2	109.1
Angunakolapellessa	99.3	315.7	369.1	254.7	164.2	132.1	112.2	87.2	146.6	64.5	41.3	3.9
Aralaganwila	13.2	532.5	325.2	742.7	501.2	218.6	142.2	38.8	101.9	0.0	64.2	36.2
Weerawila	47.6	326.7	241.8	371.2	129.2	115.5	82.5	22.5	181.0	37.9	25.5	43.1

**Table 5.3: Monthly average Rainfall in mm (2002-2011)**

Agro-met station	Month											
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwela	267.9	450.4	389.8	206.2	98.5	83.8	167.8	297.1	436.3	269.9	194.8	203.3
Peradeniya	127.0	255.5	308.1	172.4	96.1	61.5	167.5	292.9	124.0	142.8	137.1	113.8
Sita-Eliya	125.1	252.0	280.9	216.9	178.7	62.6	130.1	169.9	153.5	123.5	107.2	94.1
Bathalagoda	107.9	327.1	313.6	179.3	88.4	57.4	136.1	258.6	113.3	94.1	77.7	73.6
Makandura	159.5	388.0	299.5	113.4	64.6	49.6	152.6	235.6	220.2	172.7	92.1	93.7
Moneragala	114.4	310.3	395.4	269.5	180.5	79.6	116.5	257.9	106.7	23.1	41.4	77.9
Kundasale	75.9	182.5	249.7	177.6	107.7	72.0	117.5	178.6	80.7	72.2	58.1	66.9
Bandarawela	110.9	289.6	288.2	202.0	127.7	67.2	150.6	221.6	135.0	47.9	46.3	59.6
Maha-Illuppallama	91.4	269.0	295.6	189.7	104.5	70.6	101.5	182.9	57.9	10.6	21.2	27.7
Angunakolapellessa	89.1	152.2	251.4	153.0	79.1	45.3	103.0	120.7	102.3	47.1	47.9	66.8
Aralaganwila	53.9	274.7	405.0	409.5	289.6	151.0	97.8	136.3	73.4	20.4	33.3	59.1
Weerawila	41.6	162.0	289.5	174.1	95.3	48.3	75.3	131.9	50.0	13.1	17.0	34.6

**Table 5.4: Monthly Potential Evapotranspiration(mm) - 2012/13**

Agro-met station	2012				2013							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwela	76.8	79.4	74.4	64.5	71.9	73.9	84.3	88.8	76.9	69.6	71.9	69.4
Peradeniya	76.8	76.9	52.8	62.0	81.8	73.9	79.4	81.6	69.4	55.2	57.0	71.9
Sita-Eliya	52.8	37.2	36.0	52.1	52.1	42.6	62.0	64.8	32.2	14.4	24.8	54.6
Bathalagoda	*	*	*	*	*	*	*	*	*	*	*	*
Makandura	79.2	104.2	81.6	74.4	84.3	78.4	116.6	103.2	*	*	81.8	89.3
Moneragala	110.4	104.2	74.4	69.4	69.4	69.4	81.8	86.4	89.3	69.6	96.7	76.9
Kundasale	100.8	*	*	*	*	53.8	69.4	74.4	74.4	57.6	84.3	76.9
Bandarawela	72.0	64.5	50.4	54.6	67.0	62.7	79.4	76.8	74.4	62.4	74.4	86.8
Maha-Illuppallama	122.4	74.4	48.0	37.2	52.1	51.5	76.9	84.0	94.2	98.4	106.6	106.6
Angunakolapellessa	98.4	104.2	72.0	76.9	94.2	89.6	109.1	110.4	94.2	98.4	106.6	136.4
Aralaganwila	144.0	*	67.2	57.0	64.5	65.0	79.4	86.4	109.1	156.0	148.8	146.3
Weerawila	*	71.9	64.8	64.5	81.8	71.7	81.8	96.0	79.4	96.0	126.5	143.8

\* - Data Not Available

**Table 5.5: Maximum and Minimum air temperature (°C) – 2012/13**

Agro-met station	2012								2013															
	Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		June		July		Aug	
	Max	Min																						
Bombuwela	30.6	24.3	30.9	23.6	31.4	23.4	30.9	23.1	31.0	22.4	31.7	23.7	32.1	23.8	32.4	24.4	31.2	25.3	29.9	24.4	30.1	24.3	30.1	24.2
Peradeniya	29.4	21.7	29.6	21.0	29.0	20.8	27.9	20.6	27.6	19.8	29.4	20.1	30.9	21.6	31.2	21.9	29.6	22.8	27.2	22.3	27.5	22.4	28.8	21.5
Sita-Eliya	19.5	13.0	20.0	12.9	20.2	12.5	18.7	11.8	18.9	9.9	19.5	10.4	20.8	10.8	22.1	12.5	20.9	13.8	18.1	13.0	18.5	13.1	19.9	12.8
Batalagoda	32.2	24.1	32.2	23.0	30.3	22.4	29.6	22.7	29.0	21.0	31.0	21.9	32.9	23.5	33.5	24.7	31.1	25.5	29.6	24.6	29.9	24.6	30.9	24.1
Makandura	31.8	23.8	32.0	23.4	31.8	22.7	31.4	22.6	31.1	22.1	32.1	22.4	33.0	23.0	32.6	24.5	32.0	25.1	30.1	23.8	30.1	24.4	30.8	24.2
Moneragala	36.7	22.4	32.6	22.7	31.2	22.3	29.1	21.9	28.9	21.3	30.7	21.0	32.4	23.1	34.2	22.9	33.7	23.4	33.7	22.3	34.3	22.0	34.4	21.5
Kundasale	31.0	21.7	30.7	21.0	29.5	20.5	28.0	20.9	27.7	19.1	29.4	19.4	31.2	21.1	32.3	21.8	30.6	22.5	27.9	22.3	28.6	22.3	29.8	21.3
Bandarawela	27.8	16.2	25.5	16.7	24.8	16.6	23.6	15.6	23.0	14.4	24.6	15.0	26.3	15.7	27.5	16.3	27.5	17.1	26.1	17.1	26.4	16.7	27.2	15.7
Maha-Illuppallama	34.6	24.8	32.5	23.1	30.6	22.4	29.1	22.4	28.9	21.1	30.6	21.6	32.9	23.2	34.5	24.2	32.8	25.3	31.5	24.7	32.2	24.6	33.1	24.1
Angunakolapelessa	32.1	24.4	32.0	23.9	31.3	23.5	30.7	23.2	31.2	22.0	31.5	22.9	32.8	23.9	34.2	24.9	32.4	25.5	31.7	24.8	32.2	24.7	33.5	24.5
Aralaganwila	36.5	*	33.4	22.7	30.8	*	29.7	*	29.0	21.1	30.4	21.3	32.6	22.4	35.3	22.9	34.7	*	33.5	*	33.4	*	34.8	22.7
Weeravila	33.7	24.7	32.3	23.8	31.8	23.6	31.1	23.4	31.2	22.6	32.1	23.8	32.9	24.2	34.8	24.9	34.0	25.1	32.0	24.4	32.8	24.5	34.1	24.3

\* - Data Not Available

**Table 5.6: Relative Humidity(%) – 2012/13**

Agro-met Station	2012								2013															
	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	90	79	86	77	84	77	86	75	87	70	89	69	85	74	83	72	88	84	87	83	87	82	86	79
Peradeniya	77	66	84	79	85	75	82	73	80	71	83	67	82	67	82	70	84	75	89	85	85	81	80	70
Sita-Eliya	91	92	88	94	88	94	90	94	87	94	88	94	87	94	84	92	93	95	97	96	96	95	93	90
Batalagoda	73	61	81	69	86	72	87	73	85	69	86	64	86	61	83	63	80	73	82	77	81	73	81	69
Makandura	86	82	85	80	87	81	84	81	86	76	84	73	83	75	81	75	85	79	85	83	85	83	85	80
Moneragala	70	60	82	76	84	82	88	83	84	77	86	77	85	78	85	81	87	81	73	66	75	63	78	66
Kundasale	68	63	80	74	85	73	85	80	86	76	86	78	82	76	84	69	80	73	82	79	77	72	77	69
Bandarawela	67	63	79	80	85	82	85	81	85	80	82	73	78	70	76	72	77	72	72	69	70	66	67	63
Maha-Illuppallama	73	49	82	70	87	73	91	77	90	71	91	67	87	61	83	56	80	66	80	66	79	60	79	58
Angunakolapellessa	83	77	82	78	87	83	86	79	85	73	87	77	84	77	81	76	84	78	85	79	83	74	81	72
Aralaganwila	62	46	78	69	84	73	87	75	88	73	87	68	85	68	79	57	73	61	63	54	62	54	65	52
Weeravila	74	64	78	73	85	78	85	75	79	72	83	71	80	68	76	62	82	68	80	69	78	66	70	57

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

**Table 5.7: Bright Sunshine Hours – 2012/13**

Agro-met station	2012				2013							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwela	7.1	6.3	6.9	5.4	6.4	7.2	7.6	8.1	5.4	5.1	5.9	6.8
Peradeniya	6.1	5.4	5.9	4.4	5.8	6.6	7.1	7.5	5.9	3.5	4.9	7.3
Sita-Eliya	5.7	4.6	5.4	4.1	5.5	5.1	5.7	7.3	4.9	2.3	2.6	5.2
Batalagoda	6.9	5.8	5.7	5.0	6.0	7.1	7.7	8.3	6.0	4.2	5.5	7.6
Makandura	*	*	*	*	*	*	*	*	*	*	*	*
Moneragala	*	*	*	*	*	*	*	*	*	*	*	*
Kundasale	5.7	5.4	4.4	4.2	5.8	6.4	7.0	7.1	7.0	6.5	5.2	5.7
Bandarawela	5.7	4.6	3.3	3.4	4.2	5.1	6.1	6.4	5.7	4.8	5.9	7.1
Maha-Illuppallama	8.1	6.3	5.9	4.5	5.5	6.7	7.8	8.5	7.4	5.9	7.2	8.4
Angunakolapellessa	*	*	*	*	*	*	6.6	7.3	5.8	5.9	6.3	8.0
Aralaganwila	8.1	6.4	5.5	4.2	4.4	6.2	7.4	8.0	8.1	7.5	8.1	8.9
Weeravila	7.2	7.0	6.5	5.6	*	6.7	7.3	7.7	6.5	6.9	7.6	8.7

\* - Data Not Available

**Table 5.8: Wind Velocity (Km.p.h) – 2012/13**

Agro-met station	2012				2013							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwela	2.3	2.1	*	*	*	*	*	*	*	*	*	*
Peradeniya	3.5	2.4	2.5	5.2	6.3	4.5	3.1	1.7	3.2	4.5	3.9	3.4
Sita-Eliya	11.3	5.7	4.3	8.8	6.5	6.5	5.5	3.9	8.9	19.6	17.6	11.2
Batalagoda	*	*	*	*	*	*	*	*	*	*	*	6.9
Makandura	4.5	5.0	3.9	5.0	4.6	4.9	4.5	4.9	4.7	4.0	4.2	4.2
Moneragala	2.6	1.7	1.4	1.4	1.9	1.4	1.1	0.9	2.0	1.7	1.7	1.6
Kundasale	4.2	3.0	1.9	2.5	2.4	2.4	*	*	2.6	5.1	4.5	3.5
Bandarawela	4.3	3.8	2.5	2.9	3.1	3.2	3.1	2.9	3.7	5.3	4.7	4.6
Maha-Illuppallama	8.7	4.5	3.2	4.9	4.9	4.5	4.0	3.3	7.5	9.7	9.3	7.6
Angunakolapellessa	5.3	5.2	1.3	4.6	4.7	5.2	5.3	4.8	5.7	6.8	6.9	6.9
Aralaganwila	4.5	2.8	2.0	2.1	2.1	1.9	1.9	2.0	2.9	7.9	6.0	4.4
Weeravila	6.6	3.2	1.3	2.3	3.1	2.6	2.2	1.9	5.1	7.1	7.4	6.1

\* - Data Not Available

## 6. PUBLICATIONS & PRESENTATIONS

### Research Publications

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## 7. SENIOR STAFF

(As at 2013.12.31)

R.R.A. Wijekoon	Ph.D., Director General of Agriculture	W.M.R. Kumari	M.Sc., RO, Plant Breeding
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A.M. Perera	Ph.D., DD, Plant Breeding	H.M.P.T.K. Hettigedara	B.Sc., RO, Agronomy
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D.M.J.B. Senanayake*	M.Sc., RO, Plant Pathology	N.H.M.S. Chitrapala	M.Sc., RO, Plant Breeding
K.N.C. Gunewardena	M.Phil, RO, Entomology	W.M.K. Fernando	M.Sc., RO, Soil Science
M.S. Nijamudeen*	M.Sc., RO, Soil & Water Management	K.H.S.T. Deshabandu	B.Sc., RO, Agronomy & Plant physiology
K.A. Renuka	M.Sc., RO, Soil Science	E.S.C. Edirisinghe	M.Sc., RO, Tissue Culture
K.N. Kannangara	M.Sc., RO, Plant Breeding	W.A.R. Dammika	M.Sc., RO, Biotechnology
M.A.P.W.K. Malaviarachchi	M.Sc., RO, Agronomy	P.G.B.A. Palkadapala	M.Sc., RO, Plant Breeding
M.G.D.L. Priyantha	Ph.D., RO, Plant Physiology	B.M.K. Senarathna Menike	M.Sc., RO, Plant Breeding
R.A.C.J. Perera	M.Sc., RO, Soil Science	M.J.M.P. Karunaratne	M.Sc., RO, Plant Breeding
G.A. Gunawardhana	M.Sc., RO, Food Science & Technology	H.N.S. Fernando	M.Sc., RO, Plant Pathology
S. Pathirana	M.Phil., RO, Plant Breeding	P. Rajapaksha	B.Sc., RO, Plant Pathology
		A.T. Sooriyaarachchi	M.Sc., AE, Socio Economic Research

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D.G.C. Jeewani	M.Sc., RO, Plant Breeding
W. M. P. N. Dilusha	M.Sc., RO, Entomology
M. T. Gunasena	M.Sc., RO, Pathology
U.I.P. Perera	B.Sc., RO, Plant Breeding
S.T. Munasinghe	B.Sc., RO, Soil Science
Y.P.J. Amarasinghe	B.Sc., RO, Plant Breeding
W.M.N.D. Gunathilake	M.Sc., RO, Agronomy
R.A.A. Ranatunga	B.Sc., RO, Food Science
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B.N. Samaranyake	B.Sc., RO, Plant Breeding
K.H. Ruwanpathirana	Dip. In Agric., RO, Plant Breeding
I.R.. Liyanage	B.Sc., RO, Soil Science
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M.F.M. Faiz	B.Com., PDAF, Chief Internal Auditor
W.A.G. Weerasingha	ICASL Inter., PGDA, Deputy Director (Finance)
S.S.K. Liyanage	HNDA, ICASL Certif. Level, Deputy Director (Finance)
C.P. Ruwanpitiya	B.Com., Assistant Director (Finance)
H.G.I. Madusanka	B.Com., Assistant Director (Finance)
H.M.U.S. Digashani	B.Com., Assistant Director (Finance)

### **PROGRESS MONITORING & EVALUATION UNIT, PERADENIYA**

P.C. Peiris	M.Sc., DD, Agricultural Systems
H.M.R. Bandara	M.Sc., DD, Organizational Management

- On study leave
- \*\* On no pay leave

## 8. TECHNICAL STAFF QUALIFICATIONS

(As at 2013.12.31)

Institute/ Centre/ Division/ Unit		Diploma	B.A./B.B.A./ L.L.B.	B.Com./ B.Ed.	B.Sc.	C. Eng/ M.I.E.	Postgrad. Dip.	M.A./ MBA	M.Sc./ M.Ed.	M.Phil.	Ph.D.	TOTAL
FCRDI	FCRDI	14			09		01		21	04	03	52
	GLORDC	17	01		14			01	07		01	40
	RARDC/ Aralaganwila	11			01				04		01	17
	RARDC/ Kilinochchi	05	01		07				01		03	17
HORDI	HORDI	60		01	36				25	05	09	137
	FRU	04			01				03		02	10
	RARDC/Bandarawela	09	02		18				06	01		36
	RARDC/Makandura	27	03		10				04	01		45
	ARS/Sita Eliya	06			07				01	01	01	16
	ARS/Telijjawila	05			05				03			13
	ARS/Girandurukotte	06			02				01			09
FRDI	FRDI	12	01	01	08				10	04	02	38
	FCRDS	03			02				02		02	09
	PVIC	15			14				06		01	36
RRDI	RRDI	38			19			01	20	06	03	87
	RARDC/Bombuwala	28	02		16		01		10	01		58
NRMDC		12			07		04		09	01	04	37
SCPPC	SCPPC				01				04		01	06
	SCS	111			22				04		02	139
	PPS	08			04				05	01		18
	ROP	11		01	08				06		02	28
	PGRC	06			03		01		05	02	02	19
NPQS		53			16				09		02	80
SPMDC		146	22		28		01		15			212
SEPC		02	13		08			01	05	01	03	33
ETC		284	03	01	85		01	01	70	01	01	447
ICC		48	09	01	18			04	10			90
ADMN		05	20		06			01	02			34
ENG	Engineering Division	08			03	03						14
	FMRC	02			05							07
Finance Division		06	02	06	01			01				16
PMEU		03	02		02				03			10
<b>TOTAL</b>		<b>965</b>	<b>81</b>	<b>11</b>	<b>386</b>	<b>03</b>	<b>09</b>	<b>10</b>	<b>271</b>	<b>29</b>	<b>45</b>	<b>1810</b>

## 9. STAFF POSITION

(As at 31.12.2013)

No.	Designation	Service	Cadre	
			Approved	Filled
1	Director General of Agriculture	SLAgS	1	1
2	Additional Director General of Agriculture (Reasearch)	SLAgS	1	0
3	Additional Director General of Agriculture (Development)	SLAgS	1	0
4	Additional Director General (Administration)	SLAS	1	1
5	Director	SLAgS	10	2
7	Additional Director of Agriculture	SLAgS	18	3
8	Registrar of Pesticides	SLAgS	1	1
9	Deputy Director Agriculture	SLAgS	64	16
10	Assistant Director of Agriculture (Development)	SLAgS	242	233
11	Assistant Director of Agriculture (Reasearch)	SLAgS	286	221
12	Assistant Director of Agriculture (Agri.Economic)	SLAgS	16	12
13	Director (Administration)	SLAS	1	1
14	Deputy Director / Assistant Director (Administration)	SLAS	3	3
15	Cheif Accountant	SLAcS	1	1
16	Internal Auditor	SLAcS	1	1
17	Accountant (Grade I)	SLAcS	1	4
18	Accountant	SLAcS	12	6
19	Chief Engineer	SLEgS	1	1
20	Engineer (Civil )	SLEgS	4	2
21	Engineer (Mechanical )	SLEgS	9	6
22	Engineer (Electrical)	SLEgS	1	1
23	Administrative Officer	PMAS	37	25
24	Assistant Director (Agriculture )	SLTS	100	15
25	Senior Librarian	LS	1	0

No.	Designation	Service	Cadre	
			Approved	Filled
26	Agriculture Instructor (Supra)	SLTS	64	15
27	Research Assistant (Supra)	SLTS	25	15
28	Translator (English/Tamil)	TS	7	7
29	Economist Assistant	DOA	15	11
30	Programme Assistant (Agriculture)	DOA	177	101
31	Development Officer	DOA	369	196
32	Statistics Assistant	DOA	2	2
33	Agriculture Monitoring Officer	DOA	191	84
34	Legal Assistant	DOA	2	2
35	Media Assistant	DOA	5	3
36	Audio Visual Assistant	DOA	5	4
37	Budget Assistant	DOA	2	2
38	Librarian (Supr)	LS	5	4
39	Soil Surveyor	SLTS	5	4
40	Agriculture Instructor	SLTS	984	827
41	Research Assistant	SLTS	215	166
42	Engineering Assistant (Civil )	SLTS	20	3
43	Engineering Assistant (Mechanical )	SLTS	18	9
44	Engineering Assistant (Electrical)	SLTS	2	0
45	Technical Officer	SLTS	3	2
46	Librarian	LS	5	3
47	Public Management Assistant	PMAS	561	535
48	Seed Technician	SLTS	24	10
49	Audio Visual Technician	DOA	1	1
50	Artist	DOA	3	2

No.	Designation	Service	Cadre	
			Approved	Filled
51	Farm Clerk	DOA	80	70
52	Krusha Vyapthi Seva Niladhari (KVSAN)	DOA	15	0
53	Warden (Male)	DOA	11	0
54	Warden (Female)	DOA	4	0
55	Bee Demonstrator	DOA	2	1
56	Photographer (Dark Room Assistant)	DOA	1	1
57	Technical Assistant (Agricultural Extension )	DOA	85	60
58	Technical Assistant (Agricultural Research )	DOA	15	10
59	Information Technology Assistant	DOA	2	0
60	Technical Assistant (Civil )	DOA	16	0
61	Technical Assistant (Mechanical )	DOA	16	0
62	Technical Assistant (Electrical)	DOA	2	0
63	Driver	Combined Service	333	318
64	Cinema Operator	Dept	2	3
65	Foreman (Press)	Dept	1	0
66	Fitter	Dept	0	2
67	Welder	Dept	0	6
68	Blacksmith	Dept	0	2
69	Tinker	Dept	0	2
70	Painter	Dept	0	1
71	Plant Yard Operator	Dept	0	5
72	Water Pump Operator	Dept	0	3
73	Tractor Operator	Dept	100	97
74	Storeman	Dept	74	74
75	Plant Yard Attendant	Dept	18	3

No.	Designation	Service	Cadre	
			Approved	Filled
76	Research Sub Assistant	DOA	80	70
77	Lorry Cleaner	DOA	28	15
78	Book Binder (Press)	DOA	2	1
79	Machinist	DOA	45	25
80	Machine Operator	DOA	18	10
81	Carpenter	DOA	30	18
82	Mason	DOA	30	4
83	Electrician	DOA	25	17
84	Composer	DOA	4	2
85	Machine Minder	DOA	4	3
86	Lawn Mover Operator	DOA	0	3
87	Bee Keeper	DOA	13	13
88	Budder	DOA	69	67
89	Video Editor	DOA	4	2
90	Audio Rcorder	DOA	4	2
91	Technician	DOA	65	41
92	Vidio Cameraman / Camaraman Asisstant	DOA	4	2
93	Steward	DOA	1	0
94	Cook	DOA	40	31
95	Seedman	DOA	30	29
96	Nurseryman	DOA	0	2
97	Office Employee Service	Combined Service	100	77
98	Circuit Bunglow Keeper	DOA	22	22
99	Video Lighting Assistant	DOA	4	2
100	Video Edit Assistant	DOA	2	2

No.	Designation	Service	Cadre	
			Approved	Filled
101	Video Assistant	DOA	2	2
102	Demonstration Assistant	DOA	2	2
103	Watcher	DOA	656	599
104	Waiter	DOA	4	2
105	Sanitary Labourer	DOA	0	18
106	Special Labourer - Stores	DOA	0	1
107	Labourer	DOA	1900	1406
108	Contract Labourer	DOA	0	2876
	<b>Total</b>		<b>7483</b>	<b>5708</b>

LS – Librarian Service

PMAS – Public Management Assistants’ Service

SLAcS – Sri Lanka Accountants’ Service

SLAgS – Sri Lanka Agricultural Service

SLAS – Sri Lanka Administrative Service

SLEgS – Sri Lanka Engineering Service

SLTS – Sri Lanka Technical Service

TS – Translators’ Service