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2014

**DEPARTMENT OF AGRICULTURE
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SRI LANKA**

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Vision

Achieve excellence in agriculture for national prosperity.

Mission

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

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FOREWORD

The year 2014 was another successful year of the DOA with the successful introduction of several programmes pertaining to rice, field crops, fruits and vegetables in line with the vision of the DOA to achieve excellence in agriculture for national prosperity. With the aim of achieving higher productivity and year round production of crops, transition from green revolution towards white revolution was continued promoting environment friendly agriculture through introduction of higher technologies and mechanization to promote agriculture among youth.

The Department has released 14 new varieties of rice, fruits, vegetables and coarse grains which produce higher yields, resistant to pests and diseases and adaptable to different climatic conditions. With the objective of increasing average national paddy yield up to 5.1 mt/ ha, 'Yaya 2' programme with eco-friendly cultivation practices has been launched. In addition, emphasis has been given to increase production, productivity and quality of fruits with a potential for export market through establishment of fruit zones. Steps have already been taken to increase production and extent of cultivation of crops. Potato cultivation has been expanded covering new areas including the Northern Province and Big onion cultivation has been expanded to non-traditional areas. Promotion of cultivation during mid-seasons has contributed to increase the production field crops with efficient land use.

With the intention of increasing demand for local food, local food promotion programme is being continued with expansion of the chain of local food sales outlets and conducting exhibitions and distribution programmes of seeds and planting material to popularize home gardening, fruit and vegetable cultivation and consumption.

I wish to express my gratitude to the staff of the DOA for their valuable contribution towards the achievements made during 2014. I also wish to thank the editors and staff of the Progress Monitoring & Evaluation Unit for their immense effort in publishing of this report within the time specified.


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

HIGHLIGHTS - 2014

NEW VARIETIES RELEASED

- **Rice**

- **Bg 251GSR**



- White nadu variety maturing in 75-80 days
- Tolerant to moisture stress. Suitable for drought prone areas especially for Yala cultivation.
- Realizable yield is 5 t/ha
- Resistant to major pests (Brown plant hopper and Gall midge), diseases and lodging.

- **Bg 310**



- White nadu variety maturing in 3 months
- Tolerant to salinity. Suitable for saline areas.
- Average yield is up to 5.4 t/ha.

- **Bg 455**



- Red nadu variety maturing in 4¹/₂ months
- Moderately tolerant to submergence and suitable for flood prone areas
- Average yield is up to 5.4 t/ha

- **At 373**



- White, aromatic small samba grain type variety maturing in 3¹/₂ months
- Good cooking quality and appearance.

- **Fruits**

- **Lavulu**



Horana Lavulu 1



Horana Lavulu 2



Horana Lavulu 3

- Three new varieties of Lavulu with larger elongated fruits and a higher percentage of flesh.

➤ **Papaya**



Horana Papaya Hybrid

- Moderate tolerance to Papaya ring spot virus, anthracnose and powdery mildew
- Yield of 55 kg/ tree/ year
- Thick sweet flesh

➤ **Chempadak**



- A new fruit having characters similar to jak fruit

● **Sweet Potato – HORDI Malee**



- Can be harvested 3 months after planting
- Very less sweetness.
- Tolerant to weevil damage
- Average yield is 24 t/ha

- **Big Onion – MIBO 1**



- High yield (38 t/ha)
- Short duration variety (matures in 70 – 80 days after transplanting)
- Better resistance for damage by thrips

- **Chilli (MIPC -1)**



- Released for cultivation in Eastern province.
- Short pods (4.5-5cm length and 1.8-2.2cm width)
- Tolerant to major pests and diseases
- Pods can be stored long time and have a high pungency
- Average yield is around 15 t/ha

- **Horse gram (Kollu)**
 - i. **ANK Black (Anguna Black Kollu)**
 - ii. **ANK Brown (Anguna Brown Kollu)**



ANK Brown (Anguna Black Kollu)



ANK Black (Anguna Brown Kollu)

- The first two horse gram varieties recommended by the Department of Agriculture.
- Average yield of ANK black is 900 kg/ha and can be harvested 85-95 days after planting.
- Average yield of ANK brown is 800 kg/ha and can be harvested 95-100 days after planting.

MACHINERIES DEVELOPED

- **Cassava ridger**



- 4 Wheel tractor attached ridger to form ridges according to the recommended spacing.

- **Finger millet thresher**



- High capacity finger millet thresher which can be operated by both electric motor and 2w tractor engine with the capacity of 320 kg/hr.

- **High capacity Maize thresher**



- Maize thresher, driven by 4 wheel tractor with a capacity of 5 tons/ hour and threshing recovery of 95% and higher cleaning efficiency.

- **High capacity seed paddy cleaner**



- Seed paddy cleaner with steel structure and durable oscillating unit, capable of cleaning 400 kg/ hour

- **Tine tiller seeder**



- Tine tiller coupled seeder more suitable for local conditions which can be used for high land crops and high land paddy

TECHNOLOGIES DEVELOPED

- A fertigation recommendation package for Chilli under drip irrigation in RBE soil



- Advantages
 1. Average yield of green chilli (Variety KA 2) has found to be increased by 25%
 2. Water use efficiency has found to be increased by 20%
 3. Inorganic fertilizer application could be cut down by 25%
- Two new technologies have been released for cultivation of mushroom
 - Low cost spawn production technology which can reduce capital and operational costs by 90 % without affecting production efficiency
 - Technology on using paddy straw as a substrate for Oyster mushroom production
- Integrated disease management method has been identified for Chilli, Gherkin and leafy vegetables enabling cultivation under pesticide free conditions
- Integrated pest management package has been developed to delay disease development of pumpkin yellowing
- Integrated pest management programme has been introduced for Guava and Mango in major growing areas

OTHER ACTIVITIES

- New 'Hela bojun alevi piyasa' was established at Peradeniya



- Fruit promotion week was held at Fruit Research Development Institute, Horana for the promotion of fruit cultivation and consumption.



- Promotional weeks were held to distribute seed and planting material to popularize home gardening



ABBREVIATIONS & ACRONYMS

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

IRRI	– International Rice Research Institute	NCVT	– National Coordinated Varietal Trial
IRSSSTN	– International Rice Soil Stress Tolerance Nursery	NEAP	– National Environmental Action Plan
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
NCRVT	– National Coordinated Rice Varietal Trial	Allium	
		TOT	– Training of Trainers

TSP - Triple Super Phosphate
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

Other Field Crops (OFC) include condiments (chilli and onions), grain legumes (mung bean, cowpea, black gram), oil seeded crops (ground nut, soy bean, sesame and sunflower) and coarse grains (maize, finger millet, sorghum and other millets). Field Crops Research and Development Institute, Mahailuppallama and its satellite stations are responsible in developing varieties and other associated technologies and primary dissemination of the same to its stake holders. FCRDI also caters to the enhancement of the productivity of rice fruits and vegetables having regional importance. To achieve its objectives FCRDI collaborates with national and international

research and development institutes, universities and private sector organizations.

FCRDI system comprises of the main research station at Mahailuppallama, Grain Legumes and Oil Crops Research and Development Center (GLORDC) at Angunakolapellessa, Regional Agriculture Research and Development Centers (RARDC) at Aralaganwila and Kilinochchi, Agriculture Research Station (ARS) at Thirunelvely and Vavuniya. RARDC, Karadiyanaru and ARS, Mullativu which were damaged are in the process of developing into adaptive research stations.

BUDGET

Table 1.1.1: Annual budget - 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	9,359,400	8,615,569	92
Recurrent	34,997,225	30,211,324	86
Projects			
• Development of hybrid varieties of Chilli, Maize and Onion	59,660,000	53,401,969	90
• NARP			
I. Onion	1,047,671	946,288	90
II. Chilli	1,000,000	873,764	87
III. Water Management	327,400	309,000	94
IV. Postgraduate	526,000	263,080	50
• KOPIA			
I. Mung bean	3,459,000	1,945,367	56
II. Onion	6,400,000	1,710,416	27
• Other field crop production			
I. Pop corn	1,620,000	514,294	32
II. Cowpea	1,250,000	458,650	37
III. Black gram	920,000	10,900	1
Total	120,566,696	99,260,621	82

PROGRESS

CROP IMPROVEMENT

Condiments

Chilli

Major constrain associated with chilli cultivation in Sri Lanka is the susceptibility of biotic and abiotic stresses. The crop improvement program of chilli focused on the development of high yielding hybrid and open pollinated chilli varieties (>3.5 t/ha of dry chilli yield) having quality characters and resistance/ tolerance to pests and diseases.

Chilli hybrid variety development program

- National Coordinated Varietal Testing (NCVT) trials were conducted for locally developed 6 chilli hybrids. Three hybrids were identified based on green chilli yield over 20 t/ha and resistance/ tolerance characters to major pests for Varietal Adaptability Testing (VAT).
- Twelve locally developed chilli hybrids were evaluated under Preliminary Yield Trials. Six hybrids were identified as promising hybrids.
- About 3kg of F₁ seeds of local hybrids were produced through hand emasculation and pollination for NCVT, VAT and large scale field evaluation. About 680 g of seeds were produced for generation advancement of inter-specific hybrids.
- Fifty new crosses were done and 25 g of F₁ seeds from each cross were produced for the field evaluation to identify new chilli hybrids.
- Eighteen parent lines were maintained for chilli hybrid breeding program and 200 g

of seeds from each parent line were produced.

- Parental lines/ inbred lines required for chilli hybrid breeding programme are developed. Following progenies of intra-specific chilli hybrids were advanced.
 - 109 progenies (from F₅ to F₆)
 - 28 progenies (from F₃ to F₄)
 - 15 progenies (from F₂ to F₃)
 - 6 progenies (from F₁ to F₂)
 - Nineteen progenies (from F₁ to F₂) progenies of inter-specific chilli hybrids were advanced.
- Male sterile character was transferred to 5 promising parent lines/ inbred lines. The second back crosses with male sterile line and 5 promising parent lines were done and seeds were extracted.
- Twenty five exotic chilli hybrids were evaluated. Four exotic chilli hybrids were identified based on yield and pest and disease incidences for commercial cultivation.

Chilli Open Pollinated Varieties (OPV) development program

- Forty new F₁ crosses (single, double and three way crosses) were made seeds were produced. Eleven new F₁ crosses were made with 'Kochchi'.
- F₁, F₂ and F₃ generations of OPVs were maintained. Selection was made for desirable yield and other characters.

F₁ generation

Twenty (20) populations made from new crosses were r field evaluated.

F₂ generation

Seventeen populations with better agronomic traits were advanced.

F₃ generation

Fifteen populations with better agronomic traits were advanced up to F₃ generation.

- **Yield Trials**

According to the preliminary Yield Trials (PYT), performance of Jaffna Selection was comparable with that of the standard varieties MI Green and MI 2.

- **Inducement of virus tolerance**

There are many types of virus (Cucumber Mosaic Virus (CMV), Chilli Leaf Curl Virus (CLCV), and Tomato Spotted Wilt Virus (TSWV)) that has become one of the major constraints in chilli cultivation. Virus tolerance characters were observed in 'Waraniya' landraces under field level and crosses were made to transfer the virus tolerance character to the recommended varieties and promising lines. Under which seven new crosses and three back crosses were made.

- **Improvement of 'Waraniya Green' population**

From about 10000 - 15000 plant population of 'Waraniya Green', plants with expected morphological characters were identified and off types were removed.

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

Plants with desirable characters of Jaffna Selection and 'Hene Miris' were maintained as a bulk for population improvement.

Onion

Onion breeding programme was aimed at developing high yielding short duration varieties (35 t/ha) with longer storability (losses < 25 % in 4 month storage) and showing resistance/ tolerance to major pests and diseases.

- NCVT trials and VAT trials were conducted to test the adaptability of 2 big onion lines. MIBO 09 E2 showed better adaptability having a yield of 37 t/ha. This line was released as MIBO 1 big onion variety' for local cultivation. It matured within 70 days - 80 days after transplanting and showed lower incidence of thrips damage.

- Fourteen onion lines were evaluated with Dambulla Selection and MIBO 1 as the controls. Results showed that the yields of 3 lines (MIBO 12-2, MIBO 12-8, and MIBO 12-9) were significantly higher than that of the controls. Two lines showed early maturity. Study is in progress.

- One F₁ cluster onion generation and ten F₃ families were advanced in the hybridization programme.

- **Population improvement of cluster onion.**

Three cluster onion lines having good seed setting character were improved considering especially the number of sets/ cluster and the true seed setting ability.

- Seed multiplication and cropping technology development of big onion varieties for Sri Lanaka was initiated under the KOPIA Project. Around 8000

kg of quality mother bulbs were produced at both research and farmer filed level.

Coarse Grains

Maize

- Maize breeding programme is set to develop maize hybrid varieties having target yield of 8 t/ha. The identified Indonesian maize open pollinated variety, Srikandikuning 'MIOPV 1' showed mean yield of 4.5 t/ha in VAT trails. Large scale VAT is being planned.
- Six maize hybrids received from CIMMYT were evaluated at NCVT trials. These hybrids recorded yields from 6 t/ha - 7 t/ha. Two were selected for VAT trials.
- Ninety four new maize single crosses were made from new maize inbred lines received from CIMMYT and evaluated. Ten promising hybrids were selected for NCVT trials.
- Twenty new maize single crosses were made planned for evaluations.
- Thirty new test-cross maize hybrids were developed from locally developed maize inbred lines. These hybrids will be evaluated.
- Nine exotic maize hybrids and two sweet corn hybrids were received from different private organizations were evaluated. Maize hybrids, SH 111217, SH111212, SA 336, SA 282, Liberty 789, S 7328, ST 6772, NM 6639 and S 6248 hybrids showed average yields from 5.5 t/ha to 8.2 t/ha and performed appreciably well under local conditions.

Finger millet

The objectives of finger millet breeding programme are to develop 3 - 3 1/2 months

aged finger millet varieties having a yield of 3.5 t/ha.

- Eight promising finger millet accessions were evaluated under Advanced Yield Trials (AYT). Three promising accessions were selected for NCVT based on their yield performance. Yields were in the range of 3.4 t/ha - 3.8 t/ha.

Sorghum

- Six promising sorghum accessions were evaluated under Advanced Yield Trials (AYT). Four accessions were selected for NCVT based on their yields (3.5 t/ha - 4 t/ha) and other characters such as plant height (150 cm - 170 cm) and days to maturity (100 days - 110 days).

Foxtail millet

- Six foxtail millet accessions were evaluated under NCVT. Three promising accessions out of six were selected for VAT based on their yields (2.75 t/ha - 3 t/ha) and other characters such as plant height (100 cm - 120 cm), seed size (1000 grain weight - 5g to 7g) and shorter days (95 days - 110 days) to maturity.

Grain Legumes

Mung bean

- The objectives of the mung bean breeding programme are to develop high yielding (> 2.5 t/ha), pest and disease resistant/ tolerant shorter/ medium/ longer duration (from 60 days - 80 days) varieties. The synchronized maturity is another aspect that is highlighted in the present programme. Twenty six mung bean F₁ populations obtained from the crosses.

- Twenty two F₂ populations, thirty one F₃ populations and nineteen F₄ populations were established in the fields as bulk populations for generation advancement.
- Four hundred twenty-seven F₅ progenies of ten crosses were established in the field as progenies for generation advancement.
- Eight promising lines having potential yields of about 2 t/ha were evaluated in NCVT with the check variety, MI 6 and Ari. Lines, MIMB 936, MIMB 937 and MIMB 938 were selected for VAT.
- Two high yielding (about 2.5 t/ha) lines (MIMB 901 & MIMB 904) were evaluated in VAT to test the adaptability in different locations. Seed sample of MIMB 901 was given for the DUS test.

Cowpea

Objective of the cowpea breeding program is to develop the varieties having yield of over 3.0 t/ha under irrigated and 2.0 t/ha under rain fed conditions together with other desirable traits such as tolerance/ resistance to pest and diseases.

- Ten cowpea F₁ populations were crossed. Five F₂ and four F₃ populations which were selected from F₁ and F₂ generations respectively were established in the fields as bulk populations for generation advancement.
- Nineteen accessions from PGRC were evaluated. Two lines had maroon color medium size seeds which can be used in cowpea hybridization program as parents. Four lines showed early maturity (65 days).

Black gram

- Nine F₁ populations obtained were established in the field. Seven F₂ populations and three F₃ populations were established to continue the evaluation and selection.

Oil Seed Crops

Soy Bean

Objective of the soy bean breeding program is to develop the varieties having yield of over 5.0 t/ha under irrigated and 3.0 t/ha under rain fed conditions together with other desirable traits such as determinate growth, large seeds and tolerance/ resistance to pest and diseases.

- Forty one soybean F₁ populations obtained from the crosses to achieve the above soybean breeding objectives. Three F₂ populations were established in the field as bulk populations for generation advancement.
- Five AVRDC grain soybean germplasm were evaluated in PYT with Pb 1 and MISB 1. Maturity period of one line (MISB 1060635) was earlier (83 days) than Pb1 and MISB 1. The line, MISB 9301 showed hundred seed weight of 24.2 g while MISB 01 showed that of 12.6 g.

Vegetables

Okra

- Two okra lines, OKS 1 and OKS 3 selected on low yellow vein mosaic virus (YVMV) infestation and good pod characters (soft slightly/ no pubescence, short in pod length (15 cm), dark green, slight mucosity, low number of ridges) were identified for VAT.

- Fourteen crosses were done and seven F₁ generations were established in the field for generation advancement.
- Rice variety evaluations under NCRVT trials were done with the collaboration with the RRDI.

Fruits

- The following grapes varieties were maintained in the germplasm collection.

Khandara	Exotic
Niagara	Concord
French MI	Muscat MI
Israel Blue	A variety from Bangladesh

Five new Wine varieties -

Carignao	Babera
Merlot	Alicante Bouschet

Syrah (imported from Italy and from Portugal)

Seedless variety Sonaka from India was included in the germplasm collection.
- Two exotic water melon varieties were tested for pests/ diseases and yield performances. Varieties, BN 44 and Yuvaraj were identified as suitable for cultivation in the Dry Zone.
- Twenty six exotic mango varieties have been maintained and characterization of the same was commenced.
- Dragon fruit demonstration cultivation commenced flowering in April and continued up to September. The maintained plants gave a mean yield of 8 kg per plant.

Other Crops

- Maintained the Dry Zone Field Gene Bank to conserve genetic resources of important Dry Zone crop species. Forty plant species which containing around 180 plants were established.

AGRONOMY

- It was found that both mung bean and Maize were affected due to increase in ambient temperature. Hence, experiments were initiated to study the crop adaptations to climate change. The experiments are in progress.
- Low seed productivity is a major problem in onion true seed production. Ratio between bulbs (kg): seed (Kg) is 10:1 in Sri Lanka while in other countries much improved ratio is achieved. An experiment was initiated to increase onion true seed production by adopting a seed treatment of KNO₃. Bulbs dipped in 10 % KNO₃ level gave a 15-20 % significant seed yield increment. Experiments are in progress to ascertain the optimum concentrations. Water stress reduces plant growth and yields and mung bean is mostly a crop grown under rain fed conditions. A study was initiated to screen mung bean, genotypes as affected by soil moisture regimes. Varieties; Ari, MI6 and MIMB 901, did not show a significant response to the soil moisture depletion. The study will be continued to confirm the results.
- Four varieties of grapes (Isreal Blue, Muscat MI, French MI and Khandara) were trained on live wild plants (Gliricidia, Ipil-Ipil, Gansooriya and Kilavei) to identify suitable wild plants for grape vine training. Considering the growth rate and the training ability,

Gansooriya and Kilavei plants were superior to the others.

- Pruning of grapes done in twice a year during the months of January and July to control the vegetative growth and stimulate the reproductive growth. A study was conducted to find out the optimum spur density. When pruning was practiced, higher number of spurs with three buds were in Israel Blue and French MI, whereas spurs with two buds were observed in Musket MI. Forty six and 60 bunches were observed in the spurs with three buds in Israel Blue and French MI. Forty eight bunches were observed in the spurs of Musket MI.
- Grapes grown in Sri Lanka have the problem of compacted bunches and small sized fruits. A study was initiated to study the effect of girdling on berry size and quality of grapes in the variety French MI. When girdling was practiced fruit diameter, volume and the length of the bunch was increased at the stage of fruit set.
- Purple yam/ water yam (*Dioscorea alata*) is one of the staple foods in African countries. . With the collaboration of Federal Institute for Technological Sciences (ETH), Switzerland and the Faculty of Agriculture of the University of Peradeniya, an experiment on integrated nutrient management package for sustained tuber production in *Dioscorea alata* was initiated It produced mean tuber yields of 28 t/ha and 35 t/ha with no fertilizer and doubled rate of N fertilizer respectively, in the first year. Experiments are in progress to investigate the possibility of substituting inorganic mineral nutrients sources with organics.
- A study conducted to evaluate the effectiveness of different mulching materials on productivity and fruit quality of water melon revealed that the reflective polythene mulch reduced the yellowing patches on fruits by 20 % compared to that with rice straw mulch. Fruit rot was reduced down to 8 % with reflective polythene mulch whereas it was 30 % in the fruits with rice straw mulch. The crop with reflective mulch gave a mean yield of 49 t/ha whereas, that was 27 t/ha with rice straw mulch.
- Four rice varieties Bg 3171, Bw 1198, Bg 366 and Bg 358 were tested for the effect of high temperature on pollen fertility, spikelet fertility and canopy temperature. Results revealed that canopy temperatures were significantly different among the varieties tested. Varieties Bg 358 and Bw 1198 showed a 24.6 % and 39 % reduction in pollen fertility by at 30.1 °C of air temperature. Tiller angle, flag leaf angle, flag leaf length, and panicle: flag leaf ratio were significantly correlated with the pollen fertility. The variety Bg 3171 performed better with early sowing whereas, Bg 366 performed better at late sowing.
- Twenty three rice varieties were screened under high air temperature stress in the field condition. The variety Bg 352 showed better temperature tolerance characteristics under high RH% conditions.
- The effect of bio fertilizers to reduce Nitrogen and Phosphorus fertilizer levels in paddy was tested. There was no

significant impact of bio fertilizer on decreasing Nitrogen and Phosphorus fertilizer levels in terms of the grain yield.

- Fifteen rice varieties were screened on alternative wetting/drying and aerobic soil conditions. Varieties Bg 250 (4.4 tha^{-1} and 3.9 tha^{-1}), Bg 352 (3.4 tha^{-1} and 3.8 tha^{-1}) and Bg 366 (3.1 tha^{-1} and 3.2 tha^{-1}) performed better under both conditions. Varieties Ar 9-15, Bg 352 Bg 250, Bg 357, Ar 10-26 recorded higher yields of 4.0 tha^{-1} , 3.8 tha^{-1} , 3.9 tha^{-1} , 3.9 tha^{-1} and 3.9 tha^{-1} under alternative wetting/ drying condition. Varieties Bg 250, Bg 352, Bg 360 and Bg 366 recorded higher yields of 4.4 tha^{-1} , 3.4 tha^{-1} , 3.5 tha^{-1} , and 3.1 tha^{-1} respectively under the aerobic condition.
- Impact of high air temperature and moderate moisture stress during anthesis on the canopy temperature, pollen fertility and spikelet fertility in Bg 366 and Bg 358 were studied. BG 358 recorded 1.5 tha^{-1} and 1.2 tha^{-1} decrease in grain yield stress conditions while. Yield sensitivity to abiotic stress was greater in BG 366 than BG 358. Pollen fertility decreased by 12.3 %, 15.5 % and 24.5 % under combined moisture and temperature stress moisture stress and temperature stress. Spikelet fertility decreased by 6.7 %, 0.8 % and 4.3% respectively under the above three stress conditions.
- Six rice varieties namely Ar 10-17, Ar 6-1033, Ar 9-15, Bg 300, Bg 352 and Bg 250 were screened under different soil moisture regimes; ie saturated condition, field capacity, 20 % depletion level and 40 % depletion level at three growth stages. Results showed that Variety Ar 9-15 as the most tolerant one for moisture stress.

CROP PROTECTION

Pathology

- A study was carried out to identify resistant ground nut lines for leaf spot, rust and bud necrosis. Lines 97045, 97049, MIGN 1, MIGN 2 and MIGN 3 were tested with the check varieties Tikiri and Indi. None of the lines tested were resistant for early leaf spot, rust or bud necrosis.
- A study was carried out to identify resistant chilli parent lines for CLCV. Twenty two parental lines were tested. 'Waraniya Purple' and 'MI Waraniya 01' were moderately resistant for CLCV.
- Six local chilli hybrids which were in NCVT trials were tested with one exotic hybrid TM 66 for CLCV. Hybrids NCVT 02, NCVT 03 and NCVT 04 showed moderately susceptible reactions to CLCV.
- Five chilli open pollinated varieties were tested for CLCV. Waraniya Green showed moderate resistance for CLCV. Jaffna Selection and 'Hene Miris' were moderately susceptible.
- Nine promising local chilli hybrids were tested for CLCV with one exotic variety. All the local hybrids tested here were susceptible for CLCV.
- In Sri Lanka, banded leaf and sheath blight disease caused by *Rhizoctonia solani* is a serious disease in maize cultivation. An experiment was conducted to identify a suitable non destructive accurate screening technique for this disease. Five techniques were tested, Inserting sclerotia to sheath showed symptoms within 04 days and 100% disease incidence within 11 days. Among

the techniques tested inserting sclerotia to sheath was significantly superior to other techniques. Experiments are in progress.

- Forty one mung bean germplasm were screened for Mung Bean Yellow Mosaic Virus (MYMV) and powdery mildew diseases. Out of 41 germplasm tested; 3 germplasm were highly susceptible, 15 were susceptible, 8 were moderately susceptible, 4 were moderately resistant and 11 were resistant for MYMV while 20 germplasm were highly susceptible, 18 were susceptible and 3 were moderately susceptible for powdery mildew disease.
- Twenty seven black gram germplasm were screened for Yellow Mosaic Virus (YMV) disease. Out of 27 germplasm tested; 14 germplasm were highly susceptible, 10 were susceptible, 3 were moderately susceptible, 4 were moderately resistant and 6 were found to be resistant.
- Nine finger millet accessions were tested for finger millet blast disease using 'Oshada' and 'Rawana' as check varieties. Out of 9 accessions tested; 2 accessions were highly susceptible, 6 were susceptible and 1 was moderately susceptible for the finger millet blast disease at the nursery. Two accessions were highly susceptible, 8 were moderately susceptible and 1 was moderately resistant in row seeding field. Moderately resistant accession 11369 showed comparatively low disease severity than moderately resistant check variety 'Oshada'. Experiment will be continued.
- Tested fungicide azoxystrobin 250 g/l SC identified as an effective fungicide against downy mildew of grapes. Dilution rate is

10ml/ 10l water. The rate of application is 1.5 ml – 5 ml/vine.

Entomology

- Six mung bean lines were evaluated for pest damages along with local recommended varieties, Ari, MI 5 and MI 6. All the tested lines were damaged by the pod borer (30 % -41%). The virus incidence was higher in MIMB 936 (49 %) and MIMB 938 (40 %) lines.
- Different sources of diazinon and fipronil granules were tested to review the efficacy of presently recommended insecticides for the controlling of stem borer in maize. All the tested insecticides were effective in controlling the stem borer damage.
- Six local Chilli hybrids were evaluated for major pest damages along with the exotic hybrid, Wijaya under unsprayed conditions. The severity of thrips damage was lower (severity index: 22- 31) in all the tested hybrids compared to that of the exotic hybrid (severity index: 62). The percentage of virus damaged plants was lower in 3 local Chilli hybrids (6 % -13 %).
- Thirty four exotic Chilli hybrids were evaluated for major pest damages under sprayed conditions. Thrips, mites and aphids damages were not observed during the experimental period. However, the virus incidence was very high in all the exotic hybrids (25% - 91 %) compared to that of the local Chilli hybrid (8 %).
- Laboratory studies confirmed the effectiveness of dust formulation of *Pirimiphos methyl* 2% D in controlling maize weevil.

- The effect of reflective mulch on Chilli thrips was studied with a view to incorporate it as a component of the integrated pest management package of Chilli leaf curl complex. Severity of thrips damage was low under reflective mulch (28 %) applied plots compared to other tested mulches (33 % -53%).

WEED MANAGEMENT

- A study was conducted to evaluate the herbicide resistance of the weed *Ischaemum rugosum* (Gojava). Forty percent seedlings showed Polyembryony in their population. Study is in progress national coordinated herbicide screening trial for wet-seeded rice. Metribuzine 70% WP (Sencor) was evaluated to control weeds on mung bean and soy bean under the re-evaluation programme. Despite the weed controlling ability, high phytotoxic effect was observed on both crops.

SOIL FERTILITY

- Demand driven need based nutrient management is effective method for increasing the fertilizer use efficiency of crops. Hence, an experiment was started to test the applicability of using a leaf colour chart to determine the nitrogen requirement of maize. Threshold leaf colour chart values were identified as 4.5 and 5 for vegetative and reproductive stages. These values will be validated in future experiments.
- An experiment was conducted to study the effect of foliar application of micronutrients on growth and yield of Chilli. Zinc was identified as deficient

among the tested micronutrients (other tested micro nutrients were Ferrous, Copper and Manganese) in the soil. Effect of foliar application of Zinc Sulfate was not found on growth or yield of chilli.

- The fertilizer use efficiencies of Urea and Ammonium Sulfate were compared with respect to the growth and yield of onion. Three different rates (45, 90 and 135 kg/ha) of Nitrogen were tested and the Nitrogen rate of 135 kg/ha from Ammonium Sulfate gave higher fertilizer use efficiency (16 % higher) than that of Urea.
- It was observed under pot experimental condition that the Single Super Phosphate produced for TSP is effective for maize. A series of field experiments conducted to confirm the results did not show any significant response to the added Phosphorus. Hence, the experiment will be repeated in forthcoming seasons to verify the results under field conditions.

WATER MANAGEMENT

- A study was carried out to investigate the relationship between soil moisture status and hard seed formation in mung bean (*Vigna radiata* L.). Results revealed that the irrigation at 4 days interval (27.5% depletion level) should be used for mung bean cultivation in order to minimize the hard seededness (7.9%). The optimum soaking time for removal of the hardness of mung bean seeds is 12 hours.
- A study was initiated to give a fertigation recommendation for chilli in RBE soil. The study revealed that fertigation with each irrigation event (the average green

chilli yield of the variety, KA 2 - 19.5 t/ ha) could be used to increase the green chilli yield by around 25 % and the water use efficiency by around 20 % compared to those of the manual fertilizer application (the average green chilli yield of the variety, KA 2 - 15.4 t/ ha) under drip irrigation in RBE soil in the dry season. Further, it was found that the inorganic fertilizer rate in the Department of Agriculture recommendation for chilli could be cut down by 25 % without scarifying the green chilli yield through fertigation.

- Micro irrigation system have been identified as important components to increase water use efficiency (WUE)/ water productivity in present agricultural practices. A study was initiated to evaluate different layouts of the micro sprinkler irrigation system on growth and yield performance of onion in RBE soil. The results showed that overlapping of 40% could be applied in the layout of micro sprinkler irrigation system in order to reduce the equipment cost as well as the water consumption in onion cultivation by around 50 % compared to those with 100 % overlapping in RBE soil in the dry season.
- Soil conservation bunds are found to be one of the most practicable ways of upland soil conservation in the Dry Zone. Space allocation from cultivation area and lower sustainability of the bunds due to poor maintenance are some of the issues associated with the upland soil conservation. A long term study was initiated and continued to evaluate different multifunctional soil conservation

bund systems consisting of selected perennials for rain fed uplands with supplementary irrigation with collaboration of NRMC, Peradeniya. Dwarf drumstick and 'Kathuru Murunga' showed better growth and yield performances ensuring their suitability to be included in the multifunctional conservation bund systems in rain fed uplands with supplementary irrigation facility in the Dry Zone.

BIOTECHNOLOGY

- Eighteen chilli accessions including recommended varieties were screened to identify resistant sources for chilli Leaf Curl Disease (LCD). Waraniya Purple and Acc. 11642 were found to be tolerant to LCD. Field resistant character of 'Waraniya Purple' and Acc. 11642 could be used to develop chilli varieties with resistance to LCD of chilli. . However, genetic studies are needed to be carried out to understand the nature of resistance.
- It is believed that field tolerant characters in *Capsicum chinens*/ *Capsicum frutescens* and variety derived from the cross between *Capsicum frutescens* and *Capsicum annum* is a good solution for the LCD problem. However, senescence of fertilized buds in the crosses made with these lines is a problem in transferring the character. A study was carried out with *Capsicum frutescens* /*Capsicum chinens* / *Capsicum annum* lines and land races to identify optimum embryo rescue conditions through tissue culture techniques. After crossing of selected local accessions; Purple 'Nai Miris', Horana Kochchi and PGRC Acc #11642

with MI-02, KA 02, MI Hot, Waraniya, Waraniya Purple and Galkiriyagama immature embryos derived from above crosses (wide hybrids) were cultured on different tissue media. Protocol was developed for embryo rescue of chilli wide hybrids.

- Incorporation of the Opaque -2- gene into non QPM lines is desired to convert QPM line/ variety to develop QPM varieties. Molecular markers could be used to identify the proper varieties/ lines. Selected two lines of BC1F1 (CML 20/193, 164/CML 20) population were advanced to BC1F2 population by doing selfing. Selected fifty plants from each

cross combination of BC1F2 (CML 20/193, 164/CML 20) were back crossed with CML 20 to form BC2F1. Molecular screening is in progress.

- Identified sequence portion with the object of developing transgenic resistance for chilli leaf curl virus.

DEVELOPMENT

Seed Production

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

Table 1.1.2: Quantities of breeder and certified/ commercial seeds produced during 2014

Crop	Variety	Breeder seed production (kg)	Certified/ commercial seed production (kg)
Maize	Ruwan	64.0	-
	Bhadra	26.0	-
	CML 20	79.0	-
	CML 348	70.0	-
	CML 161	851.0	-
	CML 194	387.5	-
Finger millet	Rawana	27.0	-
	Oshada	27.0	-
Chilli	MI Waraniya	2.0	-
	MICH 3	2.6	264 (dried pods)
	MI 2	6.12	-
Mung bean	Ari	10.0	-
	MI 5	63.0	-
	MI 6	34.0	-
Big onion	Dambulla Selection	7.8 (true seeds)	-
Black gram	MI 1	63.0	-
	Anuradha	24.0	-
Soy bean	Pb 01	57.8	-
	MISB 01	50.0	100.0
Cowpea	Dhawala	15.5	-
	MICP 01	47.8	-
	Waruni	13.3	-
	Bombay	28.4	-
Snake gourd	MI Short	4.8	-
Drumstick	Dwarf variety	-	10.0

TECHNOLOGY DISSEMINATION

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

Details of programmes conducted during the year are given below.

- FCRDI scientists participated in various programmes as resource personnel;
 - Over 190 training programmes were conducted on OFC production for officers, farmers and for school, university and technical college students with a total number of participants over 5500.
 - Thirteen plant clinics
 - Over 200 field visits with extension staff
- Technical advices were provided for over 750 clients who visited the institute and over the telephone.
- About 500 of leaflets on technical information were distributed.
- Planting materials issued free for farmers and other institutes.
Seed material: 92 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)
- Four university students completed their in plant training at the institute. Six undergraduate students completed the final year research project at the institute.

TV/ Radio Programmes

Seventeen radio programmes and two TV programmes were broadcast with the participation of the scientists of FCRDI during 2014.

Projects

The sub project of 'Infrastructure Development to Support the Crop Improvement Programme of Development of Hybrids and OPV's of Chilli, Maize and Onion' was initiated in 2013 and continued in 2014.

The following activities under the project were completed by the end of 2014.

- 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 under sheltered condition from rains
- Construction of a thermo gradient chamber for temperature screening of varieties
- Strengthening of irrigation facilities by rehabilitating/ upgrading the existing surface irrigation systems and introducing micro irrigation systems to increase irrigation efficiency
- Upgrading of existing laboratories, plant houses and storage facilities for smooth functioning of research activities
- Establishment of 02 large scale cold rooms to strengthen seed storing facilities

- Acquisition of field machinery for appropriate mechanization of field activities
- Acquisition of laboratory equipment for smooth functioning of research activities
- Assuring the security of research fields by strengthening the surrounded upgraded fencing systems

Newspaper Articles

Five newspaper articles were published during 2014 with the participation of the scientists of FCRDI.

PLAN FOR 2015

Research

- Crop Improvement and variety development of other field crops
- Studies on climate change on productivity of other field crops
- Development of technologies to control pest and diseases in other field crops
- Effective utilization of biotechnology tools in crop improvement and development of disease tolerance
- Development of techniques to enhance the water productivity in the dry zone
- Development and identification of fitting vegetable and fruit varieties/ crops for the dry zone
- Development of soil management technology for other field crops

Development

- Production of breeder seeds of the recommended other field crop varieties
- Dissemination of agriculture technology to stakeholders

STAFF LIST

Designation	No.
Director	01
Additional Director	01
Deputy Director	01
Assistant Director (Research)	24
Assistant Director (Development)	01
Assistant Director (Economics)	01
Research Officer	04
Programme Assistant (Agriculture)	02
Research Assistant	17
Agricultural Instructor	05
Research Sub Assistant	11
Technical Assistant	02
Public Management Assistants' Service	16
Office Assistant (KKS)	01
Mechanic	03
Technician	03
Lorry Cleaner	01
Driver	07
Storeman	02
Circuit Bungalow Keeper	01
Earth Mover Operator	04
Watcher	32
Labourer (Permanent)	280
Labourer (Contract)	30
Total	447

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

Grain Legumes and Oil Crop Research and Development Centre is the main agriculture research Centre located in Southern Dry Zone. It is mainly focusing on the research and development programmes of grain legumes, oil crops, regionally important vegetable and fruit crops, farming systems and transfer of technology to enhance agricultural productivity in the country along with its satellite station at Weerawila in DL₅ Agro-ecological region. In 2013, the mandate was expanded to conduct research and development programmes on Big onion, Red onion, Chilli and Maize. All the

research programs are planned based on both national and regional research needs in the thematic areas of crop improvement, agronomy, plant protection, water management and soil science.

In addition, the Centre engages in the production of breeder seeds and basic planting materials of released varieties, making recommendations on site specific fertilizer application and dissemination of technical information to field officers, farmers and other stakeholders. Centre also provides technical assistance for interested parties on a demand driven basis.

BUDGET

Table 1.1.1.1: Annual budget – 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	4,390,000	4,224,328	96
Recurrent	23,187,970	18,710,487	81
Projects (NARP)			
• Development of medium duration , high yielding large seeded groundnut varieties	462,880	307,121	66
• Improvement of cowpea varieties for drought tolerance and moisture stress	665,938	601,126	90
• Development of a high yielding, short age mung bean variety suitable for catch cropping under paddy fields	651,651	573,824	88
• Development of efficient water management packages for chilli and onion in the Dry Zone soil	205,000	205,000	100

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
• Identification of virus diseases in cowpea cultivation and develop a control package	288,776	261,609	91
• Study the effect of weeds on yield of groundnut and determine the critical crop – weed competitive period for groundnut	242,440	189,520	78
• Germplasm collection, conservation and evaluation of grapes to select seedless grape varieties	437,641	277,469	63
• 100 million project	14,383,884	12,454,849	87
Total	44,916,180	37,805,334	84

PROGRESS

RESEARCH

CROP IMPROVEMENT

Coarse grains

Maize

- Six Hybrid entries were evaluated with standard checks of Pacific 984. CLQRCYQ59 X CLQRCYQ49 hybrid showed the highest yield.

Finger millet

- Five entries of finger millet were evaluated with standard checks of 'Rawana' and 'Oshada'. Promising line TVFM013-1 showed better yield than standard varieties.

Sorghum

- Five entries of Sorghum were evaluated with standard checks PAC501. The line 8949 showed the best yield.

Variety Adaptability Testing (VAT)

- Conducted VAT trials of Groundnut Mung bean, cowpea, mustard and hybrid maize in Hambantota and Moneragala districts.

Oil Crops

Ground nut

- Two large seeded medium duration groundnut promising lines (ICGV 05200, ICGV 05198) and 3 medium seeded, medium duration lines (ICGV 0068, ICGV 06233, ICGV 06214) performed better under farmer managed conditions were identified for further evaluation.

Sesame

- In the varietal improvement programme -6 crosses were made and 4 F₁ generations were advanced. Under the

mutation breeding programme 3 lines were selected for yield trials.

Mustard

- A promising Mustard line (C 241) was selected for varietal release and samples were submitted for DUST testing.

Soybean

- Eight soybean lines having short age character were selected for yield trials.

Grain Legumes

Mung bean

- In the mungbean varietal development programme, 30 accessions were evaluated and 6 accessions were selected for Preliminary Yield Trials (PYT). Four lines were identified for Major Yield Trials (MYT) from the previous PYT. Altogether 20 progenies were advanced from F₁ to F₆ generations from the crosses made. From the mutation breeding programme three lines were identified for preliminary yield trials.

Cowpea

- A high yielding cowpea variety ANKCP 1 was released for island wide cultivation. This variety is capable of giving 1.5 t/ha and more than 75% of the harvest could be picked from the first pick itself. Two drought tolerant cowpea accessions were identified for Major Yield Trials. Two cowpea lines (CP 32, CP 158) were nominated for Varietal Adaptability Trials (VAT) and three cowpea lines (ANKCH 1,2,3) were nominated for National Coordinated Varietal Trials (NCVT)

- Four new entries were evaluated with standard checks of MICP 1, Waruni, and Bombay under National coordinated testing Programme. Promising line ANCF 82 showed better yield compared to the standard varieties.

Horse gram

- Two horse gram varieties ANK Black (*Anguna kalu kollu*) and ANK Brown (*Anguna dumburu kollu*) were released for island wide cultivation.

AGRONOMY

- Trial conducted to determine the effect of inoculation on Mungbean in DL_{1b} Agroecological Zone showed no effect on crop yield.
- A crop species evaluation was carried out the third season cultivation. Black gram and little millet were showed better performances than cowpea, maize and foxtail millet as a third season crop.
- An experiment conducted to evaluate the best crop intercropped combinations showed that groundnut, maize intercropping as the best. Inoculation of the groundnut crop has resulted an increase in yield compared to the un inoculated crop.

VEGETABLES

Spine gourd

- Developed three high yielding hybrid varieties with desirable fruit quality and agronomic traits.

Ela batu

- Identified six lines with desirable fruit quality characteristics for further improvement.

Okra

- Six promising lines having tolerance to mosaic virus were identified. Study is in progress.

Ruhunu miris

- Improved a Ruhunu miris cultivar and seed samples were distributed among selected farmers to obtain information on their preference.

Big Onion

- Established collected big onion Germplasm in the field for seed production.
- Studies were initiated to identify the suitable planting time for big onion in Hambantota district.

Red Onion

- Compared flowering performances of vernalized and non-vernalized red onion.

FRUIT CROPS

Wood apple

- Established 67 accessions of wood apple collected from different parts of Sri Lanka. Further evaluation will be carried out.

Beli

- Established 15 accessions of Beli collected from different parts of Sri

Lanka. Further evaluation will be carried out.

Mango

- Completed the hard pruning for rejuvenation of older mango plantation at the Centre.
- Canopy management study of budded mango plants was initiated.

Banana

- Established 9 promising banana accessions of Kolikuttu (2), Seeni kesel (4) and Embul banana (3) and initiated the yield evaluation.

Papaya

- Established and evaluated local papaya hybrids in a NCVT trial.
- Twelve Papaya Ring Spot Virus (PRSV) disease resistant/ tolerant papaya lines were identified and F₃ generation plants are presently being evaluated in the field.

Grapes

- Four seedless grape accessions and four seeded grape varieties are being evaluated for their performances.

SOIL SCIENCE

- Evaluated two local bio fertilizers for nitrogen fixing and phosphorus solubilizing for paddy. There wasn't significant positive effect compared to the control (No Nitrogen & No phosphorus.)

- Evaluated two local liquid fertilizers (Golf and SMC express) for paddy. There is no significant positive effect on paddy yield.

WATER MANAGEMENT

- A research was conducted for Determination of Crop Co-Efficient and Crop Water Requirement of Mung Bean DL1b Agro Ecological Region. The crop coefficient values of Mung bean at initial, development, mid season and late season stages were found to be 0.5, 0.97, 1.25, and 0.75, respectively.

FOOD SCIENCE

- Nutritional status of the Mung bean varieties and promising lines were evaluated. Variety Ari showed significantly high mineral content than other varieties and lines tested.
- Experiments were conducted identify the best stage for processing Embul Banana. Ripening stage 5 (Bright yellow with green tip) showed higher juice yield, total soluble solid and sugar: acid ratio.
- Nutritional status groundnut varieties and promising groundnut lines were evaluated. ICGV 87187 and ICGV 01276 lines showed higher level of crude fat content than other all varieties and lines.
- Four types of sausage fillers (Red rice flour, Cowpea flour, Mung bean flour and Maize flour) were tested with wheat. Results showed that sausages filled with maize were superior.

PATHOLOGY

- By screening more than 100 lines, 15 moderately virus tolerant/ resistant line were selected.
- Results of an experiment revealed that method of cultivation did not have an effect on the development of chili leaf curl complex.
- Sclerotium fungi were identified as main causal organisms for onion bulb rot in Hambantota area.
- In an experiments of r *In-vitro* mutageneses of banana for Fusarium wilt (*Fusarium oxysporium* f.sp. cubense (Foc)) Resistance/tolerance only 135 were infected from 405 plants were established for screening.

ENTOMOLOGY

- Botanical and synthetic insecticides were evaluated under calendar and monitored application for pests in grain legumes. Calendar applications of synthetic insecticides were found effective against Aphid, Pod borer and field Bruchid infestations. Calendar sprays of botanical insecticides were found effective against Pod sucking bug damages. Monitored sprays of botanical insecticides were found effective against reducing Thrips and Aphid damages.
- Role of host plant resistance and intercropping in reducing field infestation of Cowpeas by Bruchids were evaluated. A significantly higher number of Bruchid eggs were laid on pods of MI-35, Dhawala and Bombay when sown as a monocrop. The least number of exit holes of F₁ adult bruchids were recorded from pods of MI-35 when intercropped with Fingermillet.

- Tested the candidate insecticides Thiomethoxam 20%+ Chlorantraniliprole 20% (Virtako) against pod borers of Mung bean & Soya bean, Chlorantraniliprole 200 g/l SC (Coragen) against Shoot and fruit borers of Okra, Diflubenzuron 25% WP against leaf eating insects of Soybean and candidate miticide Pyridaben 20% WP against mites of Okra.
- A preliminary study carried out revealed that HDPE three layer bag was the optimal hermetic storage structure for Maize. It eliminated the maize weevil damage and increased the shelf life.

WEED SCIENCE

- Experiments conducted revealed that 3 – 7 weeks after seeding as the most critical weed free period groundnut. Results will be confirmed at Farmer managed condition.
- A survey conducted to identify the weed flora in other filed crops cultivating field in the Southern Province has identified 30 grass species, 9 sedge species and 200 broad leaf weed species.

ARS, WEERAWILA

Big onion and Red onion

- Trials carried out identify the best time of planting showed that planting in months of September, October and December increases the vulnerability to fungal disease.

DEVELOPMENT

TECHNOLOGY TRANSFER AND TRAINING

TV Programs

- ‘Mihikatha dinuwo’ TV programs – 02 on finger millet cultivation.

Radio programs

- ‘Ruhunu gewaththa’ - 06 ; On Suitable technology for OFC cultivation in Yala season (01), three programs on vegetable and Big onion cultivation (03), Sesame and groundnut cultivation (02).

Training programs

- Other field crops and vegetable – 08.
- Appropriate technology for finger millet cultivation - 02.
- Banana Disease management - 01.
- Fertilizer and other input management and incorrect use of chemical fertilizers and its implications on human and environment - 02.
- Cultivation and technological aspects of Oil crops 01.
- Home Gardening and Value addition of agricultural commodities - 03
- Preseason trainings – 26.

Services provided

- Soil Test Based Recommendation 200 soil samples.
- Compost analysis – 17.

Visits abroad

- W.M.N.D. Gunathilaka (RO) - Climate change in South Asia policy measures- Philippines
- R.A.A. Ranatunga (RO) - Seminar on Fruit processing and comprehensive

utilization for developing countries, Beijing in China.

- N.T. Prathapasinghe (RA) – Hybrid cotton production for Asian countries, China.

SEEDS AND PLANTING MATERIAL PRODUCTION

Table 1.1.1.2: Seed and planting material production during 2014

Crop	Variety	Type	Quantity
Groundnut	Tikiri	Breeder	140
	Indi	Breeder	155
	Tissa	Breeder	60
	ANKG 1	Breeder	32
		Commercial	230
Sesame	Uma	Breeder	11.7
		Commercial	477
Cowpea			400
Spine gourd	-	Basic	500
Big onion	-	Commercial	200 lots
Mandarine	-	Commercial	8800
Woodapple	-	Commercial	15000
Mung bean	-	Commercial	105
Pineapple		Commercial	30000
Soybean		Commercial	70
Finger millet		Commercial	150
Black gram		Commercial	23
Maize		Commercial	294

PLAN FOR 2014

- Crop improvement of Oil seed crops and Legumes
- Crop improvement of Spine gourd and Ela batu.
- Development of crop management practices for Oil seed crops and Legumes.
- Development of Pest and Disease management technology for oil Seed Crops Legumes.
- Soil fertility management in oil seed crops and leguminous crops.
- Identification of nutritional status and development of processing technologies for oil seed and legumes.

STAFF LIST

GLORDC, Angunakolapelessa

Designation	No.
Additional Director	01
Deputy Director (Research)	01
Research Officer	14
Programme Assistant (Agriculture)	01
Development Officer	03
Farm Manager	01
Research Assistant	10
Agricultural Instructor	05
Research Sub Assistant	05
Administrative Officer	01
Management Assistant	05
K. K. S.	01
Circuit Bungalow Keeper	01
Earth Mover Operator	02
Driver	07
Watchers	13
Labourer (Permanent)	40
Labourer (Contract)	156
Total	269

ARS, Weerawila

Designation	No.
Research Officer In-Charge	01
Research Assistant	02
Earth Mover Operator	01
Driver	01
Watcher	03
Labourer (Permanent)	10
Labourer (Contract)	08
Total	26

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

Regional Agricultural Research and Development Center, Aralaganwila comes under the purview of FCRDI is responsible for research and development activities of Other Field Crops. However it deals with rice, fruits and vegetables as well.

The station has responsibilities to develop relevant agriculture technologies for the mandated regions of the Mahaweli Systems B, C, & G and Eastern province.

BUDGET

Table 1.1.2.1: Annual budget - 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	4,200,000	3,519,537	84
Recurrent	12,905,239.41	11,199,483	87
Projects			
• Seed production program – Cluster onion	5,040,000	4,570,427	91
• Seed production program – Ground nut	1,250,000	882,731	71
• Efficient water management packages for chilli and onion (NARP)	210,000	190,786	91
• Soil sample testing program	500,000	397,135	79
• Banana Evaluation (NARP)	50,000	36,048	72
Total	24,155,239	20,796,147	86

PROGRESS

VARIETAL IMPROVEMENT

Cluster onion

- The morphological & quality characters assessment of 65 accessions was continued. Five short duration accessions (< 60 days) were selected for NCVT. 22 bolting type (>5% bolting) accessions & seven high pungent accessions were evaluated under Major Yield Trial. Two accessions (ACA 16 & ACA 66) were

evaluated under VAT. ACA 66 performed well with farmer preference. ACA 66 was forwarded to DUST with the parallel testing of VAT.

- Male Sterility lines confirmation was done through staining method. All the lines were observed to be fertile.
- Application of Gibberalic acid was not successful in gametocide development of onion.

- F₁ generations of 11 crosses were established and multiplication of F₁ generation was done.
- Nine vegetable bolting onion lines were evaluated & two lines (ACA 67, ACA 78) performed well.

Horticultural crops

Mango

- Forty six promising mango accessions were maintained and evaluated. Quantitative and qualitative yield data were collected from seventeen accessions. ACC 46 and 06 showed the highest brix value of above 22.0 while ACC 116 had the largest fruit size (427g) and followed by ACC 27 (213g). Data collection will be continued.
- Flowering and shoot development behavior in the varieties of Karathakolomban and Velleikolomban was studied. Flowering started in the 1st week of August, and 15% and 30% flowering were observed in Velleikolomban and Karathakolomban respectively. Experiment is continuing.

Banana

Seven accessions of 'Seeni' banana were evaluated under NCVT program. Accession MKS produced above 8kg of bunch weight. Experiment is continuing.

Papaya

Seasonal variation in seed formation in Ratna papaya under Dry Zone condition was started. Plants are at growth stage and study is in progress.

Dragon fruit

- Research on "Off seasonal flower induction in dragon fruit" was conducted to observe off seasonal flowering ability in dragon fruit with the use of plant growth regulators. Cytokinin and GA₃ plant growth regulators were not capable in inducing off season flowers in dragon fruit.

Rice

17 lines of 3.5 months maturity classes and 14 lines of 3 months maturity classes were tested. Three lines from 3.5 months maturity class and one line from 3 months maturity class out yielded the checked varieties.

Underutilized crops

Thibbatu

Around 70 plants of 'Bindu' variety were maintained as a field gene bank. Study on management of hard wood stem borer is in progress.

Spine gourd

Evaluation for heat tolerant and quality characters of the available germplasm is continued.

- Inter-specific hybridization between *Momordica cochinchinensis* (FM) and *Momordica dioica* (M) was done F₁ generation was established. Study is in progress.

PLANT PATHOLOGY

- To identify high yielding, disease resistant red onion varieties 04 studies were conducted in Maduruketiya (RBE/DL_{1b}) and Kolonna (RBL, RYP/ IM_{2a}). Best

variety identified was Jaffna local for Kolonna area. Vethalan, TVS and Jaffna local did not show any disease development in Maduruketiya.

- Technical and social aspects of agrochemical use in agricultural areas was studied in Mahaweli System B in collaboration with ISTC – Hansayapalama and University of Peradeniya. Data analysis is in progress.
- Evaluation of different nursery management practices to raise red onion was studied. The best treatment was the raising of seedlings in nursery trays with sterilized soil mixture.
- It was observed that soil application of gypsum did not show any significant disease reduction in red onion. Increased keeping quality and lower tip burning incidence was also observed with gypsum application.
- It was identified as *Drechslera* spp. As the causal agent for pod rot in Drumstick and Tebuconazole was the best chemical to control it. It was tested in vitro and in vivo.

SOIL SCIENCE

- In a long term application of chemical fertilizer and green manure (Rice-legume rotation) application trial, results showed crop residue application gave the highest yield.
- In a long term application of chemical fertilizer and organic matter ex situ (Rice-rice rotation) application trial, results showed that organic fertilizer application showed more favorable impact than chemical fertilizer application alone (Yield > 4 t/ha).

WATER MANAGEMENT

- Using DSSAT 4.5 (Decision Support System for Agro Technology Transfer) crop model yield predictions were done for future predicted climate changes. Increase in maximum and minimum temperature by 2°C showed a rice yield reduction around 12% and increase in CO₂ concentration showed a positive impact on yield.
- Suitable overlapping percentage for the region was tested for red onion using micro sprinklers. In the Yala season 60% overlapping treatment showed the best results and in Maha season no significant difference were observed among the treatments.

SEEDS AND PLANTING MATERIAL PRODUCTION

Table 1.1.2.2: Seeds and planting material production in 2014

Crop	Variety	Seed type	Production
Ground nut	Tissa	Foundation	142 kg
	Tikiri	Foundation	60 kg
	Indi	Certified	299 kg
Spine gourd	-	Potted plants	500
Tibbatu	Bindu	Breeder	3 kg
		Commercial	55 g
Papaya	Rathna	Breeder	3 kg

TECHNOLOGY DISSEMINATION

Field days and Trainings

- **Training programmes:** Officers conducted training programmes for AOs (Mahaweli), AIs, FAs (Mahaweli), farmers and school children.
- Conducting Pest and Disease management in onion cultivation under ‘Api Wawamu

– Rata Nagamu’ program all over the country.

- **Crop clinics:** Officers attended as resource persons.
- **Provincial and Mahaweli Technical Group Meetings:** Provided required technical assistance at preparatory meetings for Mahaweli B, C and G for both the seasons. Officers attended in Eastern, Sabaragamuwa, South and Uva PTWGs too.

Services

- **Soil testing:** Analyzed 330 soil samples and recommendations were given accordingly.
- Farmer advices for more than 75 farmers on plant protection problems.

PLAN FOR 2015

- Crop improvement for Red onion, Spine gourd, Grain legumes, coarse grains, Rice and fruit crops.
- Development of suitable crop management practices for other field crops and fruits.
- Development of appropriate pest and disease management practices for other field crops and fruits.

STAFF LIST

Designation	No.
Deputy Director (Research)	01
Research Officer (SLAgS)	04
Research Assistant	04
Agricultural Instructor	01
Acting Administrative officer	01
Public Management Assistant	03
Store Keeper	01
Research Sub Assistant	06
Technical Assistant	02
Driver	06
Electrician	01
Watcher	13
Earth Mover Operator	03
Carpenter	01
Blacksmith	01
Circuit Bungalow Keeper	01
Budder	01
Technician	01
Labourer	76
Total	127

1.1.3 REGIONAL AGRICULTURE RESEARCH AND DEVELOPMENT CENTRE (RARDC) – KILINNOCHCHI

Regional Agriculture Research & Development Centre (RARDC) was established in 1981 to cater the agriculture research & development needs of the Northern region of Sri Lanka. It has 03 satellites stations in three districts at Thirunelvely, Oddusuddan and Vavuniya.

It is mandated to carry out research activities that are important at regional level and to recommend crops, crop varieties, appropriate management practices. The Centre also

involves in other development activities including supply of breeder seeds and quality seeds to regional and national need. Further, RARDC is also responsible to investigate problems encountered by farmers during cultivation in the region and to recommend suitable remedial actions for these problems.

RARDC also engages in technology dissemination to farmers and students, seed producers, advisory services and fertilizer recommendations based on soil testing.

BUDGET

Table 1.1.3.1: Annual budget - 2014

Vote	Allocation (Rs)	Expenditure (Rs)	Expenditure (%)
Capital - RARDC Kilinochchi	14,900,000	14,574,570	98
Capital - ARS Thirunelvely	21,200,000	589,107	03
Recurrent - RARDC/ARS Tv	7,887,897	6,754,184	86
Projects			
• Soil	500,000	493,719	99
• Sun hemp	500,595	441,746	88
• Seed Production	4,075,000	4,017,333	99
• Breeder seeds	750,000	693,878	93
• Hybrids- Recurrent	5,620,000	6,514,366	116
• Hybrids-Capital	2,000,000	199,963	10
Total	57,433,492	34,278,867	60

PROGRESS

CROP IMPROVEMENT

Chilli

Improvement of *Navatkuli* selection

Thirty six individuals were selected based on the superior phenotypic characters and seeds were collected. Selections were made based on Plant height, Pest and disease resistance/ tolerance, Leaf colour, Leaf thickness, Pod shape and Green chilli yield. Ability to withstand for long duration under minimum water supply over other commercially available chilli varieties is a major character of this land race and the other characters of selected individuals as follows. The trial is progressing.

Preliminary Yield Trial in Chilli

Thirty lines developed from three cross combinations of line number 21 gave the highest green chilli yield followed by 17 and 13. Line number 22 gave the highest red chilli yield and line number 8 was the second.

NCVT of Chilli hybrids

Eight entries of chilli hybrids received from FCRDI, Mahailuppallama were evaluated.

Onion

- 26 cluster onion land races were collected from Northern region and characterization was done.
- A dual purpose multiplier onion namely TVM-6 was identified with higher degree of field tolerance to major fungal diseases and also produces more than 800 kg of true seeds and 22 t/ha bulb yields.

- A high yielding TVM-1 was identified with high adaptability under different climatic condition in VAT.

Finger millet

Three ultra short finger millet lines were included in to NCVT and two of them were promoted to VAT in Northern region.

Foxtail millet

Three ultra short foxtail millet lines were included in to NCVT and two of them were promoted to VAT in Northern region.

Ground nut

Three lines generated from locally preferred land race –Mullatitvu local, tested under PYT having high consumer preference were promoted to NCVT.

Sesame

Two gingly introductions received from India viz: TMV-3 and TMV-4 having high oil content were multiplied and are included in to NCVT.

Potato

Eleven different potato varieties were evaluated for yield and adaptability. This study revealed that potato could be cultivated in Kilinochchi. There is a possibility of obtaining higher yield. This study has to be continued in next season.

PLANT PROTECTION

Management of Chilli Thrips

(Scirtothrips dorsalis)

Palmyrah leaf fencing was found to be effective for the control of chilli thrips. Fencing enhanced the micro environment to

promote the growth of chilli plants. Study is in progress.

It was also observed that intercropping with bitter gourd was an effective method. Thrips population in Yala season was drastically higher than Maha season. Wing bean acted as an alternative host for white fly.

Efficacy of insecticides for the control of yellow stem borer in rice

Studies revealed two formulations of Fipronil 0.3G and Virtako 40WG were effective in controlling yellow stem borer.

HORTICULTURE

- Banana gemplasm block was established with thirty local germplasms.
- Pomegranate, grape, dragon fruit and papaya plots were established.

ARS, THIRUNELVLEY

WATER MANAGEMENT

Optimum basin size for Calcic Red Yellow Latasol (CRYL) soil

An experiment was conducted to find out the optimum water depth class for the basins in calcic red latasols. It was observed that soil moisture uniformity was high in 20 cm – 40 cm depth class compare to 0 – 20 cm and 40 cm to 60 cm depth classes.

Irrigation layout for Red onion in CRYL soil

Ridged & furrowed basin gave the lowest bulb yield of 15t/ha. The differences in the bulb yield among other irrigation layouts were not

significant and, bedded basin with 10 cm height gave the highest bulb yield of 19 t/ha.

Drip irrigated Chilli with fertigation

Objective of this experiment to identify the efficient fertigation method under drip irrigated Chilli cultivation. Chilli, MI Green variety was tested under five different fertigation methods such as No fertilizer application, 75 % of department of agriculture (DOA) recommended fertilizers with manual application, 75 % of the DOA recommended fertilizers through fertigation tank, 100 % DOA recommended fertilizers with manual application, and 100 % DOA recommended fertilizers through fertigation tank. 75 % DOA recommended fertilizers, manually and 100 % DOA recommended fertilizers, manually gave higher yield compare to other treatments. Their yields were 5.4 t/ha and 6.4 t/ha respectively.

Red onion cultivation under Micro sprinkler irrigation

Study revealed that 60 % of overlapping water spray gave the highest of 22.2 t / ha. However, the differences between the bulb yields of the treatments were not significant.

PLANT PROTECTION

Management of little leaf disease (LLD) of brinjal

Poultry manure, Border crops Maize, Sun flower, Kurakkan and mulched Gliricidia leaves, neem leaves were evaluated. The lowest % of LLD was with the sunflower border. All the plots covered with a border

recorded low infestation of shoot and pod bored.

Insecticides for shoot and fruit borer in Brinjal

Thiamethoxam 20% & chlorantranilliprole-20% (Virtako), Chlorantranilliprole 200g/l sc (Coragen) Spinosad 25g/li sc were tested.

Chlorantranilliprole 200g/l sc (Coragen) gave better control than other chemicals tested.

Insect pests & diseases in the local cultivars of onion

Nine local cultivars with check variety Thinnavelly Red were evaluated for pest and disease incidence. During Maha 2013/2014 only Leaf Twister disease and purple blotch disease were observed. Flowered type TVM 6 showed high tolerance to purple blotch and leaf twister disease. During Yala season the lowest incidence of Thrips was observed in Thinnavelly Red.

CROP IMPROVEMENT

Potato lines

Four varieties and 28 lines of potato were evaluated. Lowest late blight incidence was observed in the variety Connect and highest yield was obtained in the Line 115.

AGRONOMY

Onion

Results indicate the size of the mother bulb has no effect on the bulb sizes; yield is highly correlated with planting material weight. Study is in progress

Aerobic Rice Inter cropping

Intercropping tomato with aerobic rice gave higher yield than sole crops.

DEVELOPMENT

Mass production and breeder seed production

Red onion Thirunelvely Red was produced at mass scale (> 750 Kg/season) and red onion Thirunelvely Red breeder seeds were carried out successfully in the formal way.

Infrastructure development

- Rehabilitation of Staff officer quarters (Grade iv)
- Completion of Circuit bungalow
- Establishment of over head water tank for irrigation
- Construction of Cycle Park
- Construction of Net house
- Construction of Onion storage
- Completion of labor line
- Establishment of metrological station
- Construction of Cattle shed
- Establishment of model farm

Land

All 22 acres of land in the research station were brought under research and production.

Laboratory

- Soil and water management laboratory was fully upgraded using funds from the FAO project.
- Pathology laboratory was partially upgraded.

TECHNOLOGY TRANSFER

Exhibitions

Participated and provided exhibits for the Northern Province Agricultural Exhibition held in DATC, Vaddakachchi.

Radio Programmes

Five radio programmes were conducted on eco-friendly pest management.

Farmer advisory services and visitors

- The research station provided necessary advice and recommendations for about 125 farmers who visited the station and forces.
- Eighteen soil samples from farmer fields were analyzed and soil test based fertilizer recommendations were provided for different crops.
- Approximately forty field visits were made by the officers to solve regional site specific problems.

Workshop

Conducted a workshop on “Procedures for testing of new molecule of agro chemicals” for Extension officers and representatives of chemical companies.

Training

- Conducted training on plant breeding for students of the Faculty of Agriculture, University of Jaffna.
- Conducted 16 training programmes for farmers under the FAO project in Mullaitivu and Kilinochchi districts.

- Provided 02 National Masters Trainers.
- Conducted 02 training programmes for Officers and farmers on Plant protection.
- Conducted theory and practical training classes on plant protection and soil conservation for 270 farmers, 300 students and 240 government officers.

Foreign Trainings

- Dr. S.J.Arasakesary: Utilization of atomic energy in crop production, Indonesia, one week.
- Dr. T. Karunainathan: Construction & Maintenance web based geographic information service platform for developing countries, Republic of China, two weeks.

PLAN FOR 2015

Crop Improvement

- Development of Hybrid and OPVs of Chilli
- Development of dual purpose cluster onion
- Crop improvement in Finger millet, foxtail millet, ground nut, gingerly and sweet corn.

Plant Protection

- Management of Chilli Thrips
- Efficacy of *Calotropis* leaves for the management of rice leaf-folder (RLF)
- Management of root-knot-nematodes (RKN –*Meloidogyne spp*) in Chilli.

- Management of pig weed weevil (*Hypolixus haerens*) in *Amaranthus spp*
- Mass rearing of parasitoids of papaya mealy bug

Agronomy

- Year round performances evaluation of cluster onion landraces in Northern region
- Management of cluster onion seedlings

STAFF LIST

Designation	No.
Addl. Director of Agriculture (Research)	01
Assistant Director of Agriculture (Research)	04
Agricultural Instructor (Class- I)	01
Agricultural Instructor	01
Public Management Assistant	02
Driver	03
Earth Mover Operator	01
Store man	01
Mechanic	01
Technician	01
Technical Assistant (Research)	01
Research Sub Assistant	01
Watcher	08
Permanent Laborer	12
Contract Laborer	15
Total	53

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

Horticultural crops research and Development Institute (HORDI) has been assigned with the task of enhancing national vegetable and floriculture crop production through research and development. Hence its mandated crops are vegetables, root and tuber, potato and floricultural crops. HORDI is affiliated with several other research centers namely RARDC, Bandarawela, RARDC, Makandura, ARS, Sita Eliya, ARS, Telijjawila and ARS Rahangala in accomplishing the mission of the institute. HORDI undertakes demand driven research under the disciplines of

plant improvement, pest and disease management and soil fertility management. In addition to the research programme, HORDI is engage in agriculture development activities on vegetable production. Under this theme, production of nucleus seeds and planting materials, dissemination of knowledge on mandated crops and their production techniques by provision of trainings and other activities are undertaken by the Institute. HORDI is an open Institute to all sectors of the general public who shows an interest in greener agriculture.

BUDGET

Table 1.2.1: Annual budget - 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	42,655,355	39,724,547	93
Recurrent	72,832,632	64,572,760	89
Projects			
• National Agricultural Research Plan NARP (285-2-2-5-2502 (11)	9,907,156	5,613,378	57
• Increasing Seed Availability of Popular Traditional Vegetable (285-02-04-1-2502-5)	2,000,000	1,783,907	89
• Korean Project on International Agriculture (Vegetable Cultivation) (285-2-2-4-2502-(13)KOPIA12)	1,924,128	1,965,911	102
• Korean Project on International Agriculture (Fertilizer management) (285-2-2-4-2502-16(13)FERTILIZER13)	1,901,131	2,237,017	118

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
• Korean Project on International Agriculture (Mushroom) (285-2-2-4-2502-2(13)Mushroom)	4,184,174	4,482,066	107
• Production of postharvest manual for Vegetable / Fruit – FRU (AFASI 2-2-4-250-2 (13)	2,000,000	673,106	34
• Establishment of a Food factory to increase income of small scale farmers	8,400,000	4,158,230	50
• Asian Network for Sustainable Organic Farming Technology (ANSOFT) HO - 285-2-2-4-2502 - (13)	849,376	794,074	93
• Integrate Management System for Plant Genetic Recourse (285-2-2-4-2502-15(13)	1,199,640	1,123,245	94
• Seed Potato Production (285-2-4-250)	16,000,000	8,652,055.23	54
• Control of fruit flies in commercial fruit orchard of Manago and Guava under the Development of fruit villages project (285(FR-FRI)-02-02-9-2502(11)	1,300,000	1,255,771	97
• Increasing Planting Material for National Productivity -2014 (285-2-2-4-2502 - 15 (13)	2,000,000	1,838,670	92
• Vegetable Hybrid varietal development programme (SP-285-2-4- 0-1504- HORDI)	3,000,000	2,757,743	92
Total	170,153,592	141,632,480	83

PROGRESS

PLANT BREEDING

Bean

One high yielding pole bean line KTB was selected for adaptability studies under diverse farmer environments. Another high yielding

line, Cora Pole, was selected for stability testing at three research locations.

Bitter gourd

One locally developed hybrid, M15 having high yield and good consumer preference was selected for large scale varietal testing at farmer locations and it will be nominated for

VRC in 2015. Development of five new Bitter gourd breeding lines is at preliminary evaluation stage. Among the 12 exotic Bitter gourd varieties, 5 were selected for commercial cultivation on the basis of high yield and tolerance to major pest and diseases.

Brinjal

Out of four hybrid varieties tested under NCVT & VAT, the “lena iri” type hybrid EGH 8 was selected based on high yield. It is expected to release the variety in 2017. Out of 16 crosses made in 2013, 5 F1 hybrids were selected for preliminary yield trial. One open pollinated dark purple exotic brinjal line that showed high yielding and resistant to bacterial wilt in the observational yield trial was selected for further evaluation. Under the project on Utilization of crop wild relatives in brinjal, pre-breeding for adaptation to climate change, interspecific crosses between 36 brinjal accessions belong to all 3 gene pools were made & seeds were produced from possible crosses.

Capsicum

One hybrid variety, HCA 1, having high yielding ability and resistant to bacterial wilt will be nominated to VRC in 2015 and this is the 1st Capsicum hybrid to be released by the DOA. Out of eight exotic varieties evaluated, two varieties were accepted for commercial cultivation.

Cucumber

Two promising open pollinated cucumber lines, R2 and M2 were selected for yield and quality evaluation.

Leafy Vegetables

Nutritional aspects and phytochemical characteristics of ‘Kiri handa’, were studied. Phytochemicals such as Terpinoids, Phenolics, Flavanoids, Tanins and Saponins are present in Kirihanda, but Cyanogenic glycosides and Phytosterols are not found in this crop. It has crude protein (26.53%), Ca (17.46 mg/100g), P (38.77 mg/100g), Mg (2.81mg/100g) and anti-oxidant activities (593.21µg/ml).

Tomato

Testing of combining abilities of twenty F₁ crosses for growth and yield performances resulted in identifying eight F₁ crosses for further yield evaluation. Out of thirty exotic varieties, eight were selected for commercial cultivation.

Among four cherry tomato cultivars tested in polytunnel, Cherry 2 was found superior on the basis of higher marketable yield, fruit quality and external appearance.

Yard long bean

The locally developed yard long bean line 39-9, which possesses characteristics of high yield, tolerance to collar rot disease and satisfactory quality will be nominated for VRC in 2015. Another three locally developed lines were selected for stability studies and four lines were selected for yield and quality evaluation.

Adaptability of Korean vegetables

Two Chinese cabbage varieties viz. CR Yeoreummat and Woori; 3 white radish

varieties, Yeongdong, Supergiljo and Metjinmatdonamu; one red pepper variety Manita and two lettuce varieties, Cheongchima and Hanbatjeokchima brought from South Korea were found to be adaptable under mid country conditions.

SOIL FERTILITY MANAGEMENT

Potassium management of banana

Response to the addition of K fertilizer in the wet zone of Sri Lanka was tested. Results revealed that the banana crop responds to the application of K fertilizer however there was no greater yield increase observed with the application of higher quantity of K than the recommended amount under the Wet Zone soil conditions.

Correct fertilizer recommendations on vegetables

Farmers generally applied excessive quantities of fertilizer to vegetable crops. In a series of experiments conducted to identify the need of application of excessive quantities of nutrients revealed that the present department of agriculture fertilizer recommendation was sufficient to obtain good harvest. The increased amounts of nutrients addition did not increase the crop yield.

Micronutrient response study on vegetables

An experiment conducted showed that application of secondary nutrients and micro nutrients are necessary for cabbage under the

condition of depleted nutrients reserves in soil. Studies are in progress to identify the deficient nutrient.

Nutrient removal by vegetable crops

Studies were conducted to study the removal of nutrients under optimum crop yield. Results showed that that relative removal of K is high followed by N for Tomato, Brinjal, Capsicum and Bitter guard. Removal of P was low compared to N and K in all crops. Calcium removal was greater in tomato compared to other crops studied.

Trace metal contents of vegetables

A research was conducted to assess the contamination of trace metals in vegetables found in the market. Vegetables obtained from different markets in Kandy district were used. According to results none of the vegetables tested were contaminated by trace elements. All the vegetables contained high amount of zinc compared to the other elements tested.

Beneficial rhizosphere microorganisms

A research was conducted to isolate nitrogen fixing microbes using selective media from rhizosphere soils. Isolates were tested for their ability to fix nitrogen using Brinjal, Capsicum and Okra. Results revealed that isolates were capable of fixing nitrogen at green house scale. Studies are progressing.

Compost enriched with P solubilizing microbes

Compost was enriched with phosphorus solubilizing microbe of *Bacillus megaterium* (Bm). However the bacteria enriched compost failed to increase the phosphorus availability in a soil – rock phosphate based media.

Organic Farming

Split application of organic fertilizer on vegetables

Application of organic manure is a pre requisite to maintain soil fertility under organic farming conditions. Experiment revealed that the amount of organic manure applied can be reduced by nearly 30% when it was split applied. Experiments are in progress to determine the best split for different organic manures.

Biochar as a soil amendment

Three biochar feed stocks namely coconut husk, rice husk were compared. Results showed that the biochar was beneficial with the conjoint use of cattle manure. The yield increase was nearly 40% compared to the cattle manure alone treatment. When conjointly used with poultry manure there was marked yield increase. Results also revealed that rice husk feed stock was superior over the coconut husk.

Effect of continuous application of compost on vegetable yield

Long term experiment showed that it is essential to apply organic manures even with the application of inorganic nutrients to sustain the fertility level of the soil. There was a greater buildup of P and K in inorganic fertilizer alone

treatment compared to organic manure added treatments.

TISSUE CULTURE

Banana

In-vitro multiplication experiments were continued to increase the multiplication rate of variety Agra. Five numbers of shoots per one subculture cycle was achieved as the average shoot multiplication rate in the Murashige & skoog media which included coconut water at the rate of 150ml/l.

Grape

Field evaluation of tissue cultured grape plants were continued at Kalpitiya and Mahalluppallama for var.Thompson seedless. Crop is at the vegetative growth stage.

Root & Tuber crops

In-vitro multiplication was initiated for three recommended varieties of *Dioscorea* (Kirikondol, Kekulu, Raja ala). Multiplied plantlets at the hardening stage and will be field evaluated in 2015.

Flowers

Studies showed that new Anthurium hybrid varieties (M30 and M36) released from Makandura could be micro propagated successfully.

Bitter gourd

Bitter gourd anthers were introduced to callus initiation medium. Growing callus was observed. As the bitter gourd is highly cross pollinated crop, anther culture technique can

be employed to produce homozygous plants in future hybrid development program.

PLANT PATHOLOGY

Chemical free strategies to manage pest and diseases

Integrated pest/disease management package was developed for the tomato, chilli, gherkins and leafy vegetables (*Gotukola* and *Mukunuwanna*) using different formulations of Trichoderma bio-control agent, natural polymers “chito power 1 & 2” and neem seed water extract (NSWE). Trials in research fields were successful and studies are in progress to monitor the pilot scale performance.

Disease management and fruit quality improvement of grapes

Pest and diseases of the grapes and their management strategies were identified with minimal use of agrochemicals. Studies are continuing to improve fruit quality using different treatments of Gibberelic acids.

New fungicides for cucurbits and tomato

Experiments conducted revealed that Fluazinam 500 g/l SC (at the rate of 10ml/10l of water), Mancozeb 60% + Dimethomorph 9%WP (at the rate of 50g/10l) and Kresoxim-methyl 500 g/ l SC (at the rate of 12ml/10l) can be effectively used to control downy mildew while kaligreen (at the rate of 15g/10l

of water), Flutrifol (10ml/10l), Flusinam 500g/l, (at (10 ml/10l), Azoxystrobin 25% SC (10 ml/10l) and Kresoxim-methyl 500g/l (12 ml/10l) can be effectively used to control powdery mildew in cucurbits. Experiments also revealed Fluzinam 500 g/lSC (at 10 ml/10l), Azoxystrobin 120 g/l + Tebuconazole 160 g/ l SC and Azoxystrobin 120 g/l + Tebuconazole 200g/l SC were effective in controlling tomato early blight.

Curly top virus in tomato

Molecular level detection showed tomato plants showing upward leaf curling, yellowing, purple coloration of veins and stunting were found to be infected with tomato curly top virus. Nearly 5-12% of affected plants were present in farmer fields. Plant showing mixed symptoms contained both Yellow Leaf Curl Virus and Curly Top Virus.

Evaluation of exotic varieties for bacterial wilt

Varieties/accessions were screened for resistance to bacterial wilt caused by *Ralstonia solanacearum*.

Table 1.2.2: Varieties screened for resistance to bacterial wilt

Crop	Moderately resistant	Moderately susceptible	Total
Tomato	17	02	19
Capsicum	20	01	21
Brinjal	09	-	09

Newly reported diseases

Table 1.2.3: Newly reported diseases of crops

Crop	Disease	Causal agent	Location
Brinjal	Blight	<i>Botrytis</i> spp	Gannoruwa
Tomato	Stem and fruit canker	<i>Clavibacter michiganensis</i> ssp. <i>Michiganensis</i>	Matale, Embilipitiya
Drumstick	Pod rot	<i>Drechslera haraiiensis</i>	Mahaweli system B
Ice burg lettuce	Grey Mould	<i>Botrytis</i> spp	Nuwaraeliya
Passion fruit	Scab	Unknown	Sangarajapura
Melon	Fruit Blotch	<i>Acidovorax avenae</i> ssp <i>citrulli</i>	Kalpitiya
Anthurium	Rust	<i>Puccinia</i> spp	Katugastota
Anthurium	Anthracnose	<i>Colletotrichum</i> spp	Daulagala
Chilli	Roset	<i>Begomovirus</i>	Anuradhapura
Cucumber	Phyllody	<i>Phytoplasma</i>	Gannoruwa

MUSHROOM

Productions of paddy straw spawn at farmer level

A technology was developed for the production of paddy straw spawn at farmer level using regiform box installed with thermostat and 5 watt filament bulb. This technology can be adopted for commercial level cultivation of paddy straw mushroom under artificial conditions.

ENTOMOLOGY

Integrated Pest Management (IPM) package for Pumpkin yellowing disease

An effective IPM package was developed for pumpkin yellowing disease management was tested in a large plot in farmer's field at Maho in the North Western province. Results showed

the package was effective in reducing yellowing virus disease and increase the yield by 25%. The package was released as a new technology.

New insecticide for banana weevils (*Odioporus longicollis/ Cosmopolites sordidus*)

Bio-efficacy of four insecticides was tested to identify effective and environmentally safer new insecticides to replace Carbofuran. All the tested insecticides were effective in controlling banana weevils when used in the pseudostem traps placed in the field. The experiment is being continued to determine the efficacy of the insecticide when applied to the soil.

Controlling mites in Polytunnel grown Bell Pepper

A local commercial neem product (Azadirachtin) was found highly effective in controlling mites in bell pepper grown in poly tunnels. Experiment is in Progress.

An unknown bee disease in the Central Province

Bee colonies were reported to abscond due to unidentified bee disease during 2012-13 in the Central province. Samples submitted to Veterinary Research Institute (VRI), and Medical Research Institute (MRI) showed that the causal agents were neither fungi nor bacteria. The symptoms observed in diseased colonies were identical to the symptoms of Thai Sac Brood Viral disease which is known to spread among *Apis cerana* colonies in South Asian countries. For the confirmation of the causal agent further studies on molecular aspect will be conducted.

IPM package for virus diseases management in cucurbits

A novel insecticide package comprised of Thiamethoxam seed treatment, polythene

mulch, neem seed water extract, sulfoxaflor and pymetrozine showed less severity of virus incidence compared to the other treatments. The trial will be continued.

Low toxic insecticides for brinjal shoots and pod borer, *Leucinodes orbonalis*

Brinjal shoot and pod borer, *Leucinodes orbonalis* causes a significant yield loss if not controlled properly. Spinotoram 25% WG, 0.4 g/L at two rates (110 g/Ha and 125 g/Ha), Flubendiamide 20% WG (360g/Ha) have been identified as potential insecticides for controlling brinjal shoot and pod borer. A pilot scale test at a farmer field will be carried out to confirm the results.

Technology Released

- Low cost spawns production technology for mushroom.
- Commercial production of oyster mushroom on paddy straw.
- Integrated pest management package for pumpkin with special emphasis to pumpkin yellowing virus disease management.

DEVELOPMENT

Seeds and Planting Material Production

Table 1.2.4: Seed and planting material production during 2014

Crop	Variety	Seed/Planting material type	Quantity kg
Bean	Gannoruwa bil	breeder	66.4
Luffa	Gannoruwa Ari	breeder	3.0
Mae	Plon Mae	breeder	6.0
	Gannoriwa hawari	breeder	6.0
Bitter Gourd	Matale Green	breeder	7.5
Cucumber	Kalpitiya white	breeder	7.0
	Champion	breeder	2.0
	R2	parental	6.6
Mushroom	Paddy straw	commercial	157 packets
	Oyster	commercial	547 packets
	Abalone	commercial	307 packets
Traditional vegetables		commercial	1200 kg

New Production Unit for Mushroom

A mushroom unit, a spawn production unit and a cropping house was developed at Pasyala research farm.

TECHNOLOGY DISSEMINATION

Special Programmes

Fruit fly Management in commercial level cultivations of guava and mango

An island wide programme was carried out to control fruit flies in commercial cultivations of guava and mango in Anuradhapura, Mathale, Puttalam, Jaffna, and Rathnapura districts and in 4 Mahaweli development zones. Field demonstrations were conducted in two commercial orchards per district and in Mahaweli zone. Training programmes were conducted for officers (extension and plant

quarantine) and for fruit growers in the selected areas. Awareness programmes were conducted for village level government field officers, Teachers, School children and farmers. Fruit collectors and several exporters in the Gampaha district were also trained. Five radio programmes were conducted and 5000 leaflets on the AW IPM package were distributed.

Radio programmes

- N.R.N. Silva - Soil test Based Fertilizer Recommendation, Kandurata Sewaya.
- Priyantha Weerasinghe - Chemical Fertilizers diversity and Uses. Sri Lanka Broadcasting Corporation.
- S. Ratnamalala - Water management in Home Garden Sri Lanka Broadcasting Corporation.

- S. Ekanayaka - Antioxidant properties of Vegetables Sri Lanka Broadcasting Corporation.
- S. Rathnamalala - Utilization and value addition of fruits and vegetables grown in home garden. Sri Lanka Broadcasting Corporation.
- S. Rathnamalala. New Technology for Home Garden. Kandurata Sewaya
- S. Rathnamalala - Ways of improving vegetable consumption. Rangiri Dambulu Sewaya
- S. Rathnamalala - Time Management in home garden. Sri Lanka Broadcasting Corporation.

Presentations

- Priyantha Weerasinghe. Fertilizer management in vegetable family farming. At Plant Genetic Resource Centre on International Soil Day, Department of Agriculture
- Sagarika Rathnamalla. Nutrients and increasing of vegetable production. At Export Agriculture Department.

Research Extension Dialogues

Participated at the following dialogues.

Table 1.2.5: Details of Research – Extension dialogues

Province	Discipline	No.
Central	Plant Pathology, Mushroom, vegetable cultivation, Soil fertility, Entomology	09
Western	Plant Pathology	01

In-service training programmes

- Officers attended 17 programmes as resource persons on various subjects.
- Officers attended as master trainers on Pest Risk analysis and Good Agricultural Practices.

Other trainings

Training opportunities were provided for the following institutes during the period under review under different subject areas.

Table 1.2.6: Details of trainings conducted

Institute	No. of Students
University of Kelaniya	06
Open University, Nawala	08
University of Sabaragamuwa	04
University of Peradeniya	08
University of Rajarata	01
University of Ruhuna	04
University of Uva Wellassa	02
University of Wayamba	01
Technical College, Dambulla	06
Sri Lanka Youth Farm, Batangala	03
Agriculture Training Institute, Naiwala	08

- No. of School children participated on Tissue culture lectures – 750
- One day training programs & advisory services Tissue culture
- Training Programme for officers at BASF pvt Ltd, Grain Elevators Pvt. Ltd., NADRO pvt Ltd on different aspects of Plant Pathology.
- Training programme for officers at Cargills Ceylon Ltd. on Soil Testing.

- Certificate course on oyster mushroom cultivation for 2126 fellows.
- Training on paddy straw mushroom cultivation and its spawn production for students at Open University and Sabaragamuwa University.
- Training on Plant breeding techniques for university undergraduates.
- Training on identification of hybrids and parental lines for Schools of Agriculture
- Training on tomato hybridization for technical staff of government seed farms.
- Training on hybrid cucumber seed production for the staff of seeds and planting material centre.
- Training on home gardening for farmers, students and technical officers.
- Training on insect pest management in Crop for undergraduate students and school children.
- Training farmers on organic farming.

Exhibitions conducted

Assistants were given to Island wide exhibitions conducted by various organizations by providing posters and technical information

- Thelijjawila “Govisathiya” – One Week
- Science Society – Kegalu Vidyalaya
- Bright International School- Kandy
- Seevali Kanishta Vidyalaya- Maldeniya
- Sarasavi Uyana Maha Vidyalaya-Kandy
- Seewali Maha Vidyalaya- Hindagala

Laboratory Analytical Services

Table 1.2.7: Laboratory analytical services conducted

Commodity	Purpose	No.
Soil	Soil test based recommendation	870
	Research analysis	1042
Compost	Analytical Service	155
Water	Analytical Service	17

Crop disease diagnosis and advisory service

Over 700 disease affected plant samples received through different sources were clinically tested for diagnosed. Necessary disease management advices were provided. 150 pest problems brought by the farmers were identified and necessary advices were provided.

Screening of exotic hybrids for pest and disease

59 cucurbits and 19 tomato hybrid seed samples imported were screened by ELISA test. Results revealed that all tested seed samples were free from seed born viruses. 25 exotic hybrid vegetables were evaluated for pest and disease resistance.

Seed potato health testing

Seventy consignments of seed potatoes imported from different countries were tested for pathogens. Diseases pertaining to all consignments were found to be below the permissible levels and thus recommended for release. Two consignments with high

incidence of common scab were recommended for rejection. Special instructions for storage were given for consignments having high incidence of *Geotrichum* spp. A consignment showed black scurf disease at marginal level was conditionally released.

CENTRAL LIBRARY

During period under review central library continued its functions by collecting, preserving and endowing the knowledge particularly in the field of Agriculture. In this circumstance it served all parties interested in the field of agriculture as its client base. During the period central library has purchased 04 new books, exchanged 50 journals. It has lent 300 books; received 65 inter library loans while 1800 had visited the library for seeking information.

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. During the period under review 41762 school children, 3062 teachers, 2632 farmers, 753 public servants, 244 university students, 106 foreigners and 6980 interested individuals were visited during 2014. 1686 numbers of “Kamath Bashawa” leaflets were sold.

Trainings received

- Ms. H.M.V.T. Welegama, Ms. H.M.P.P.S. Kumari and K.A.D.S.D. Kahandawa

Arachchi - Two days biotechnology training at FCRDI, Mahailuppallama

- Ms. H.M.V.T. Welegama, Ms. H.M.P.P.S. Kumari and K.A.D.S.D. Kahandawa Arachchi - One day training on statistical data analysis at PGIA. University of Peradeniya.
- Ms. H.M.V.T. Welegama, Ms. H.M.P.P.S. Kumari and K.A.D.S.D. Kahandawa Arachchi - Two days training on plant breeding at RRDI, Bathalahoda
- Ms. H.M.V.T. Welegama, Ms. H.M.P.P.S. Kumari - Seminar on Plant breeding, WUS, Makandura.
- Ms. H.M.V.T. Welegama -Workshop on Scientific Writing at PGRC, Department of Agriculture, Peradeniya.
- Ms. H.M.V.T. Welegama and Ms. H.M.P.P.S. Kumari - Workshop on Farmer participatory breeding programme at RRDI, Bathalahoda
- K.A.D.S.D. Kahandawa Arachchi - Technological essentials for quality seed production of annual food crops at PGIA, University of Peradeniya
- R.G.A.S. Rajapakshe - W.A.G.P. Weeraratne, W.A.R.T. Wickramaarachchi
- Workshop on plant defence on 2014-10-31 at PGIS
- W.A.G.P. Weerathna - Training workshop on molecular diagnostic 17-19 November, 2014 at AgBTC, Peradeniya Weeraratne, W.A.R.T. Wickramaarachchi
- R.G.A.S. Rajapakshe, W.A.G.P. Weeraratne, W.A.R.T. Wickramaarachchi - Practical training on plant pathological aspects from 15-16, December, 2014 at HORDI
- D. Galaniha - SAARC Pesticide information network training programme

– Faculty of Agriculture, University of Peradeniya, 23-27 June

- P. Ranaweera - Training on plant protection Two weeks

Visits abroad

- G.K.P. Manellanga - Seminar on Agriculture South Cooperation for officials of English Speaking Countries in Africa. 6th – 26th June 2014. China.
- H.C. Rambukkana - 2nd AFACI International Training Workshop on Germplasm Management System. 12th – 21st May. Korea.
- H.H.D. Fonseka - Ceremony for celebrating the relocation of RDA. 14th – 18th September. Korea.
- H.H.D. Fonseka - International Workshop on Conservation and Sustainable use of Genetic Resources. 4th March – 6th March. Japan
- H.H.D. Fonseka - 8th Meeting of the Governing Board of SAARC Agriculture Centre (SAC). 29th – 30th September. Bangladesh.
- H.H.D. Fonseka - Kick-off meeting of the project utilization of crop wild relatives in eggplant pre-breeding to adaption to climate change. 15th – 17th May. Spain
- H.H.D. Fonseka - Utilization of crop wild relatives of eggplant pre-breeding for adaptation to climate change. 11th – 12th December 2014. Ivory Coast.
- H.M.V.T. Welegama - Workshop on Vegetable Breeding. 15th – 19th December 2014. Vietnam
- H.P.D. Sumanasinghe - Construction and maintenance of web-based geographic information service platform for

developing countries. 14th – 27th October. China.

- P. Malathy - Mitigation of Climate Change for Asian Countries. 5th – 25th September. China.
- P. Weerasinghe - Construction of the Asian Network for Sustainable Organic Farming Technologies (ANSOFT). 1st – 5th July. Nepal.
- R.M.N. Dissanayake - KOPIA Training Programme for partner countries. 11th – 21st May. Korea.
- W. A. R. T. Wickramaarachchi - South Asia Agricultural Science and Technology Training Class and the Exchange and cooperation consortium for Agriculture Sciences and Technology (Yunnan) South Asia. 11th – 25th August. China.
- W.R.D.M.A.K. Wickramasinghe - Training on Hybrid cotton for developing countries of Asia. 1st – 30th August. China.

PLAN FOR 2015

- Crop improvement of Vegetables.
- Development of Pest and Disease management technology.
- Soil fertility management in vegetable crop cultivation.
- Status of metal contaminations in vegetable crops.
- Mush room production technology improvement.
- Foliage plant production technology development.
- Plant nutrient management in vegetable crops.

STAFF LIST

Designation	No.
Director (Actg.)	01
Additional Director (Actg.)	02
Deputy Director (Research)	01
Research Officer	17
Agriculture Officer	01
Administrative Officer	01
Senior Librarian	02
Programme Assistant (Agriculture)	09
Technical Assistant	01
Public Management Assistant	12
Farm Clerk	03
Agricultural Instructor	12
Research Assistant	13
Research Sub Assistant	10
Development Officer	02
KKS	01
Driver	08
Store man	01
Mechanist	04
Machine Operator	03
Carpenter	01
Electrician	01
Lawn Mover Operator/Grass Cutter	01
Land Mover Operator/Tractor	02
Water Pump Operator	01
Bee Demonstrator	01
Budder	01
Circuit Bungalow Keeper	01
Watcher	13
Sanitary Labourer	01
Unskilled Labouer	141
Total	268

1.2.1 FOOD RESEARCH UNIT (FRU) – GANNORUWA

The Food Research Unit (FRU) comes under the purview of Horticultural Crop Research and Development Institute (HORDI). FRU is primarily responsible for conducting research on post harvest technology and product development. Quality evaluation of samples

derived from crop improvement programmes is another responsibility of the unit. FRU performs collaborative programmes with non-government and private sector organizations on technology development transfer and use of food machineries.

BUDGET

Table 1.2.1.1: Annual budget - 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	300,000	295,130	98
Recurrent	2,057,250	1,995,116	97
Projects			
• Production of postharvest manual for Vegetable / Fruit – FRU (AFASI)	2,000,000	673,106	34
• Establishment of a food processing factory to enhance income of small scale farmers	8,400,000	4,158,230	50
Total	12,757,250	7,121,582	56

PROGRESS

RESEARCH

Product development

Sprouting changes the biochemical form of nutrients in grains. A technique was developed to make soybean sprouts in three days. Sprouted soybean was used to develop a ready to serve value added food and the product showed good palatability. This food can be included in children's diet.

Extruded products; 'Samaposha', Suwaposha', Mauposha are generally prepared using rice, corn soya and mung bean. Sesame seeds were included in the preparation of these products to

raise the iron content. It was revealed that the iron content can be increased by incorporating 20% sesame seeds into the mixture. It was also revealed that the addition of popped sesame to the flour mixture increased the palatability of Rotti, Pittu and Thosei. In addition, sesame included flour mixture produced products having good texture. Similar results were obtained with popped Kurakkan too.

A flour mixture was developed using Corn, Kurakkan and Soya flour for local food preparation. This composite flour mixture is rich in nutrient and having 10% more protein. Flour mixture also contains high contents of Calcium and Iron.

Pumpkin smoothie was developed. This drink is very palatable and rich in vitamins and minerals. Addition of yoghurt increased the nutritive value of the product. Results showed that one litre of drink could be produced at the cost of Rs 120.00.

A new mushroom based food flavour was developed. This is a non chemical based flavour and the product form is a powder. This can be used as a flavour enhancer of food items and also as a drink. A new mushroom based sausage was also developed and it was found that that the product could be stored for three months under freezing conditions. Both these products are being marketed by two private organizations.

Experiments conducted revealed that sago (Sauw) could be prepared by using cassava caasava flour and cassava starch. The cost of sago produced by using cassava flour is nearly 50% of the imported product present in the market. This technology can easily be used by the small scale producers.

Value added products of Rotti, Pittu and Konji were developed using Calabash gourd. All the products showed good palatability and high consumer preference.

Business Clinics

Table 1.2.1.2: Business clinics conducted during 2014

Institute	Discipline	No. of participants	Days
Kegalle – Ministry of youth affairs and skills development	Youth agriculture entrepreneurship development	50/ program	3
Industrial Development Board	Food processing techniques	18/ program	4
Provincial Agriculture Department- Monaragala	Food quality standards	35/ program	3
Export Development Board	Post harvest loss reduction of fruits and vegetables for export	60/ program	3

Technology was developed for canning raw mango. Raw mango can be kept for 6 months after canning. The use of osmotic dehydration technique for ripe Karthakolomban results the production of chewable mango slices which can be stored for 3 months easily.

Starch Properties

Starch of seven recommended Cassava (*Manihot esculenta* Crantz.) varieties (CARI 555, Kirikawadi, Shani, Suranimala, HORDI, Swarna, and MU 51) were isolated and evaluated for physicochemical parameters. The isolated starches are being evaluated to identify an alternative for corn starch which is totally being imported at present.

DEVELOPMENT

Technology dissemination

Television programs

K.H. Sarananda, Product development of sesame -2 programs, Sri Lanaka Rupavahini Corporation.

Radio programmes

K.H. Sarananda, Post harvest loss reduction of fruits, ‘Kandurata Sewaya’.

Trainings

In-service training programmes

- Officers attended as resource persons for 17 programmes on Post harvest technology, food processing and packaging.

Other trainings

Training opportunities were provided for following institutes during the period under review on post harvest technology and product development.

- University of Sabaragamuwa
- University of Peradeniya
- University of Uva wellassa
- University of Wayamba
- Technical College, HARDI
- Technical College, Aquinas
- Technical College, Kandy
- Agricultural Entrepreneurship Development and Information Service
- Vidatha Centres
- Ministry of Agriculture
- Chamber of Commerce
- Department of Industries
- Mahaweli Authority
- Department of Health
- Department of Education

The topics covered during these trainings were post harvest technology and food processing, rice , cereals and pulse based food products, processing of fruits and vegetables, milk based food products, soy based food products, food quality analysis and food processing and candied products, bites, pastes and bakery products.

Exhibitions

Food Research Unit participated at the following exhibitions. “Govisathiya”, “Deyata Kirula”, “Palathuru Dekma”, Bright International School, Kothmale Maha Vidyalaya, Department of Auyrveda.

Laboratory Analytical Service

Quality assurance testing was performed on following products during the period under review.

Table 1.2.1.3: Quality assurance tests performed

Product	Number
Vegetables	309
Fruits	81
Sweet potato	20
Spice powder	47
Flours	18
Processed products of fruits & Vegetables	93
Milk products	07
Bites	05
Soya products	07
Treacle & Bee honey	11

Local Trainings received

- Ms. D.N. Hettiarachi, reduction of postharvest losses of fruits and vegetables in market chain at HARTI, 4 days.
- Ms. Anusha Sagari, value added food production of fruits and vegetables at In-Service training institute, Gannoruwa, 5 days.
- Ms. Anusha Sagari, Mushroom production at HORDI, 1 day.
- Ms. H. M. V. T. Welegama, Ms. H.M.P.P.S. Kumari and K.A.D.S.D.Kahandawa Arachchi - Two

days biotechnology training at FCRDI, Mahailuppallama

Overseas trainings

- W.R.D.M.A.K. Wickramasinghe. Training on Hybrid cotton for developing countries of Asia. 1st – 30th August. China.
- D.N. Hettiarachchi, Analytical techniques used in nutrition, food safety and bio safety from 1 – 14th September, 2014, at ICRIS in India.
- S.M.A.C.U. Senarathne, Functions of genetic resources at faculty of Agriculture from 3 to 27th November in Yamaguchi University, Japan.

PLAN FOR 2015

- Preservation of fruit juices without additives as preservative.
- Development of technology for vacuum drying of fruits
- Determination of antioxidant levels and shelf life of organically grown fresh herbs
- Analysis of physico-chemical parameters & Value addition of Sweet potato and *Dioscorea* spp.
- Effect of dehydration of leafy vegetables on quality and palatability.

- Evaluation of bees honey according to geography and climatic conditions.
- Development of palatable food products from dragon fruit.
- Development of processed food products for Mango varieties using vacuum dehydration technology.
- Preparation of Instant nutritious pittu/ rotti mixtures
- Development of technology for frozen vegetables.

STAFF LIST

Designation	No.
Head	01
Research Officer	02
Programme Assistant (Agriculture)	01
Research Assistant	02
Agricultural Instructor	03
Development Officer	01
Research Sub Assistant	04
Public Management Assistant	02
Driver	02
Machine Operator	01
Electrician	01
Watcher	02
Unskilled Labourer	08
Total	30

1.2.2 REGIONAL AGRICULTURE 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 IU₂, IM₂, IM₃, WM₃, IL₂

and WM₃. The centre functions under the purview of HORDI, and it has a satellite station at Rahangala. In addition to research activities, the centre involves in many technology transfer and agricultural development activities 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 – 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
RARDC-Bandarawela			
Capital	3,359,750	525,335	16
Recurrent	12,399,600	10,349,788	83
Projects			
• ANSOFT	50,000	27,763	56
• NARP Bean	466,700	447,679	96
• NARP Potato	571,457	557,061	97
• NARP Banana	50,000	49,738	99
• NARP Floriculture	919,093	898,353	98
• Citrus fruit village	750,000	498,440	66
• KOPIA vegetable	300,000	270,683	90
• Seed potato	2,800,000	2,150,195	77
• NARP Citrus	200,000	163,678	82
• Seed potato production (Development of storage facilities for mini tubers)	1,200,000	1,100,000	92
• KOPIA- Soil fertility management	340,200	290,233	85
• Soil testing	500,000	468,089	94
• Hybrid Tomato	150,000	119,119	79

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
• NARP Citrus IPM	47,500	47,500	100
• KOPIA seed potato	443,400	339,960	77
• Fertilizer testing	40,000	12,321	31
ARS, Rahangala			
Capital	600,000	525,335	88
Recurrent	375,200	274,428	73
Projects			
• NARP Bean	200,000	189,927	95
• Fruit village	750,000	641,911	86
• NARP Citrus	200,000	161,959	81
• Seed potato	2,000,000	1,330,293	67
Total	28,712,900	21,439,788	80

PROGRESS

RESEARCH

Crop improvement

- Three different seed sets of “Capri” pole bean (Brown, Black and Nil) were collected from farmer fields and purification programme has been initiated.
- Under pole bean variety improvement programme, F₁ seeds were collected from back crosses made.
- Strawberry accessions that produce low number of runners were identified at ARS, Rahangala.
- Twenty pole bean accessions were collected and characterized at ARS, Rahangala

Agronomy

- A simplified nutrient film technique was identified for G₀ seed potato production.
- Breathable liner bag technology was introduced for storing of bell pepper fruits.

Use of bags helps to keep the fruits up to 3-4 weeks without decay and de greening.

- Studies revealed that cut G₀ seed potato tubers (2 to 4 pieces) performed equally well compare to the whole G₀ tuber.

Plant protection

- Chrysanthemum cultivars were screened against white rust (*Puccinia horiana*) disease and 12 immune cultivars, 19 highly resistant cultivars; one resistant cultivar, two moderately susceptible cultivars and 01 susceptible cultivar were identified.
- Evaluation of fungicides to control of white rust (*Puccinia horiana*) disease in chrysanthemum revealed that the disease can be controlled by using Pyraclostrobin 250 g/l EC applied at 07 days interval.
- Testing revealed that following agro chemicals were effective in controlling the following pest and disease problems.

Table 1.2.2.2: Effectiveness of agrochemicals tested

Disease/pest	Fungicide/Insecticide
Potato Late blight	Mancozeb 60% + Dimethomorph 9% WP
Bean rust and angular leaf spot	<ul style="list-style-type: none"> • New pre mixture, Azoxystrobin + Tebuconazole 120g/l + 200g/l • Flutriafol 250 g/l SC • Tebuconazole 25 % WDG • Triforine 190 g/l DC
Damping off of nursery plants	Hymexazole 360 g/l
Armored scales in rose	5% soap solution
Cabbage leaf eating caterpillars	Virtako40 WG at 0.25 g/l
Gerbera mites	Milbemectin 1 EC (1.25 ml/l, 3.75ml/l)
Tomato pests (Tomato fruit borer, Whiteflies, Aphids)	Virtako 40 WG at 1.9 g/16 L

- Validation of selected potato late blight forecasting models in UCIZ was done. Fungicide application frequency can be reduced using Hyre model (10 days accumulative rainfall higher or equal 30mm and 5 day average temperature higher than 20°C) prediction.
- Preliminary study revealed that leaves of *Cymbopogon nardus* (Mana) and *Cucurbita maxima* (Pumpkin) showed repellent activity against potato tuber moth.

- Results showed that Cabbage-leeks intercropping system assist in successfully managing cabbage leaf eating caterpillars.
- Insecticides namely Spinetoram 25% WG (4g/16 l), Flubendiamide 20% WG (4g/ 16 l), Flubendiamide 24% WG (8g/ 16 l) and Pyridalyl 10% EC (8ml/ 16 l) were evaluated against tomato fruit borer. All chemicals including Spinetoram 25% WG were equally effective as already recommended product, Chlorantraniliprole 200g/l (3ml/16 l).
- Novaluron 10% EC (1ml/1L) was re-tested and results showed no deterioration of performances in controlling tomato fruit borer.

Horticulture

- One promising line of purple color passion fruit variety was identified for UCIZ and further studies are progressing.
- 100 Ehime mandarin plants were field established to evaluate the performance at high density planting.

Tissue Culture

- Sago and Kithul flour were found to be low cost gelling agents for in-vitro propagation of potato, experiment will be continued.
- Two promising lines of Gerbera were identified through seed culture and polyploidy mutation. Studies are in progress.

Floriculture

- Gibberelic acid can be successfully used to increase flower production and quality of Chrysanthemum.
- Provision of artificial light from 10 p.m. to 2 a.m. will delay Chrysanthemum flowering and increase stem length.
- Effect of Plant Growth Regulators BAP (6-Benzylaminopurine) and GA3 (Gibberellic acid) on flower production and quality of Roses – 1 was completed successfully. Studies are in progress to test the efficacy of other PGRs

Soil Science

- Five commercially available foliar fertilizers were tested to evaluate their effect on growth and yield of up country vegetables and results revealed that there is no positive effect due to the application of foliar fertilizers.
- Number of tubers in hydroponically grown potatoes can be increased through pH alteration. Maintenance of solution pH 3.5 for 8 hours at 5 and 7 weeks after planting gave significantly higher number of tubers compared to constant pH at 5.5.
- The most appropriate phosphorus analysis method for up country soils was identified as the Bray I method based on nutrient uptake and plant dry matter content.
- A quick and simple colorimetric method was developed to determine site specific lime requirement for up country soils.

DEVELOPMENT

Seeds and Planting Material

Production

Table 1.2.2.3: Seed and planting material production during 2014

Seed/planting Material type	Crop	Variety	Quantity
Breeder	Pole bean	Bandarwela Green	42kg
	Pole bean	Balangoda nil	80kg
Parental seed material of vat.Bathiya	Tomato	HT-2123	0.72kg
	Carrot	Lanka carrot	0.195kg
G ₀	Potato	Granola	43000 tubers
G ₁	Potato	Granola	700kg
Certified or commercial	Mandarin	Rahangala	7500 plants
	Mandarin	Ehime	4500 plants
Tissue culture	Potato	Granola	28751 plants
	Gerbera		5464 plants
	Pear		1500 plants
Mother plants	Mandarin	Ehime	100 plants

Analytical services

- Soil test based fertilizer recommendations were given for 240 farmer samples and 390 research fields samples

Technology transfer

- RARDC officers were 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 of different categories (farmers, university students, school children, and officers from other government organizations) on various agricultural activities, seed potato production in simple hydroponic technique, 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.
- A field day was conducted to demonstrate proper fertilizer practices in up country vegetables
- Training programmes were conducted for more than 500 personnel belong in school and other government organizations, private organizations and farmers on safe use of agro chemicals, bee keeping and grafting of fruit crops.

In service training programmes

- Pre-seasonal training – Uva Province on
- Current trends in postharvest handling of cut gerbera and chrysanthemum
- Pre-seasonal training – Sabaragamuwa Province on Gerbera and Anthurium cultivation

Visits Abroad

- Ms.R.M.N. Dissanayake on protected vegetable production technology and Ms. J.M.D.D.E. Jayamanne and Ms. T.K.A.I. Hadji on Seed potato production technology in South Korea.

- Ms. G.D.G. Chaturani on International Agriculture Biotechnology program at Michigan State University, USA.
- Mr. K.P. Somachandra on Analysis of the function of genetic resources in Yamaguchi University, Japan.
- Mr. P.D. Abeythilakarathne on Mutation breeding in Japan.

Trainings received

- Seven research officers participated at two training programmes on experimental design and data analysis at ISTI Gannoruwa and PGIA, University of Peradeniya
- Two officers participated at a short course on plant protection techniques at PGIA, University of Peradeniya
- Five officers participated at a training on plant disease diagnosis at ISTI, Gannoruwa

PLAN FOR 2015

Crop Improvement

- Development and improvement of vegetables potato and floriculture crops.

Agronomy

- Development of techniques to enhance the vegetable production in poly-tunnels.
- Development and improvement of seed potato production and storage techniques.
- Productivity enhancement studies in mandarin strawberry and floriculture crops.

- Development of technologies for Chrysanthemum culture

Plant protection

- Studies on chemical and non-chemical methods for managing diseases and pests in vegetables, potato and floricultural crops and validation of disease forecasting models.

Soil Science

- Development of nutrient management package for seed potato and citrus
- Testing of different fertilizing practices on up country vegetables.
- Development of methodologies for soil fertility improvement.

STAFF LIST

Designation	No.
Deputy Director (Research)	01
Research Officer	12
Economist's Assistant	01
Programme Assistant (Agriculture)	07
Development Officer	02
Research Assistant	09
Agricultural Instructor	06
Research Sub Assistant	03
Technical Assistant (Extension)	01
Administrative Officer	01
Public Management Assistant	11
KKS	02
Driver	06
Farm Clerk	02
Store Keeper	01
Technician	01
Mechanic	01
Backhoe/ Earth Moving Machine Operator	02
Budder	02
Mason	01
Carpenter	01
Watcher	14
Circuit Bungalow Keeper	01
Permanent Labourer	87
Contract Labourer	42
Total	217

1.2.3 REGIONAL AGRICULTURAL RESEARCH AND DEVELOPMENT CENTRE (RARDC) - MAKANDURA

The Regional Agriculture Research and Development Centre (RARDC), Makandura was established in 1980 to cater the agricultural research needs of the area under coconut cultivation including the Low Country Intermediate Zone (IL1 and IL3), Low Country Wet Zone (WL2 and WL3) and Mid Country Wet Zone (WM3) in the Kunegala, Gampaha and Puttalam districts.

The satellite stations; Agriculture Research Station (ARS) Kalpitiya, Adaptive Research Unit (ARU) Walpita, Thabbowa, Wariyapola

and Inginititiya; strengthen the research network by handling location specific research programs. The research programs mainly focus on crop improvement and development of varieties, development of crop management technology and the multiplication of nucleus planting materials. The RARDC Makandura comes under the purview of the Horticulture Crops research and Development Institute, Gannoruwa collaborates with national and international research and development institute and universities to cater for the agriculture development of the country.

BUDGET

Table 1.2.3.1: Annual budget – 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	7,233,519	2,532,801	35
Recurrent	9,486,456	7,253,244	24
Projects			
• Increasing availability of popular traditional vegetable seeds	50,000	45,000	90
Total	16,769,975	9,831,045	59

PROGRESS

RESEARCH

CROP IMPROVEMENT

Pumpkin

Field evaluation was conducted for 15 local pumpkin accessions. Mk 74, Mk 60 and SPK 1 selected as pipe line varieties. National Co-ordinated Varietal Trials (NCVT) were

conducted at 3 locations for 4 entries (Vilachchi, Ruhunu, Line B and check variety Arjuna). Varieties performed well at Mahailuppallama and trial was not conducted at Angunakolapellessa due to water shortage in last Yala 2014.

Variety adaptability trials (VAT) were conducted for 4 entries (Vilachchi, Ruhunu, Line B and check variety Arjuna). Variety Vilachchi and line B performed well and

variety Ruhuna was attacked by viruses at early stage. Farmers preferred variety Vilachchi at Rambe.

Roots and Tuber crops

Germplasm collection and evaluation

Seven varieties of Cassava, eleven varieties Sweet Potato, eighteen cultivars of *Dioscorea*, two Ratala cultivars and 'Isuru Kiri Ala' variety were maintained as a collection and for future studies.

National Coordinated Variety Trial in Cassava

The trial was established and maintained. Data collection is in progress.

Pineapple

Suitable time period for pineapple pollination

Crosses were made at different time intervals to identify the best time for pollination. The highest percentage of number of filled seeds (113.6%) and seed weight (76.43mg) was observed in crosses made during 8.30am-9.30am.

Suitable medium for pineapple seed germination

Sterilized wet sand was identified as the most appropriate germination medium for pineapple seed germination. Wet sand showed the highest germination percentage (92%), least number of days for germination.

Fruit quality of pineapple hybrids (H3 and H4)

H4 x Mauritius back cross population was evaluated for spiny character. Spineless character was observed in fifty percent of the population.

Pomegranate

Hybridization Program of Pomegranate

Desirable fruit characters (Red arils, Soft seeded and Orange red peel) were found in F₁ (AxD and CxD) hybrids. F₁ and F₂ seeds were collected for further evaluation.

Improvement Programme of Pomegranate Cultivar - Kalpitiya red

Two plants were selected with desirable traits (Surface appearance (red group), aril color and soft seeded) for further improvement.

Banana

National Coordinated Variety Trial Banana - Seeni kesel

Second harvest was severely affected prevailed drought, and good suckers were maintained for collecting 2nd harvest yield data.

Banana Germplasm collection and Evaluation

Thirty two varieties of banana were maintained as a DOA recommendation for future studies and conservation. Selected one promising Abul kesel cultivar and multiplication of Ambul kesel selection and data collection has been continuing.

CROP MANAGEMENT

Off Season Fruit Production of Dragon Fruit (*Hylocereus Undatus*)

Off season dragon fruit production was achieved by using artificial lighting (20 watts CFL bulbs) during 7.00 pm to 11.00 pm period in short day periods (December to April).

Enhancement of average fruit yield of Pineapple

Applicability of different farmer practices on fertilizer and PGR applications were studied and data collection is in progress.

Root and Tuber

Year round planting material production in Cassava

Significantly higher quantity of planting materials (10.6 m per plant and 4.225 kg per plant) were produced compared to the routine practice by maintaining 5 branches at 1m cutting height.

FLORICULTURE

Ex situ* Germplasm collection and utilization of *Anthurium andraeanum

Crop was maintained under 85% shaded condition and reciprocal crosses were made between the best quality group and the medium quality group to develop novel cultivars.

SOIL AND PLANT NUTRITION

Use of alternative plant nutrient sources for red onion

Application of compost tea with 75% of DOA chemical fertilizer recommendation + 10 t/ha compost for red onion has shown significant yield increase (29%) compared to the current DOA recommendation with or without manure.

Nitrogen and Potassium response of pineapple

The use of different N and K combinations as foliar applications are being tested in order to assess the yield and fruit quality of pineapple in LCIZ. Trial is progressing.

SOIL MICROBIOLOGY

Pure cultures of rhizosphere microorganisms from eight selected rice varieties including traditional and improved, were isolated to compare the variability of microbial population density especially N fixing microbes.

ENTOMOLOGY

Unidentified Pest in *Annona* and its Management

A pest reported mostly in *Annona* spp species causing a significant yield loss or resulting tree death was identified as *Indarbela* spp belongs to Family – Metarbedelidae with the assistance of CABI (Commonwealth Agricultural Bureaux Institute). Further studies are needed to identify the pest at species level.

Spatial and temporal distribution of scale insects (*Ceroplastis* spp) in

Mango

Two overlapping peaks in populations were observed during February and September with the variations in time, climatic factors and the cultivars of mango. Control measures should be taken during the peak periods to control the scale insects.

Control measures for scale insects (*Ceroplastis* spp)

Imidacloprid 200 g/l SL was the most effective insecticide in controlling scale insects. Thiamethoxan 25% WG, Buorofezin 10% WP and Mineral oil was not that effective. However, it was shown that the Imidochlopride should be applied when the pests are at young stages (Nymphal I & II) for better results.

Natural enemies of mango scale insects (*Ceroplastis* spp)

A spider, a weevil predator, coccinellid beetles and two other parasitoids as prominent natural enemies of scale insects was identified.

New miticide for Brinjal

A new miticide Pyredabin 20% WP was tested with two recommended miticides namely, Abamactin 18g/l EC and Sulphur 80% WP against the red spider mite (*Tetranychus urticae* Koch) in brinjal. It was observed that all three were effective.

Bio efficacy of insecticides on

Pineapple Mealy bug

A field trial was established to find out the bio efficacy of Profenofos and Acetamiprid 200 SP (for pilot testing) on controlling of pineapple mealy bug. Data collection is in progress.

PATHOLOGY AND MUSHROOM

A new insect proof cladding material for oyster mushroom (*Pleurotus ostreatus*) growing houses

The adaptability and the suitability of a new cladding material were compared with the existing mushroom growing house under similar environmental conditions. The new cladding material used is TYVEK which is a very thin material with many micro holes. These holes facilitate easy exchange of air. New cladding material did not affect the mushroom yield. However, pest population was zero under new growing house condition compared to the existing growing house. Hence, the new insect proof cladding material is a good solution for insect pest problems in the mushroom cultivation.

A new edible mushroom

Naturally grown mushroom of Sri Lankan origin belongs to genus *Calocybe*, was tested with milky mushroom. The new mushroom showed a higher growth rate and yield compared to the milky mushroom. It has been planned to submit the line for releasing committee.

Cultivation of *Ganoderma lucidum* on

Saw dust and log

Locally available rubber logs, mango, rubber and lunumidella saw dusts could successfully be used as the main raw materials as the substrate for ganoderma cultivation. Further experiments will be needed to develop a cultivation package.

Usage of non-chemical method to control disease in Capsicum

Trichoderma and compost tea were tested to control disease in vegetables. Capsicum (HYV) and Brinjall (Amanda) were used as test crops. Compost tea (level 01), compost tea (level 02), trichoderma and daconil (control) were used as treatments. No significant differences between treatments were observed. Experiment will be continuing.

DEVELOPMENT

- Drainage was improved in five ha of land and pineapple and banana were established for planting material production.
- Circuit Bungalow was renovated. Floor was tiled and wash room doors and broken windows were replaced.
- Renovated 1.5 km tar roads and gravel roads within the research premises
- Rehabilitated 2 ha of coconut land. Palms were replanted in 2 ha and new pineapple cultivation was established as an intercrop.
- Installed surface irrigation system in developed land.
- 12,000 pineapple suckers were established under the programme for development of

fruit village and maintained for sucker production.

- Installed an evaporative cooling system using mist in net house used for floriculture purpose.
- Soil thermometers, Stevenson box and Evaporation tank at the agro meteorology unit were replaced with new instruments.
- Rehabilitation of plant pathology laboratory –Tilled the floor, Partitioned and installed new lab cupboards.
- A model growing house was constructed for oyster mushroom at the research center
- New auditorium was constructed for training purposes.
- Under the – Organic Fertilizer Production and usage project following achievements were made.
 - Production of 300 mt of compost.
 - Distribution of 16,387 inoculum bags of 5 kg each
 - Distribution of 150, 220 leaflets on composting and related subjects.
 - Training 7607 personal on compost making.
 - Participation at 4 exhibitions.

Technology dissemination

- A field day was conducted in Kuliyaipitiya farm on 2014-08-06 with Korean mushroom scientist for the mushroom growers.
- Field visits were made with two Korean extension officers in Gampaha and Kurunegala districts and during these visits farmers were exposed for the

Korean technology on mushroom production.

- Farmer participatory awareness programmes were done for organic

farmers with the help of Provincial Department of agriculture (NWP) under the ANSOFT project.

Training programmes

Table 1.2.3.2: Training programmes conducted during 2014

Title	No. of programmes	No. of participants	No. of advisory programmes
Pineapples	15	400	20
Tissue culture	05	50	03
Banana	10	320	21
Dragon Fruit	07	260	24
Vegetable	15	300	18
Home garden	20	420	32
Soil & Plant nutrition	03	63	24
Root & Tuber	08	455	15
Floriculture	15	360	20
Mushroom	17	347	36
Entomology	10	190	10
Compost	117	7607	150
Organic Farming	01		

Radio and TV programmes

- KOPIA activities on mushroom development in Sri Lanka, “Govibimata Arunalu”.
- Compost tea production and Successful Organic farmer in “Mihikatha Dinuwo”.
- Govithenata Peyak radio programme on “Sarthaka kola lawalu wagawak sadaha upades”
- “Govithenata Peyak” radio programme on “Annasi wagawe nawa bhawitha”
- Delivered voice cuts, for radio on “Dragon fruit pruning, Management of

pomegranate tree for preventing Anthracnose and on Compost tea”

- Delivered voice cut on “Mitimurunga Wagawa”
- TV programme on compost tea production 17/08/2014, “Govi Bimata Arunalu”
- TV programme on successful organic farmer 26/08/2014, “Mihikatha Dinuwo”
- 03 Radio Programs and 05 TV Programs were conducted on compost production and utilization

Seed and Planting material production

Table 1.2.3.3: Planting material produced during 2014

Crop	Type	Production
Dragon Fruit	Commercial	500 plants
Banana	Commercial	500 plants 350 TC
Pineapple	Commercial	12000 suckers 5000 TC
Vegetables	Commercial	Red mae-60 k
Anthurium	Commercial	1000 plants
Idda	Commercial	100 plants
Mushroom	Commercial	300
Cassava	Commercial	300 meters
Sweet potato	Commercial	20 kg

Breeder seeds and Nucleus planting materials

Table 1.2.3.4: Breeder seeds and nucleus planting material produced during 2014

Crop	Variety	Quantity (kg)
Snake Gourd	TA 2	5.3 kg
Bitter Gourd	Thinnaweli white	4.0 kg
Cucumber	LY 58	1.5 kg
Pumpkin	Villacchiya	3.0 kg

Samples Tested

- 332 soil samples, 83 compost samples, 05 water samples and 74 plant samples were analyzed by the Soil and Plant Nutrition Division.

Trainings received

- K.A.J.C. Premawardhana and S.A.S.M. Kumari - Training on experimental designs at PGIA 28-30 April 2014
- K.A.J.C. Premawardhana - Training on plant protection by CARP and PGIA.
- B.A.N.K. Balasooriya - Five local trainings on vegetable breeding and seed production.

Visits abroad

- S.A.S.M. Kumari on “International Training course on in vitro and cryopreservation for conservation of PGR: Current methods and technique” - 17 - 28 February 2014 at NBPGR, New Delhi, India.
- D.M.P.S. Dissanayake South Asian Organic Leadership course 2014 International Federation of Organic Agriculture Movement (IFOAM) ; 23/03/2014 to 02/04/2014 in Sri Lanka and 02/11/2014 to 09/11/2014 in Kochin, India.
- P. Rajapakse on mushroom cultivation at Mushroom research institute, Korea; 24 March 2014 to 05 April 2014.

Varieties Released

- Two Anthurium varieties namely “Lanka Kumari” and “Lanka Beauty” was released
- One Idda variety– M2 line was released.

Seminars

- Importance of soil testing and correct nutrient management practices” suppliers to Cargills collecting centers at Kalpitiya and Wattala.
- Use of alternative plant nutrient sources – compost tea for sustainable agriculture. Soil Science Society of Sri Lanka, RARDC, Makandura.
- Efficiency of controlling root knot nematodes using *Trichoderma* enriched compost, International conference of organic Agriculture - Biofach exhibition at Kerala, India.
- Seminars on mushroom Mr. Rajapakse at Horticulture Research and Development Institute, Gannoruwa

STAFF LIST

Designation	No.
Deputy Director (Research)	01
Research Officer	06
Administrative Officer	01
Agriculture Monitoring Officer	02
Programme Assistant (Agriculture)	01
Economics Assistant	01
Public Management Assistant	07
Agricultural Instructor	14
Research Assistant	07
Development Officer	03
Earth Mover Operator	02
Watcher	05
Sanitary Labourer	01
Unskilled Labourer	70
Total	121

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

Agricultural Research and Development Centre located at Sita Eliya in Nuwara Eliya District is the main Potato Research and Development Centre of the country. Hence its research and development activities are mainly focused on Potato. In addition, the center deals with the up country vegetable crops and also on temperate fruit crops and flowers.

It handles research programmes on crop improvement, agronomic crop management and pest and disease management.

Development of soil management practices for Nuwara Eliya region is one of the prime research focuses of the centre. Centre also engages in programs to up lift the status of quality and quantity of seed potato production, production of planting materials of strawberry and some ornamentals. Agriculture Research and Development Centre, Seeta Eliya comes under the purview of the Horticultural Crop Research and Development Institute at Gannoruwa.

BUDGET

Table 1.2.4.1: Annual Budget - 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	2,898,085	2,534,930	87
Recurrent	8,433,358	7,356,762	87
Projects			
• Improvement of seed potato production technology (NARP)	1,123,865	876,660	78
• Development of new potato varieties for local conditions (NARP)	733,370	345,501	86
• Development Of Local Seed Potato Production	10,000,000	4,965,080	53
• Organic Fertilizer Programme	500,000	232,281	46
• Vegetable Cultivation Technology (KOPIA)	300,000	173,801	58
• Soil Fertility Management - (KOPIA)	195,700	103,021	45
• Mushroom (KOPIA)	747,683	272,967	37
• Seed Potato (KOPIA)	3,066,340	662,972	22
Total	27,998,401	17,523,976	63

PROGRESS

RESEARCH

Agronomy

- Effect of planting method and spacing was evaluated for pre basic seeds of variety Golden Star. Planting on beds gave higher seed tuber yield than planting on ridge and furrows. Experiments are in progress.
- Evaluated the effect of inter and intra row spacing on seed yield of consumption potato for variety Golden Star. Further experimentation on this aspect will be continued to arrive at a conclusion.
- Compared the growth and yield of tissue cultured potato plants and plants obtained from minitubers grown in aeroponic system for var. Granola and Golden Star. When considered the yield, tissue cultured plants of variety Golden Star gave higher yield than the mini tuber plants and in variety Granola tissue cultured and mini tuber plants gave comparatively same yield.
- Evaluated the feasibility of using micro tubers of variety Granola for the production of pre basic seeds. Results showed that micro tubers can be used for the production of pre basic seeds of potato in the aeroponic system.

Crop Improvement

- Four locally developed potato lines (M-18, 19, 01-12-10 and 01-09-05) were evaluated under NCVT in researcher managed conditions and 2 of the lines (19 and 01-09-05) gave significantly higher yield. Experiment is in progress to

monitor the performance under farmer managed condition.

- Five locally developed potato lines (01-11-01, 99-25, 01-10-01, 01-08-15 and A-17) were established under NCVT under researcher managed conditions. Experiments are in progress.
- Identified 13 locally developed potato lines from 32 lines to develop heat tolerant varieties for non-traditional potato growing areas (Kalpitiya and Jaffna), based on yield and tuber characters.
- Identified 11 locally developed lines from 35 lines to develop high yielding potato varieties for Up Country Wet Zone.
- Evaluated 8 locally developed lines under AMYT.
- Evaluated 10 locally developed lines under MYT.
- Identified high yielding five exotic carrot varieties, two cabbage varieties and two cauliflower varieties having tolerance/resistance to pest & disease and quality for in Up Country Wet Zone.

Tissue Culture

- Medium composition & duration of photoperiods were tested to improve quality & quantity of Potato micro tuber production. It was found that Murashige & Skoog (MS) medium+ 4 mg/l 6-Benzyl Amino Purine (BAP) +120 g/l sugar as the best medium. The best photoperiod identified was 16 hr light + 8 hr dark per day for a period of one month followed by two months diffuse light.
- Hardening technique was developed for direct planting of *In-vitro* Potato plants (in

Albert solution) aeroponic and hydroponic system.

- F₁ generation was obtained from a cross between strawberry varieties Chandler X Festiva to produce new hybrid straw berry variety.

Entomology

- Efficacy of Spinetoram 25 WG was tested for the management of diamond-back moth (*Plutella xylostella*) in cabbage. The concentration of 2.5 g/10l was recommended at the rate of 80-50 g/ha.
- Bio-efficacy of Pyridalyl EC (new molecule) & Indoxacarb SC (New Formulation) were evaluated for Cabbage Caterpillar Complex (DBM). 20 g/10l Pyridalyl EC was recommended at the rate of 640-1200 g/ha and 4 ml/10l Indoxacarb SC was recommended at the rate of 160-300 ml/ha.
- Bio-efficacy of Pirimiphos methyl 2D (Dustable powder) was evaluated for the control of Potato tuber moth (PTM) in seed potatoes. It is recommended at the rate of 600g/100kg of seed potatoes was recommended.
- Clothianidin 16% SG was evaluated against sucking pest complex in potato and 6g/16l was recommended.
- Experiment was conducted to test chemicals for re-registration purpose. Tiamethoxam 25%WG found to be effective for the control of Green Peach Aphids at dilution of 2.5g of formulated product /10 L water. The dilution of 5ml formulated product/10L water was effective for the Imidacloprid 200g/1SL to control Thrips in potato.

Plant Pathology

- The new fungicides Azoxystrobin+Tebuconazole 2.5 ml/L & 3.0 ml/L were screened against Potato Late blight. The new fungicide effectively controlled the late blight of potato and the controlling effect was similar to Ridomil (Metalaxyl 4% + Mancozeb 68%) @ 2.50 g under field conditions.
- Efficacy of Azoxystrobin 25% SC (1 ml/L), from new source was tested under farmers' field conditions (Pilot scale test). The chemical was effective for the control of the late blight of potato under farmer field conditions.
- Mancozeb from different sources were tested against the late blight of potato. All the tested sources were equally effective against the late blight of potato.
- Screened 12 new commercial potato varieties. YP-04-80 and Mariska were selected for further evaluation based on the late blight tolerance and yield.
- 18 new commercial potato varieties were screened. Varieties namely, YP-7-611, Ludmila & Carolus were selected for further evaluation based on the late blight tolerance and yield.
- New potato breeding lines 01-12-10, 19 and 1-09-05 were found to be tolerant to late blight and gave higher yield under sprayed conditions. These lines were selected for further evaluation.

Soil Science

- An experiment was conducted to compare the formulated four nutrient solutions by the Department of

Agriculture with commercially available Albert's solutions for mini tuber production. Results showed that alternate application of locally prepared nutrient solutions performed better under hydroponic system.

- Experiment was conducted to find out the efficacy of NANO urea fertilizers in potato cultivation. Preliminary results showed promising results. Experiments are in progress .
- Potassium response study was conducted for Potato it was observed that there was no response observed for high doses of potassium in UCWZ conditions. Recommended rate gave the highest yield.

DEVELOPMENT

- Potato mini tuber production- 0.2 million pre basic seeds (G₀) were produced using Hydroponic, Aeroponic and Geoponic systems and 215,500 of pre basic seeds (G₀) were issued to farmers for production of G₁ seed tubers.
- 16,898 numbers of *in-vitro* plantlets of variety Granola were issued for formal seed potato production programme. Further 3,808 of Granola, 60 of Golden Star, 10 of Raja and 10 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.
- 3388 numbers of *in-vitro* strawberry plantlets and 2634 numbers of *in-vitro* derived planting materials were issued for private farmers.

- 3721 numbers of *in-vitro* strawberry plantlets, 4503 Baby's breath, 484 Madonna lily, 101 Grebera, 315 Limonium and 1396 Chrysanthemum, 161 *Stacticein-vitro* plantlets were produced to fulfill the demand of growers.
- 520 soil samples were analyzed for Potato Cyst Nematode and reports were sent to government seed potato farms.
- 880 number of parasite of leaf minor (*Diglypus isaea*) were distributed among the pollytunnels.
- 642 soil samples were tested for the presence of Bacterial Wilt.
- 38 potato plant samples were indexed for PLRV, PVY, PVX, PVS, PVM and PVA. Samples were collected from different phases of seed production, ie. *In-vitro*, Pre-basic, basic seed potato and farmer fields population.
- Testing of soil samples (pH - 443, EC - 347, Phosphorus (P) - 347 and Potash (K) - 347, Organic Matter 252).
- 33 plant samples received for disease diagnosis and given recommendations
- 3.7Kg of Lanka Ball radish breeder seeds were produced.

Visits abroad

- Vegetables for sustainable development AVRDC International, Thailand

Training

- Four B.Sc. undergraduates completed final year specialization projects on Tissue Culture and Agronomy.
- One B.Sc. undergraduate and five students from National apprentice and Industrial

Training Authority underwent their industrial training.

- 214 university students, 248 Agriculture School students, 1322 School students, 360 Agriculture related officers and 100 Farmers were trained on potato cultivation, 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 2015

Agronomy

- Development and improvement of the crop management practices ensuring the efficient use of resources and increasing productivity.
- Development and improvement the technology to enhance the potato seed tuber productivity.

Crop Improvement

- Identification. Improvement and development of potato varieties for up country region.
- Identification. Improvement and development of potato varieties for non-traditional potato growing areas.
- Identification development and improvement of heat tolerant potato varieties.
- Identification, Improvement and Development of exotic vegetable varieties.

Plant Protection

- Development and Improvement of Plant Protection measures for Potato and exotic vegetables.
- Monitoring of the Potato Cyst Nematode population and Bacterial wilt disease development.
- Development and improvement of integrated pest and disease management

STAFF LIST

Designation	No.
Deputy Director (Research)	01
Research Officer	06
Administrative Officer	01
Agriculture Monitoring Officer	01
Research Assistant	04
Agricultural Instructor	04
Public Management Assistant	04
Farm Clerk	01
Driver	03
Research Sub Assistant	02
Earth Mover Operator	01
Nursery Man	01
Watcher	06
Labourer	35
Labourer (Contract)	13
Total	83

1.2.5 AGRICULTURE RESEARCH STATION (ARS) - TELIJJAWILA

Agriculture Research Station, Telijjawila, function under the purview of HORDI, Gannoruwa. Research and Development activities at ARS, Telijjawila are mainly focused on developing and disseminating technologies pertaining to productivity improvement of vegetables, root and tuber crops, fruits and mushrooms. 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 - 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Recurrent	5,908,900	5,805,729	98
Capital	1,868,000	1,867,942	100
Projects			
• NARP - In-vitro mutagenesis of banana for <i>Fusarium</i> wilt	301,981	298,752	99
• NARP" (Mushroom) Programme	651,461	630,995	97
• KOPIA Mushroom project	909,603	834,904	92
• Hybrid vegetable development project	400,000	128,630	32
• Seed and planting material production (root and Tuber crops)	300,000	285,000	95
• Compost production	500,000	470,027	94
Total	10,839,945	10,321,980	95

PROGRESS

RESEARCH

Plant Breeding

Chilli

Germplasm collection of traditional chilli (*Capsicum Chinese*) was continued. Lines

were multiplied for further evaluation and eight better lines were selected for self pollination.

Mae

NCVT Mae programme was completed and second season to be continue to find the better lines. Six vegetable cow pea lines were

collected and seed multiplication was completed.

Brinjal

NCVT brinjal (Hybrid) program was completed. EGH 08 and EGH 10 lines and variety EGH05 performed better for the region. Seed multiplication and purification was started in six brinjal lines collected from Hambantota district.

Sweet Potato

Fourteen sweet potato lines were evaluated and line 199076-1, 199062-1, 440262-1 and variety Dawala were performed better for Nilwala Ganga problem soils. Further evaluation is in progress.

Mushroom

A promising growth substrate using paddy husk char was formulated for two fold yield increase in mushrooms. Further studies are in progress. Rove beetle (*Gyrophana* spp) has been identified as the major pest of oyster mushrooms in the southern region of Sri Lanka. Crude protein, fat and ash content of the cultivated oyster mushrooms were measured to determine the nutritional profiles. EC₅₀ values were analyzed to study the antioxidant properties. Oyster mushroom derived sandwich spread was also developed.

Tissue Culture and Biotechnology

In-vitro multiplication of banana shoots (variety Agra) was carried out in modified Murashige and Skoog (MS) medium with 4mg/l BAP and 2mg/l IAA. Multiplied shoot tips were treated in different concentrations of Ethyl Methane Sulphonate (EMS) alone with

1, 2 and 3 hrs of incubation periods to identify a suitable dosage. Depending on the growth and multiplication parameters, 1% of EMS with 3 hrs incubation period was identified as the most suitable dosage for mass treatment of shoot tips. 500 nos. of shoot tips were treated with the identified dosage (1% EMS+3 hrs. incubation) and multiplied *in-vitro*.

Floriculture

It was found that Baby's breath (*Gypsophila paniculata*) a popular floricultural species widely used as "filler" in floral arrangements can be successfully grown in ploy tunnels in Low Country Wet Zone.

Soil Science

Experiments were started to identify suitable crop varieties for 'Sorjan cultivation system' in Nilwala river flood protection scheme. Adaptability testing of existing "ma wee" (traditional rice) on abundant rice fields on Nilwala flood protection scheme and evaluation of different crop establishment methods of Nilwala problem soil area are in progress.

DEVELOPMENT

- A new conference hall and a mushroom spawn laboratory were constructed.
- Measures were taken to improve the irrigation facilities, access roads and to establish a weather station.
- A program was started to cultivate an extent of 200 acres in abandoned paddy lands in Nilwala Ganga area with Ma Wee. (Ongoing project).

- Materials were purchased to construct 90m (3m in height) protective fence for root and tuber crops field.
- Distribution of 600 tissue cultured banana plants for home garden development
- National Govi Sathiya exhibition 2014 was held at the Agriculture Complex - Thelijjawila
- Fifteen spawn producers and 600 unemployed women were empowered in mushroom production.

Seeds and Planting Material Production

Table 1.2.5.2: Seed and planting material production during 2014

Seed/Planting	Crop	Variety	Quantity kg
Cuttings	Manioc	kirikawadi	150 cuttings
Planting materials	Wel ala	<i>Dioscorea spp</i>	30 kg
	Brinjal	Padagoda selection	10kg
Tissue culture	Pineapple	Mauritius	824 nos.
Tissue culture	Banana	Different varieties	1934 nos.
Spawn	Mushroom	American	1050 pkts
		Oyster	(200g each)
	Orchid	Dendrobium	5,967 nos.

Compost

Twelve tons of composts were produced.

Technology Dissemination

Trainings

Table 1.2.5.3: Training programmes conducted during 2014

Training programme	Project /participants
Training on mushroom spawn production	15 school leavers
Mushroom production	15
Spawn production	01
Floriculture	10
Tissue culture	04
Advanced Level Science and Technology theory	281 students
Cottage level tissue culture	Flower growers
Floriculture training classes	02 officers from Mahaweli

Two undergraduates from University of Ruhuna completed their research projects.

Radio and TV Programmes

- Seed Dormancy of Fruit Crops – Ruhunu Sewaya
- Traditional Vegetable Production – Ruhunu Sewaya
- Edible Mushroom cultivation – Sri Lanka rupavahini

Presentations

Janaki Rajapaksha - Recent developments in Edible Mushroom Cultivation. Rajarata University of Sri Lanka.

In service trainings

Officers participated as resource persons for three in-service training programmes.

Visit abroad

J. C. Rjapaksha - 8th International conference on mushroom biology and mushroom Products. 19 - 22 November, India.

PLAN FOR 2015

- Crop Improvement
- Development of practices to enhance mushroom cultivation.
- Biotechnological interventions in improvements of Banana.
- Development of agronomic package for the crops grown on problem soils

STAFF LIST

Designation	No.
Research Officer In Charge	01
Research Officer	04
Agriculture Officer	01
Programme Assistant (Agriculture)	03
Development Officer	03
Research Assistant	02
Agricultural Instructor	04
Research Sub Assistant	02
State Management Assistant	02
Farm Clerk	02
Office Assistant	01
Store men	01
Driver	02
Watcher	06
Earth Mover Operator	01
Labourer	33
Labourer (Contract)	03
Total	70

2.6 AGRICULTURE RESEARCH STATION (ARS) - GIRANDURUKOTTE

The Agriculture Research Station, Girandurukotte, established in 1980 by the Mahawali authority of Sri Lanka, is mainly responsible for engage in agriculture research to improve farm productivity while sustaining the agriculture environment and ecosystem in Mahaweli System C. It also engages in specific agriculture development activities which have been considered as nationally important. This

station was handed over to the Department of Agriculture in 1984. Presently it functions under the administrative control of HORDI Gannoruwa.

In addition to the research and development programme, the research station serves as the main agriculture related training provider to officers, farmers, school children and relevant personnel of other organizations.

BUDGET

The allocation received and the expenditure incurred under different votes and projects during year 2014 are given in the Table 1.2.6.1.

Table 1.2.6.1: Annual budget – 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	1,729,600	1,526,579	88
Recurrent	5,146,185	4,236,475	82
Projects			
• Hybrid seed Production programme of Vegetable	550,000	534,018	97
• NARP Citrus Project	150,000	132,381	88
• Popular Traditional vegetable seed production programme	250,000	241,627	97
• Fruit Development programme	175,000	116,702	67
• NCVT Banana (NARP Project)	50,510	50,510	100
• Increasing Planting Materials Production for National Productivity	600,000	416,072	69
• Popular vegetable seed production program	779,250	319,665	41
Total	9,430,545	7,574,029	80

PROGRESS

RESEARCH

Vegetables

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

Table 1.2.6.2: National coordinated varietal trials conducted

Crop	2013/14 Maha	2014 Yala
Brinjal	06 Varieties	06 Varieties
Mae	06 Varieties	04 Varieties
Wing bean	04 Varieties	-
Cucumber	05 Varieties	-
Bitter gourd	03 Varieties	03 Varieties

National Coordinated Variety Testing of brinjal, EGH 7 and EGH 8 varieties were well performed compared with other varieties. WBMP, WBMW and M 16, M 15 were exhibited good results under NCVT program of Winged bean and Bitter gourd respectively. NCVT program of cucumber good performances was observed with variety H 31. T 32-14 and T 32-2 were given higher yield and exhibited good performances in program of NCVT Mae.

- Varietal adaptability testing trials.

Crop	2014 Yala
Capsicum	04 Varieties

Varieties of 1782 x HYW and 300 x 673 performed well compared with other capsicum varieties. Especially, variety 1782 x HYW gave a higher yield.

- SAARC variety evaluation trial

Crop	2013/14 Maha
Pumpkin	05 Varieties

SAARC pumpkin varieties suit for growing conditions of IL2 agro ecological zone showed higher yield performance. Seeds were produced for the evaluation program of next season.

- Exotic variety evaluation trial

Crop	2013/14 Maha	2014 Yala
Melon	03 hybrid	-
Pumking	02 hybrid	02 hybrid

- Twenty Elabatu lines having varying germplasm were collected. Evaluations of the lines are being progressed. Six of the lines are at S3 generation and 14 lines are at S2 generation.
- Generation advancement of tomato "Padma" variety. Evaluations of F2 generation was practiced. Identified lines were selfed and seeds were collected separately.
- Purification of traditional vegetable variety, Mahaweli mae cultivar was commenced. Three morphologically different lines were identified and seeds were collected for further improvement.

Fruits

- 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)

HOCR 23, 29, Rahangala selection and NCN, NAN, MYG varieties were well performed under the regional weather conditions (IL₂) from local and introduced varieties respectively. Mother plants orchard was established using above performed varieties.

Table 1.2.6.3: Mother plants established

Variety	No. of plants
HOCR 23	45
Rahangala selection	34
MYG	43
NAN	40
NCN	26

- **National coordinated varietal trial of Banana**

Number of varieties -07 (HOSE 21, PGRC 2, PGRC 1, Parakum ©, HOSE 13, HCK 143 MKS)

Variety PGRC 1 and HOSE 21 were exhibited well performances at Girandurukotte compared with Parakum (check variety) and other varieties. Especially PGRC 1 was given a good yield.

Rice (NCRVT)

National coordinated rice varietal trials of 3 months and 3 ½ months age groups were tested in 2013/14 Maha and 2014 Yala seasons.

Other field crops / Root and tuber crops

National coordinated varietal trials of following OFC, root and tuber crops were carried out.

Table 1.2.6.4: National coordinated varietal trials of following OFC, root and tuber crops

Crop	2013/14 Maha	2014 Yala
Mung bean	07 Varieties	08 Varieties
Hybrid chili	08 Varieties	08 Varieties
Cluster onion	-	07 Varieties

Thinnaweli red, Jafna loacal, ACA 13 and ACA 26 onion varieties performed well under the regional conditions. Mung bean variety MI 6, MIMB 901 and MIMB 931 exhibited good yield and other characters under regional conditions.

DEVELOPMENT PROGRAMMES

Fruits

During 2014, 4 ha of mixed fruits garden was established. The crop species planted were Mango, Orange, Mandarin, Guava, Star fruit, Lemon, Beli, Rambutan and pomegranate and all crops are growing. Old Mango trees in the station were rehabilitated for proper production. These mango trees were 25 years old and showed very limited fruit production capacity.

Infrastructure development activities

During the period under review one planthouse (completed roof side wall painting of side net), one 2B2 quarter (renovate all except roof) and, circuit bungalow was renovated. A new wire fence of 1500 M was established at the mixed fruit garden.

TECHNOLOGY DISSEMINATION

Seven awareness programmes were conducted and, more than 375, including school children, farmers and government officers. 03 farmer and officer training programs and crop clinic programs were conducted.

SEED AND PLANTING MATERIAL PRODUCTION PROGRAMME

Following quantities of seeds and planting materials were produced by the research station during the period under review.

Table 1.2.6.5: Planting material production

Seed/Planting material	Crop	Variety	Quantity kg
Breeder	Brinjal	HS 2	9.25
	Cucumber	Kalpitiya white	3.25
Registered	Luffa	LA 33	8.0
	Winged bean	Krishna	6.0
	Spanish	Yoda	6.0
	Red Okra		30.1
	Mae	Mahaweli	47.1
	Alanga		4.3
	Thibbatu		1.7
Commercial	Banana	Seeni/Embul /Kolikuttu suckers	300

TRAINING RECEIVED

- Mr. H.R.P. Fernando (RO) MSc. in Post harvest technology Thailand.

- Mrs. W.R.W. Wimalasena (RA) Training programme on vegetable seed production at Peradeniya.

PLAN FOR 2015

- Crop Improvement programme.
- Evaluation of mango, Anona and citrus germplasm
- Agronomic studies on vegetable crops.
- Seeds and planting material production

STAFF LIST

Designation	No.
Actg. Deputy Director (Research)	01
Research Officer	02
Agricultural Instructor	02
Research Assistant	03
Research Sub Assistant	02
Farm Clerk	01
Earth Mover Operator	02
Driver	01
Storeman	01
Welder	01
Watcher	08
Budder	01
Circuit Bungalow Keeper	01
Unskilled Labourer (Grade III)	39
Labourer (Contract)	12
Total	77

1.3 FRUIT RESEARCH AND DEVELOPMENT INSTITUTE (FRDI) - HORANA

The Fruit Research and Development Institute (FRDI), Horana has been mandated to develop technology for enhancing the productivity and quality of fruit crops. 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 particularly on the development of high yielding good quality fruit crop varieties, improved crop management practices, crop protection, plant nutrition, organic fruit culture, food technology, plant propagation techniques and planting material production.

BUDGET

Table 1.3.1: Annual budget - 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	31,150,704	21,619,312	69
Recurrent	37,546,545	22,660,483	60
Projects			
• Development of fruit village	40,000,000	34,784,828	87
• Bio diversity Project	38,000,000	33,519,623	88
• Establishment of Bio diversity garden of tropical fruits at Horana	19,700,000	16,896,655	86
• Development of Fruit Varieties Conservation Centre, Kundasale	15,000,000	13,560,934	90
• Establishment of Eco Friendly Eco system at Diyagama, Homagama Mahinda Rajapakshe Sport Complex	3,300,000	3,062,034	93
• Pruning & Rehabilitation of fruit trees	600,000	511,297	85
• Development of high yielding, good quality papaya varieties.	970,524	951,847	98
• Development of promising durian varieties for commercial cultivation	830,000	626,880	76
• Improvement of yield & quality banana (<i>Musa</i> spp.)	987,000	921,819	93
• Development of good quality high yielding cultivars of mango from existing germplasm.	1,300,000	1,079,162	83

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
• Development of high yielding, good quality citrus (orange & mandarin) varieties.	1,571,506	981,183	62
• Identification of virus & virus like diseases in papaya & develop sensitive detection methods for laboratory & field detection.	857,185	694,902	81
• Development of technology for the production of virus free planting material through propagation techniques for selected fruit crops (papaya, citrus, pineapple special varieties).	2,867,284	2,584,073	90
• Isolation & identification of potential plant growth promoting rhizobacteria (PGPR) for control of papaya rings spot virus (PRSV) in papaya through induced systemic resistance (ISR)	1,241,958	1,237,589	99
• Studies on biology & management of root knot nematode (<i>Meloidogyne</i> spp) of guava (<i>Psidium guajava</i>) in major growing areas of Sri Lanka.	523,100	397,318	76
• In - vitro mutagenesis of Banana for <i>Fusarium</i> wilt (<i>Fusarium oxysporium</i> F. species cubense (Foc) resistance / tolerance.	584,981	581,184	99
• Organic Fertilizer Programme, Ministry of Agriculture	900,000	630,267	70
Total	197,930,787	157,301, 388	79

PROGRESS

CROP IMPROVEMENT

Sour-sop (*A. muricata*)

Selected sour sop accessions of high fruit quality characteristics were established in two locations in farmers' field. Plants have not yet initiate flowers.

Papaya

Papaya is becoming more important commercial horticulture crop. The necessity of developing local papaya varieties/ hybrids with high yield and better quality is a prerequisite. A series of experiments conducted during last decade has developed two inbred lines and two hybrids of papaya. A papaya hybrid having moderate resistance to Papaya Ring Spot Virus with high yield (55 kg/tree/year) and red thick sweet flesh has been recommended and

released as Horana Papaya Hybrid for whole island cultivation.

Six populations in second generation advancement of new local papaya accessions are being evaluated to develop new superior papaya varieties.

Passion fruit

Passion fruit improvement programme gives more emphasis to develop a seed disseminating passion fruit variety. Twenty promising parental lines were selected and seed multiplication is being conducted by inter-mating. Eight kilograms of seeds have been produced.

Three promising lines which show the field resistance to Passion fruit Mottle Virus have been selected and further screening is progressing. Heritability studies on self-compatibility of passion fruit have been started.

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. Two promising varieties were selected. More than 5000 grafted plants were produced.

Another four promising accessions with good quality characters were identified for further improvement.

More than eight hundred durian hybrid individuals are being evaluated. Three year old plants were exposed to artificial flower induction. Some plants responded for flowering and fruiting. Excellent characters

were observed in Sou F₁ hybrid. Crossing programme with promising lines is being continued.

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 nine lime (*Citrus aurantifolia*) are being evaluated. Three promising mandarin lines were selected and evaluated in eight different agro ecological zones. One of the tested lines performed well in all locations.

One promising white pumello accession and one red pumello accession was identified. And one promising sweet orange variety was also identified.

Introduced eight Japanese exotic sweet orange and mandarin varieties are being evaluated in eight different agro ecological zones. Three promising exotic mandarin varieties were released for farmer as Horana Ehime 1, Horana Ehime 2, and Horana Ehime 3.

Hybridization programme is continued while 50 hybrids are grafted for evaluation. One hybrid crossed with sweet orange and white pumello was started flowering.

Mutation breeding programme was initiated in 2007. At present, fruit quality data and growth parameters of the mutants (nasnaran and HOCR 24) are being collected. Some underutilized fruit crops (Beli, anona, guawa, sapota and lavalu, and gaduguda) were exposed to irradiation in 2014 to create new mutants for developing variation.

Beli

Thirty one beli accessions collected from different areas of the country have been evaluated for seven year since 2007. One promising accession with superior characters was identified.

Floral biology of different beli accessions is being studied for further improvement of the crop.

Lavulu

As an outcome of evaluation, 3 accessions of Lavulu with high yield were identified. Among 5 accessions evaluated, three accessions were recommended as Horana Lavulu 1, Horana Lavulu 2 and Horana Lavulu 3. Average fruit weight were 450 g, 265 g and 190g recorded in Horana Lavulu 1, Horana Lavulu 2 and Horana Lavulu 3 respectively. Horana Lavulu 1 is comparatively a larger elongated fruit with high percentage of flesh weight. Horana Lavulu 2 and Horana Lavulu 3 produced 120-250 and 150-250 medium sized fruits/plant/year respectively.

Rambutan

Eight accessions were selected based on the fruit quality characters. Accession No. 11 has shown good fruit characteristics and good external appearance (pink yellow) and a higher brix value (21.4) than Malwana Special (20).

Floral biology, flowering and fruiting behavior of Veralu (*Elaeocarpus serratus* L.)

Different components of the flower, their position in the flower and their number were studied.

Less number of racemes per branch could be observed in accessions HoW 4, 5 and 12 (3-4) and higher number was observed in accessions HoW 9 and 13 (13-14). But number of florets per raceme remains almost same (9-13). A floret is a perfect flower, length varying from 4 to 8mm and having 4-5 nos. of light green 4-6mm long sepals freely arranged in outer whorl. 2nd whorl consists of 4-5 nos. white petals 5-6mm long freely arranged with lobed margins. 3rd whorl consists of 25-30 numbers of off white coloured freely arranged stamens. One ovule is found in the superior ovary. It was observed that at 50% flowering, 14 -21% florets are lost and at 100% flowering, 27 - 43% florets are lost. Only a 0.05% - 0.06% of initiated flowers transformed in to fruits. A transformed fruit takes 85-92 days to get matured.

“Chempadak” (*Artocarpus integer*)

Chempadak possess characters similar to jackfruit except few. Tree is having a pyramidal shaped crown with semi-erect growth habit. Pattern of branching is irregular with a medium branching density. Dark green colour obovate shaped leaf blade's apex is acuminate, leaf base is oblique and margin is entire. Fruits of Chempadak are set as clusters on primary and secondary branches. Fruit shape is oblong. Number of flakes per fruit is 68±8 and the number of fruits per plant per

season is 66±12. Ripen flakes are juicy and sweet in taste with a high TSS value (31± 1 Brix^o) and flakes produces a good aroma. This new fruit was officially released as “Horana Chempedak”.

AGRONOMY

Efficient layering technique

Among potential fruit crops, sour sop (*Annona muricata*), mangosteen (*Garcinia mangostana*), strawberry guava (*Psidium cattleianum*) are suitable crops for cultivation in pots, is a new trend in urban horticulture. Plants with adventitious root system are more appropriate for pot gardening. 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 having success rate of 42%. No response was shown in other crops. The study is in progress.

Reusable, low cost bag covering for guava

Bagging of guava fruits is practiced to protect from pest and diseases. A study conducted to identify suitable material for bagging revealed that fruit quality was not affected due to bagging material used. However, when wax papers were used for bagging it can be reused compared to the paper bags. Cost of each bag was Rs. 3.00.

Mangosteen (*Garcinia mangostana* L.) with added root system

Mangosteen (*Garcinia mangostana* L.) is one of the high potential fruit crops having a great demand in both local and export markets. The crop is rarely found as large scale plantations. This is primarily due to the slow growth rate, associated with 8-10 years of long juvenile period. The poorly developed root system in mangosteen that causes low intake of moisture and nutrients is reported to be responsible for its slow growth habit. During this period, the grower does not receive any income out of it. Such inherent characteristics of mangosteen cause the limited expansion of the crop.

A study initiated with the objective of reducing the time taken for fruiting in seed plants of mangosteen by provision of an additional root system was highly successful and initiated fruits at the age of 5.4 years.

At fruit set in the second fruiting year, a significant increases in canopy volume, number of primary and secondary shoot formation were observed in seed plants with added root system. Thus, technology of seed plants with an added root system reduced the time taken for fruiting and enhanced productivity by promoting its canopy development. This technology was recommended and released for the utilization.

Efficient potting for double root stock grafting and seedling inarching

In techniques of double root stock grafting and seedling inarching two stock plants were planted in 20 x 30 cm sized two separate pots.

A study was conducted to observe the possibility of incorporating two stock plants in to a single pot. Study revealed success rates of 99% and 97% in inarch and grafting respectively. Therefore in double root stock grafting and seedling inarching instead of two individual pots, the single pot could be utilized.

Planting material of Dragon fruit (*Hylocereus undatus*)

Experiments conducted to identify the most suitable type of planting material for Dragon fruit revealed that larger sizes of cuttings (12-18 inches) are suitable for planting material production. These cuttings can be successfully taken from stem sections of soft, semi hard and hard wood cuttings.

In situ grafting and top working technology

A promising in situ grafting and top working technique for fruit crops was developed. This technology can be utilized especially for limited spaced home gardens to establish multi varietal fruit trees. And also it can easily be used for changing the varieties within shorter period (8-12 months).

BIOTECHNOLOGY

Somatic embryogenesis in Passion fruit

Plants can be regenerate through callus culture and this method can be used in mutation breeding programmes as a valuable tool. During this year, surface sterilization,

establishment, callus induction and regeneration steps were successfully completed and rooting and acclimatization protocols have to be developed.

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. Therefore a research program was initiated to develop protocol for Embryo rescue of local mango varieties. At present, the sterilization, culture initiation procedures were optimized. Program will be continued.

VALUE ADDITION

Osmo dehydration and hot air drying of Lovi, Jambu, Crambola

During fruiting seasons these fruits are wasted due to non-availability of technology for value addition. Osmo dehydration and hot air drying is a low cost and cottage level technique for value addition of commodities. Feasibility of using this technology for value addition of these fruits was evaluated.

Matured fruits were cut in to 3mm sized slices, immersed in 1% citric acid. Steam blanching technique was evaluated with different time intervals (1, 3, 5 minutes).

Steam blanching (3, 5 min) seemed to be effective for all the fruits. However, time, temperature combination could not be controlled with the saw dust dryer resulting poor quality products.

Value addition of Durian

Packing and storing the durian sacs under deep freeze condition can increase the shelf life of more than one month of period without losing the quality characters.

Veralu pulp

A Veralu pulp was prepared by adding 350 ml of water to 1 kg of fruit with some additives. Pulp was in acceptable quality even after six months though certain changes were observed in colour and odour.

CROP PROTECTION

Anthracnose in papaya

Anthracnose disease is caused by *Colletotrichum gloeosporioids* in papaya is considered as a major fruit rot disease and there may be an environmental friendly and non hazardous control measure to reduce the disease incidence; hence, different safe compounds were evaluated in vitro and in vivo conditions and results revealed that sodium meta bisulphate with 1500 ppm concentration was the best treatment.

Post harvest fruit rot in mango

Anthracnose and stem end rot diseases of mango are major fruit rot diseases in mango cultivations and an environmental friendly and non hazardous control measures are most important. In vitro studies revealed that except vanillin, sodium meta bisulphate, sodium bicarbonate, potassium sorbate, sodium propionate were effective for inhibition of growth of *Colletotrichum gloeosporioids*.

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

Guava (*Psidium guajava*) has become a commercial fruit crop. Root knot nematode (*Meloidogyne* spp) is one of the major problem in guava cultivation.

A survey was completed and mapped out the distribution of root knot damage of guava using GIS in Puttlam, Anuradhapura, Rathnapura and Kalutara. Results showed that most of the commercial cultivations at Ipalogama and Thalawa were positive for root knot nematodes. The percentage of dead plants due to root knot nematode was about 12.5%. The *Meloidogyne* species responsible for root knot nematode in guava yet to be identified. Although *Meloidogyne* completes its life cycle within 6-8 weeks in tomato it takes more than 16 weeks in guava. The experiments are in progress.

Management of white waxy scale (*Gascardia brevicauda*)

White waxy scale (*Gascardia brevicauda*) is a serious pest found in Passion fruit and Goraka. It is necessary to remove adults mechanically before applying chemicals. Applications of Thiomethoxam 25Wg (Actara) twice at the rate of 1g/L at 7 days interval significantly reduced the scale population. Experiment is in progress.

An egg or nymphal parasitoid of white waxy scale was identified up to family level. It belongs to Order; Hymenoptera; Super family; Chalcidoidea and Family; Encirtidae.

A predatory beetle was also isolated. Study is in progress.

Trunk borer in fruit crops

Damaged trees /plants of Durian, Jackfruit, Mango and Anona were observed. Stem boring insect, *Batocera rufomaculata* was identified in Durian and Jack fruit. Two sortable borer species were observed in Mango and Anona. Research will be focused to find out a management package to control stem boring insect.

Fruit borer in Jackfruit

A fruit borer identified as *Diaphania caesalis* was found in infected Jak fruits. This study will be continued to findout effective control measures.

NUTRIENT MANAGEMENT

Availability of potassium for banana

An increasing trend in yield was shown with the application of higher potassium rates than the recommended levels in Red Yellow Podsolc soils. Higher rates of potassium fertilizer applied at 8 months after planting recorded higher yields than other splits of K fertilizer.

Determination of the inorganic nutrient requirement of Pineapple

The absorption of nutrients by pineapple from soil is limited as the root system is shallow. Hence, the amount and method of application of the present recommendation have to be

modified. Growth measurements showed that liquid form of fertilizer could be applied without any adverse effect. The harvest is being collected for yield and quality analysis. A separate experiment also initiated to observe the influence on Pineapple.

Farmers' perceptions towards climate change effect on fruit cultivation: Gampaha district

Study was initiated to examine the awareness of climate change and its effect among fruit growing farmers' in Gampaha District. In Biyagama Agrarian Division, 100% interviewed farmers were aware about climate change. Nearly 50% of them attributed climate to change in rainfall pattern, change in air temperature and increase in night temperature. Nearly 90% mentioned it has a negative effect on flowering and yield. All expected an increase in diseases as an impact of climate change. Analysis is in progress.

Fruit Week – 2014.07.14 – 21

For the promotion of fruit cultivation and consumption, "Fruit week" was held in July from 14th – 21st at Fruit Research Development Institute, Horana. Fourty Technical stalls and 46 Fruit and fruit product stalls and 15 plant stalls were established for customer service. During this period 50,000 school childrens and 0.5 million people visited the exhibition. 8000 persons participated the training programmes.

Micro-propagation of pineapple

Planting material production programme of Pineapple was initiated in this year and 5000

plants were already issued. Around 40,000 *in-vitro* plants and more than 30,000 plants in hardening stage are available in the division for future distribution.

In field evaluation programs of tissue cultured pineapple, which were established in different places, some somoclonal variations were observed. Therefore, an experiment was initiated for further optimization of available protocols.

SPECIAL PROJECTS

Fruitfly management programme

Fruit fly management programme with the collaboration of HORDI.

Fruit village Development project

Villages were established for Pineapple (5), Pomegranate (10), Mandarin (8), Sweet orange (8), Grapes (3), Wood apple (5), Pears (2), Mangosteen (1), Durian (5), Sour sop (4), Avocado (1) and Rambutan (1).

Bio Diversity Fruit Garden, Horana

This is a major research & development project at Fruit Research & Development Institute. Project deals with the maintenance of already established fruit garden of 32ha, establishment of new fruit orchard of 2 ha and development of other infra structure facilities. Under this project, two old buildings were renovated as a training unit and a rest room. Bio Diversity Fruit Orchard establishment and management training programmes were conducted for fruit growers and other technical

staff. More than 2000 trainees were participated at this programme.

Pruning & Rehabilitation of fruit trees

Main objective of this project is the training of beneficiaries for pruning & rehabilitation of fruit trees. This project initiated in 2012, and targeted to train of trainers and training 1500 beneficiaries at district level. After the completion of successful training, pruning kits were distributed for selected beneficiaries. In 2013, 600 beneficiaries were trained and 328 pruning kits were distributed. In 2014, rest of the beneficiaries (461) were trained and a refreshment training programmes were conducted for 1100 beneficiaries. Among the trainees, 30 pruning kits were distributed.

Flower Induction Programme

- Total number of trees Packtrabutazol applied - 4020
 - Mango – 1800
 - Durian – 2220
- No of farmers trained – 1500
- Officer training (Agriculture Instructors, Agriculture officers) – 12
- Farmer training courses – 15
- Training programmes were conducted for farmers and extensionists on the use of chemicals and effect on flower induction

Productivity enhancement of coconut lands affected with “Waligama wilt “disease in Matara district

Planting materials of Rambutan (Malwana selection) and Mango (Vellai colomban) were obtained and distributed among the growers who agreed for commercial cultivations. This programme was conducted with the collaboration of the Coconut Cultivation Board.

TECNOLOGY TRANSFER

Disease diagnosis service

- Farmer disease samples were diagnosed and treatments were suggested (40 samples) and identified following pathogens

Jak fruit- fruit rot – *Phytophthora spp.*

Jak fruit – white root disease – *Rigidoporous spp.*

Papaya – anthracnose – *Colletotrichum gloeosporioids*

Guava – soft rot – *Botryodiploidea theobromae*

Papaya – black rot – *Phoma caricae*

Avocado – dieback – *Botryodiploidea theobromae*

Pineapple – collar rot – *Phytophthora spp.*

Dragon fruit – anthracnose – *Colletotrichum spp.*

Mango – anthracnose - *Colletotrichum gloeosporioids*

Durian – root rot – *Phytophthora spp.*

Anona – dieback – *Botryodiploidea theobromae*

Banana- panama disease – *Fusarium oxysporum*

- Phytophthora root disease in durian and leaf spot disease of pineapple were diagnosed and treated successfully.

Training and awareness programs

The following training programs were conducted in 2014.

- 236 school children were visited the institute. (Except during the Fruit week)
- Several training programmes were conducted for 198 university students and lectures.
- Thirty eight training programmes on fruit cultivation, home gardening tissue culture and nursery management were conducted for 520 farmers and 348 extension officers.
- Two training programmes on biotechnology for officers, undergraduates and students
- Training programmes on pest management of fruit crops
- Training on fruit fly and cucurbit fly management
- Thirty training programmes for extensionists and farmers

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

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

Visits abroad

- A.S. Pushpakumari - Training Workshop on *Bactrocera* fruit fly surveillance, taxonomy and Identification and area - wide management. Thailand, 9-11 May.
- S.D.R. Wanniarachchi, M.K.Thantirige, A.J. Warusawitharana. - 29th International Horticulture Congress 2014 Brisbane – Australia 17 – 23 August.
- D. Chithranayana - Adaptation, Mitigation through incorporation low emission strategy utilizing geo-spatial technology. Bangladesh. November 02-14,2014
- G. N. Shiromali - Forest Law Enforcement and Government. China , October 16 - November 05

Mass Media & Publications

Officers from FCRDC participated in 03 TV programmes and 04 Radio programs on fruit crop cultivation, pest and diseases control and home garden.

- Alternative potting media – TV programme
- Alternative potting media – Radio programme
- Root rot diseases & management measures in Jak Fruit in home gardens – Radio programme
- Published one article for Alternative potting media for budded/vegetative propagated fruit plants

NATIONAL FRUIT VARIETIES CONSERVATION CENTER – KUNDASALE

The main target of the Centre is to collect fruit history and conservation of local and exotic fruit varieties. Centre also maintains an information centre for local and foreign visitors, ecological scientist, farmers, school students.

PROGRESS

- Completed the two plant houses (each one 450 square feet)
- Established Nursery area of above 500 m² with nearly 11, 000 of seed plants.
- Established nearly 125 recommended fruit varieties in the field.
- Start to make two lakes of Small scale.
- Finished the front side fence of the centre.
- Built the main gate of the centre.
- Rehabilitation of existed aged Mango plantation.
-

PLAN FOR 2015

Crop Improvement

- Evaluation and development of fruit varieties.
- Characterization of different fruit varieties.
- Germplasm collection of fruit crops.

Crop Management

- Development of crop management techniques to increase the productivity of fruit crops.
- Improvement and development of agronomic practices to enhance fruit crop productivity

Soil Science & Plant Nutrition

- Development of an nutrient management package to enhance the productivity of fruit crops
- ‘Soil Biopore Infiltration Technique’ to minimize disorders of mangosteen.
- Improvement of internal qualities of fruits by manipulating nutrient supply

Food Processing

- Increase shelf life of passion fruit using modified atmosphere storage.
- Investigate bioactive compounds in fruit pulp of Anona fruit spp.

Plant Pathology

- Management of white root disease of perennial fruit trees

- Identification of bio efficacy testing of safer chemicals for fruit crop disease management
- Isolation and identification of antagonistic microorganisms to control anthracnose of papaya

Entomology

- Studies on biology and management of root knot nematode (*Meloidogyne* spp) of guava in major growing areas of Sri Lanka.
- Identification and development of pest management strategies on fruit growing
- Evaluation of botanicals against pests in fruit crops
- Identification of natural enemies of pests of fruit crops
- Studies on emerging new pests on fruit crops

Tissue Culture

- Embryo rescue of Mango.
- Micro propagation of Banana, Passion fruit and Pineapple and assessment of their planting material quality

Post Harvest & Food Technology

- Effect of pre and post harvest treatments on fruit quality and shelf life of fruits.
- Formulation of postharvest indices for *A. muricata*

Plant Propagation Techniques

- Study of the enhancement of seed germination pattern of underutilized fruit crops. (Varalu, lovi, Uguressa)
- Development of rapid vegetative growth technique for fruit crops.
- Study the low weight (Soil less/light mixture) potting media for budded / Vegetative propagated fruit plants.

STAFF LIST

FRDI, Horana

Designation	No.
Director	01
Additional Director	01
Deputy Director	01
Research Officer	12
Agriculture Officer	02
Economist	01
Economist Assistant	01
Program Assistant (Agriculture)	07
Development Officer	02
Research Assistant	09
Agricultural Instructor	13
Public Management Assistant Service	05
Technical Assistant	01
Research Sub Assistant	01
Driver	06
Store man	01
Earth Mover Operator	02
Watcher	07
Budder	03
Labourer (Permanent)	93
Labourer (Contract)	62
Total	231

National Fruit Varieties

Conservation Centre, Kundasale

Designation	No.
Agricultural Instructor (Farm Manager)	01
Farm Clerk	01
Research Sub Assistant	01
Watcher (Permanent)	01
Labourer (Permanent)	24
Labourer (Contract)	02
Total	30

1.3.1 FRUIT CROP RESEARCH & DEVELOPMENT STATION (FCRDS) - GANNORUWA

Fruit Crop Research and Development Station, Gannoruwa is one of the main research stations which undertake research and development activities on variety development, propagation techniques, nursery management and crop management to enhance the production and productivity of fruit crops.

Container planting of fruit crops and landscaping using fruit plants are also given priority under these programmes. In addition it serves to the community by conducting training programmes for the interested partners.

BUDGET

Table 1.3.1.1: Annual budget - 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
FCRDS, Gannoruwa			
Capital	1,124,750	603,316	54
Recurrent	5,158,426	4,197,165	81
<i>Projects (NARP)</i>			
• Papaya	970,524	955,381	98
• Durian	830,000	558,984	67
• Banana	987,000	921,819	93
Rambutan Research Unit, Ambatenna			
Recurrent	912,745	753,029	83
Horticulture Research Farm, Ambatenna			
Capital	180,000	98,640	55
Recurrent	1,248,000	1,003,896	80
Total	11,411,445	9,092,230	80

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 (*Fusarium oxysporum* f.sp. *cubense*). One plant showed resistance to the disease after inoculation. Multiplication of the line was initiated using tissue culture method. Kolikuttu cultures were exposed to gamma irradiation to induce mutation.

Twelve Banana accessions showed field tolerant to Panama disease were evaluated and high yielding and good quality three SeeniKesel accessions, one Embon and one Kolikuttu accession was selected for further evaluation.

Papaya

Papaya accessions with suitable fruit characters, high yield and tolerant to Papaya ring spot virus were collected. Lines were identified to develop inbred lines.

Durian

Exotic and local accessions were evaluated for yield and quality characters. Characterization was completed for 8 accessions. One exotic accession produced high quality fruit with thick flesh, good taste, colour and appearance. 500 grafted plants were produced from this variety.

Underutilized Fruit Crops

Evaluation of under utilized fruit species such as bale fruit, ber, jamun, longan, wax apple and bignay etc. was continued. Elite accessions of Longon, Jamun and Ber were identified. Planting material production is in progress.

Agronomy

Dragon Fruit

Testing the No. of plants per post were continued. Yield and agronomic data were collected for three years and studies are continuing.

Guava

Effect of colour and material for fruit bagging was studied to improve yield and quality of

guava. Bagging with blue and white polythene resulted high fruit weight and high TSS compared to other materials and colors tested.

Mango

Effect of potting media and different fertilizer mixtures were tested to increase growth of rootstock plants of mango for early grafting. Result revealed that Compost: Sand: Burned paddy husk at the rate of 1:1:1 with application of Albert solution gave more than 80% graftable size rootstocks within 4 months period.

Star fruit

Effect of age of the stock plants to promote early grafting of Carambola (*Averrhoa carambola* L.) was studied. It was observed that 3-4 month aged seedlings can successfully be grafted.

Ber

Manually extracted soft seeds of ber germinated very early within 4-7 days. Treatment of soft seeds with 500ppm commercially available gibberalic acid significantly increased the uniformity of germination.

Evaluation of different grafting methods showed that the Wedge and splice grafting methods can be successfully used for the planting material production of Ber. Application of commercially available fertilizer mixture of T65 can effectively be used to enhance the vegetative growth of Ber under plants house conditions.

Bignay and Jamun

Budding can be successfully carried out for 1-1.5 year old seedlings of bignay and jamun.

Ceylon olive

It is observed that the hard seed coat of Ceylon olive can be removed easily by mixing seeds with half decomposed compost for about 2-3 weeks. The extracted seeds start germination within 15 – 20 days and achieved nearly 90% germination in 30 days.

Governer's plum

Seed treatment of Governer's plum with 500ppm commercially available gibberalic acid showed 100% uniform seed germination around 30 days.

Soursop

Scarified soursop seeds treated with 500ppm commercially available gibberalic acid resulted uniform 90% seed germination in about 50 - 55 days.

Experiments conducted revealed that application of commercially available fertilizer mixture of T65 can be effectively used to enhance the vegetative growth of soursop under plants house condition.

Evaluation of Container Plants

The elite accessions of Ber, Bignay, Jamun, Longon, Pumello and Amla were identified for container planting.

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.
- Seventeen training programmes- for 362 farmers

- Fifteen training programmes for 420
- Twenty six training programmes for 1367 University/Diploma/other students
- Seven undergraduate students conducted their final year research projects.

Exhibition

Officers are actively engaged in exhibitions of Deyata Kirula and Govi Sathiya.

Landscape designing

Landscape was designed and arranged in following premises.

1. Training center, Research and Development station, Makandura
2. Hela Bogun Hala, Agriculture Ministry, Battaramulla
3. Circuit Bungalow, Plant Genetic Resource center, Gannoruwa
4. Mas Holdings, Pallekelle

Technology Transfer

During the year officers were participated to 6 radio programmes on fruit cultivation, publish of 2 paper articles and edit of fruit cultivation booklets. Instructions were given to nearly 560 fruit growers on fruit cultivation and pest and disease management.

Planting Material Production

Fruit nursery of the station produced large number 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 2014

Type of plants	No. of plants produced	No. of plants issued
Grafted plants	29,020	11,759
Seedlings	79,733	8,366
Rooted cuttings	4,300	2,120
Total	113,053	22,245

RAMBUTAN RESEARCH UNIT - ERAMINIGOLLA

PROGRESS

Planting material production

Fruit nursery of the unit produced following planting materials under fruit village project

Table 1.3.1.3: Planting material production under fruit village project

Type of plants	No. of plants produced
Rambutan Grafted plants	500
Rambutan Seedlings	4000
Masan Grafted plants	150
Masan Seedlings	5000

Production of Rambutan

Rambutan plantation was well managed and earned Rs. Mn 0.4 during the year.

HORTICULTURE RESEARCH FARM - AMBATHENNA

PROGRESS

Planting material production

Fruit nursery of the unit produced following planting materials under fruit village project and funds received from Seed and Planting Material Development Center.

Table 1.3.1.4: Planting material production

Type of plants	No. of plants produced
Rambutan Grafted	590
Rambutan Seedlings	3000
Durian Grafted	7305
Jack Fruit Grafted	1500
Sapodilla Grafted	40
Carambola Grafted	1660
Lemon rooted cuttings	775
Guava seedlings	2000
Lime seedlings	350
Dwarf Ambarella seedlings	580
Miracle Berry	1000
Kathurumurunga	1000
Vegetable pots	1000

Farmer Training

Three Farmer training classes were conducted on nursery management, fruit cultivation and hybrid seed production.

Hybrid seed production

Hybrid seed production was produced from Tomato variety Maheshi.

PLAN FOR 2015

RESEARCH

Crop Improvement

- Development of high yielding good quality Papaya varieties.
- Development of Panama resistant/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
- 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
- Development of high yielding good quality longan varieties.

Agronomy

- Vegetative propagation methods for underutilized fruit spp.
- Study the pest and diseases incidences on underutilized fruits species.
- Study the methods to enhance early seed germination, seedling growth, grafting success of Ber, Sour sop and Ceylon olive.
- Management of fruit quality and yield of Rambutan, Avocado, Grapes and Mango

STAFF LIST

FCRDS - Gannoruwa

Designation	No.
Head of the Institute / Research Officer In Charge	01
Research Officer	02
Farm Manager	01
Agricultural instructor	02
Program Assistant (Agriculture)	01
Research Assistant	02
Chief State Management Assistant	01
Public Management Assistant	01
Farm Clerk	02
Development Officer	02
Research Sub Assistant	02
Driver	01
Welder	01
Earth Mover Operator	01
Budder	03
Watcher	11
Labourer	49
Labourer (Contract)	13
Total	96

Rambutan Research Unit - Eraminigolla

Designation	No.
Farm Manager	01
Agricultural Instructor	01
Budder	01
Watcher	02
Labourer	04
Labourer (Contract)	03
Total	12

Horticulture Research Farm - Ambatenna

Designation	No.
Farm Manager	01
Agricultural Instructor	01
Technical Assistant	01
Farm Clerk	01
Budder	01
Watcher	03
Labourer	13
Labourer (Contract)	02
Total	23

1.3.2 PLANT VIRUS INDEXING CENTRE (PVIC) – HOMAGAMA

The Plant Virus Indexing Centre, Homagama functions under the purview of Fruit Crop Research & Development Institute, Horana. This center deals with the technologies for plant virus and virus like organism detection, production of test kits for their detection at both field and laboratory levels. These are employed for quarantine purposes,

epidemiological investigations, evaluation of possible control 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).

BUDGET

Table 1.3.2: Annual budget - 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure %
Capital	2,486,905	1,477,622.62	59
Recurrent	3,814,263	3,024,196.18	79
Projects			
• NARPP- Papaya Project	857,185	702,204.90	82
• NARPP- Bacteria Project	1,241,958	1,161,663.33	93
• NARP-Molecular Project	2,867,284	2,017,894.89	70
• Fruit Village Development Project	500,000	468,644.45	94
• Mahinda Rajapaksha Sport Complex (agriculture unit)	3,300,000	3,062,033.56	93
Total	15,067,595	11,914,260	79

PROGRESS

Conventional Plant Virology

- Efficacy of previously prepared polyclonal antiserum for Pineapple Wilting Virus (PWV) has diminished. New antiserum was prepared and the new protocol was optimized. The test kit can be used to differentiate PWV infections in pineapple plantations.
- In a host range study for Cucumber Mosaic Virus (CMV) following plants

were confirmed as alternative hosts for CMV. Mottumal (*Physalis minima*), Acmeella (*Acmella oleracea*), Monarakudumbiya (*Vernonia cinera*), Wild rubber (*Euphorbia heterophylla*), Walkotthamalli (*Scoparia dulcis*), Walkarabu (*Ludwigia decurrens*), Sarana (*Boerhavia repens*) Tomato (*Solanum lycopersicum*), Atapethiya (*Cosmos sulphureus*), Barbaton daisy (*Gerbera jamesonii*), Marigold (*Tagetes erecta*), Mae (*Vigna spp*). This study is in progress.

- Virus diseases of cowpea (*Vigna unguiculata*) in Southern province was identified. Poty group viruses are the common virus diseases found in cowpea cultivation in the province. Cowpea aphid borne mosaic virus, Cowpea severe mosaic virus, Cowpea mottle virus and Southern bean mosaic virus were identified. This study will be continued.
- Bud necrosis of mung bean was a severe problem in the mid season mung cultivation season in Hambanthota. The disease was first reported in 2011. The causal agent for this problem was identified as Ground nut bud necrosis virus.
- Survey was conducted to identify virus like diseases in Papaya (*Carica papaya*) in Mahiyangana, Aralaganvila and Hunnasgiriya. Papaya phytoplasma was a service problem. Papaya mosaic virus and Tomato spotted wilt virus was not recorded.

Molecular Virology

- MSV 440 *Agrobacterium rhizogenes* was cultured on LB medium supplemented with kanamycin. Then a single colony was picked and grown in LB broth and plasmid (PB1 N GFP Vector) was extracted. Competent cells were prepared using *Agrobacterium tumefaciens* (LBA 4404) and transformation was carried out. Callus taken from papaya embryos were dipped in *Agrobacterium tumefaciens* with GFP plasmid and co-cultivation was carried out.

Virus Epidemiology

- Imidacloprid 200g/l SL insecticide was injected with special syringes to large durian trees at different locations in Gampaha district to control wood boring attacks. The two consecutive doses showed successful control. Further studies are in progress.
- Pineapple plants grown in research fields were checked for the development of mosquitoes in axils. It was revealed that no such opportunities arise when plants are grown in open fields.
- Bagging fruits for controlling fruit quality associated pests, disease and disorders was initiated.
- Distribution of harmful and beneficial insects in legumes was studied. Pod sucking bugs (*Riptortus pedestris*) and aphids (*Aphis craccivora*) were abundant throughout the period. Studied is in progress.

Microbiology

- For the control of papaya ring spot virus (PRSV) in papaya (*Carica papaya*) through induced systemic resistance using Plant growth promoting Rhizobacteria, 20 *Pseudomonas* isolates and 4 *Bacillus* spp were isolated. Six *Pseudomonas* spp, which delayed PRSV symptom development were identified in pot experiments. Further evaluation is in progress.
- A study on use of tree injectors to manage anthracnose disease in Mango (*Mangifera indica*) revealed that the diseases caused by *Colletotrichum gloeosporioides* in

mango cannot be controlled using tree injectors.

Tissue Culture

- In tissue cultured Papaya, success rate of rooting was 10% and success rate for acclimatization was 100%. Ten TC plants have been planted in the field. Fruit bearing is successful and fruit quality was normal. This experiment will be continued.
- About 200 *in-vitro* leaf cultures of papaya in shoot proliferation were induced from callus. The protocol for shoot formation from callus using leaf cultures was optimized.
- Fifty banana TC plants of Nethrampalam, Cavendish, Suwadel and Amban varieties were field established from different subculture levels. One variegated plant was observed in the 12th subculture level of variety nethrappalum. No variation was observed at 5-9 sub culture level from any of the other varieties. Bunches can be seen in second generation. Study is in progress.
- Variety development from imported pomegranate and grapes through seed culture was commenced. 80% seed germination at *in vitro* condition and multiplication process completed. Rooting from shoot tips has commenced. Grapes seed culture from local grape varieties are also at multiplication stage.
- 1000 MG3 leaf cultured TC pineapple plants were established at Walpita farm to test the variation and suitability of the ex plants. Variation in fruit weight, crown size and thorniness characters were observed.
- Pineapple seeds were produced using selected varieties of MG3 and Kew. Twenty hybrid plants were field planted. Study is in progress.

Technology Transfer Division

- Technology transfer activities were carried out by conducting training programmes, plant clinics and other awareness activities for more than 320 participants representing farmers, school teachers and other stakeholders.
- Disease diagnosis service
A total of 2743 samples were indexed for virus and 150 samples were identified after the presence of fungi/ bacteria.

PLAN FOR 2015

- Production of polyclonal antiserum.
- Management of virus and virus like diseases.
- Studies on anti-viral compounds
- Transmission and host range studies of Sri Lankan isolates of chillie veinal mottle virus
- Routine virus indexing
- Study the potentials for the use of tree injection technique and other measures to control insect pests of fruit crops.
- Induced systemic resistance against papaya rings spot virus using plant growth promoting rhizobacteria
- Identification and management of leaf yellowing and browning problem of aquatic plant *Echinodorus bleheri*
- Development of environmental friendly nematode management strategies for leafy vegetables

- Production of PRSV resistant papaya variety through Tissue culture and gene transfer technology.
- Disease free basis planting material and mother plant production of banana & pineapple varieties Mauritius, MG3 and papaya varieties Red lady, Sinta and local cultivar.

STAFF LIST

Designation	No.
Deputy Director. (Research)	01
Research Officer	04
Agriculture Officer	01
Programme Assistant (Agriculture)	03
Agricultural Instructor	09
Research Assistant	05
Laboratory Sub Assistant	01
Public Management Assistant	03
Store man	01
Driver	03
Labourer (Permanent)	15
Labourer (Contract)	01
Labourer (Projects)	05
Watcher	03
Total	55

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 against 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 eco-systems, to develop appropriate technologies for these varieties and to primarily disseminate varieties and technologies.

BUDGET

Table 1.4.1: Annual Budget – 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	85,171,000.	65,116,983	77
Recurrent	37,890,261	34,968,415	93
Local projects			
• Infrastructure Development	71,178,740	71,092,202	100
• Development of rice varieties for abiotic stress	1,523,885	1,378,726	91
• Assessment of water availability	1,571,506	1,351,397	86
• Management of acid sulphate soils	722,166	161,332	22
• Rice export-I	24,200,000	16,583,482	69
• Rice export-II	3,000,000	1,648,790	55
• Rice export-III	1,500,000	1,121,628	75
• Testing of liquid fertilizer	212,000	40,000	19
• Soil analysis	500,000	164,288	33
Foreign projects			
• Green super rice	1,568,526	1,393,277	89
• Closing rice yield gap	1,226,536	1,204,877	98
• Productivity of Direct Seeded Rice Areas	976,536	813,434	83
• Rice Production Technologies	1,272,694	754,183	59
• Weed management	1,340,000	1,018,237	76
Total	233,853,850	198,811,152	85

PROGRESS

RESEARCH

Rice varietal improvement

The varietal improvement at RRDI is focused on developing varieties with higher yield potential and high genetic resistance for pest and diseases to minimize production inputs and environment pollution. 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, resistant to many biotic factors and good grain quality during the year 2014.

New rice varieties

Bg 251GSR – This is a 75-80 day, white nadu variety showing tolerance to moisture stress. This was released as a variety suitable for drought prone areas and especially for Yala cultivation. It gives a realizable yield of 5 t/ha. It is resistant to major pests and diseases, and to lodging.

Bg 310 – This is a 3 month, white nadu variety showing tolerance to salinity. This was released as a variety suitable for saline areas. It gives yields up to 5.4 t/ha.

Bg 455 – This is a 4¹/₂ month, red nadu variety showing moderate tolerance to submergence. This was released as a variety suitable for flood prone areas. It gives yields up to 5.4 t/ha.

4¹/₂ months age class rice

This age class is composed of around 6% of the total annual rice crop extent in Sri Lanka. This breeding program is focused to increase

yield potential with improved grain quality (eating and coking) characteristics while incorporating pest and disease resistance and adaptable to diverse environment.

Twelve crosses for grain quality, 2 crosses for drought tolerance, 4 crosses for yield potentials, 5 crosses for Blast resistance and 7 crosses for BLB resistance were made. Twenty F₁ populations and sixteen F₂ – F₄ populations were established. Twenty three crosses were selected from 25 advance populations.

Eighteen elite lines were evaluated in yield trial for major pest and disease, grain yield and grain quality characteristics. 13-491, 10-1786, 11-315, 12-685, 11-1759, 12-574 and 11-1749 lines were identified as promising. 09-606 and 08-301 lines were purified and multiplied.

3¹/₂ month age class rice

This age class rice varieties covers about 68% of the total rice growing area in Sri Lanka. As yielding ability of some 3¹/₂ month rice varieties is similar or higher than that of 4 month rice varieties and age fits well into the most of the rice growing ecosystems, this age class is popular among farmers. This varietal improvement program is focused to develop 3¹/₂ month age rice varieties with high yielding, acceptable grain quality and resistance to major biotic and abiotic stresses.

Twelve F₁ generations were selected from eighteen F₁ crosses. Nine F₂ populations, ten F₃ populations and six F₄ populations were identified as early segregating populations. About 650 progenies were selected for advanced generations from 41 crosses.

Sixteen elite lines were selected in yield trials. Bg 11-802 was selected for NCRVT.

Bg 10-2398, Bg 10-3171, Bg 10-1407, Bg 10-1399, Bg 10-1258, Bg 11-802 and Bg 11-2236 were multiplied.

3 months age class rice

Presently 3 months age rice varieties cover about 25% of the total annual cultivation extent in Sri Lanka. Rice cultivation especially in rain fed and minor irrigation schemes are significantly affected by water shortage. Therefore, development of short age rice varieties is important to escape the above adverse environmental conditions and also to increase water use efficiency, cropping intensity and productivity in both minor and major irrigation schemes.

A total of 20 crosses were made. Twelve populations were selected for further advancement. From F₂ to F₄, 31 bulk populations were advanced. From F₅ generation onwards, total of 454 progenies from 14 advanced populations were established and evaluated.

Bg 12-3079, Bg 12-3082, Bg 12-3042 and Bg 12-3068 were selected as elite lines in preliminary yield trials, and Bg 11-1051 and Bg 10-1140 were identified as promising in major yield trials.

2½ months age class rice

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 where 3 months varieties cannot be grown due to water shortage. Further, these varieties can be grown in the dry zone during Yala season with minimum irrigation water.

Thirty five crosses were made. Fifteen F₁ generations were established. Twenty four bulk populations (twelve F₂ and seven F₃ and five F₄) were established. 305 progenies were advanced and 97 progenies were selected.

13-1208, 13-1212, 13-1219, 13-1265, 13-TC 2, 13-2284, 13-2303, 13-2319 and 13-2359 were evaluated in preliminary yield trial. 12-1679, 12-1666, 12-1697, 12-1643, 10-2907, 13-1265, 13-1212 and 13-1219 were evaluated in major yield trial. Bg 10-2907 (red pericarp, short round grain type) was multiplied to supply the purified seeds. Bg 10-2881, Bg 12-1666, and Bg 13-1265 were nominated to NCRVT.

Quality rice

Sri Lanka has achieved self sufficiency in rice through increase in productivity. Therefore rice quality improvement is highly emphasized to manage extra production as well as to cater the future demand. This program aims to improve grain quality in terms of incorporating aroma, 20% - 25% amylose content, soft/medium gel consistency, high head rice percentage, minimum white belly, intermediate gelatinization temperature, good taste, good appearance to rice grains.

124 quality lines were characterized.

25 crosses were done with the objective of incorporating aroma and low amylose content for improved varieties as recurrent parents. 7 populations were advanced to F₂ generation.

5 F₃-populations were screened, advanced to form F₄ generations and 171 progenies were selected for F₅ generation.

Stress Tolerant rice

36 F₁ populations were advanced up to F₃ populations for the development of P deficiency tolerance rice varieties.

36 exotic rice varieties/lines were evaluated for P deficiency tolerant aspect in a field not fertilized for last 30 years. Sigadis (2½ maturity period), DM 43, Emataa 16, IR 64-21, Khaototl, Sadritor, Guanyint, IRRI 123 (3½ maturity period), RTS14, Seratoes, Surjamku, IR 8, Shaikuh, DNJ 140, Tog 7871, BJ 1 (4-4½ maturity period) were found promising under P deficient conditions.

Cold tolerant rice line MA2 and drought tolerant rice line Zhoghua were multiplied.

Hybrid rice

Use of hybrid vigor of rice is a key technology aimed at bridging the yield gap and raising the yield potential. Research on hybrid rice focuses on hybrid heterosis to develop promising hybrid rice varieties and to improve hybrid seed production.

Fifty one CMS lines, 51 maintainer lines and 181 restorer lines were maintained. 198 new crosses were made with selected parental lines.

133 new F₁ combinations were tested in test cross nursery. Out of them, 99 crosses were selected for back crossing in order to develop new CMS and maintainer lines, but all of them were found not suitable for PYT.

Advanced back cross combinations (BCNI – 22 populations; BCNII – 95 populations; BCNIII – 87 populations) were evaluated with their pollen parents. 7, 10 and 19 for BCNIV, BCNIII and BCNII respectively were selected.

13 hybrids combinations were tested in PYT. BgCMS4A/R147 and 70369A/SN290 gave highest of 36.4% and 35.36% standard heterosis respectively with yields of 5.12 t/ha and 5.09 t/h.

F₁ seeds of 12 combinations each 250 g were produced for PYT in next season.

F₁ seeds of Bg 407H and recently developed hybrid Bg CMS 4A/R147 were produced.

Nuclear seeds of Bg CMS 1A/1B and Bg CMS 4A/B (0.9 kg and 1.6 kg respectively) promising hybrid combinations were produced.

Five CMS and selected Restorer lines were crossed to obtain 25 F₁ combinations in order to identify promising hybrid parents.

14R, a selected 3½ month round shape red pericarp restorer line was subjected to selection using 250 progenies for improving the line further.

Progeny selection was conducted to maintain purity of the 1B line. It is maintainer of the F₁ of Bg407H and 250 progenies were maintained.

Study conducted to determine the effect of application of Ethanol in inducing pollen sterility of inbred variety Bg 357 found that neither different concentration ranging from 10% to 60% nor application stage (flower bud initiation, heading and flowering stage) had any effect on pollen sterility.

Rice varietal improvement through Biotechnology

BC₁ F₁ populations of Bg 352 and Bg 357 were produced by back crossing with 3 donors

(DSN22, CNI24 and Kolanethivee) for developing drought tolerant introgression lines.

BC₁ F₁ populations of Bg 358 were produced by back crossing with Ciharang+AG1 and IR64+AG1 for developing anaerobic condition tolerant introgression lines.

BC₂ F₁ population of Bg 366 was produced and planted to obtain BC₂ F₂ for developing anaerobic condition tolerant introgression lines.

Two BC₂ F₃ populations of Bg 360, One BC₂ F₄ population of Bg 96-741, One BC₂ F₅ population of Bg 379-2 and One BC₂ F₂ population of Bg 358 were produced for developing abiotic stress tolerant (submergence, salinity, drought and iron toxicity) lines.

BC₁ F₁ populations of Bg 352 and Bg 357 were produced by back crossing with IRBB 60 and IRBB 65 for developing BLB tolerant introgression line.

Plants in BC₁ F₁ populations obtained by back crossing of Pokurusamba and Bg 94-1 with Tetep and IRBB60 as donor parents of Blast and BLB resistance respectively were selected using both morphological characters and molecular markers for further advancement.

BC₂ F₁ population of Bg 300 obtained by back crossing with Pokkali for developing salinity tolerant introgression lines were evaluated and advanced through molecular marker assisted selection.

BC₁ F₁ population of Bg 360 was obtained by back crossing with Suwandel for developing fragrant introgression lines.

Regenerated plants in G₆ generation obtained by frequent sub culturing of seed calli of elite

rice variety Bg 250 with the objective of developing favorable mutants from in-vitro somaclonal variation, were evaluated. One promising line was identified and included in preliminary yield trial to be tested at 3½ moth age group.

Grain quality

Fifty one samples of NCRVT entries and 72 samples of advanced breeding materials were tested. One line of NCRVT entries as having highly acceptable sensory qualities and 8 lines of advanced breeding materials as having low head grain percentages than accepted values were identified.

Eighty four rice varieties/ traditional cultivars/ breeding lines were subjected to panel evaluation in order to identify quality rice suitable for export market based on physical appearance. 19 varieties/ lines were identified by the panel as having high quality physical appearance.

Antioxidant compounds of rice flour determined by radical scavenging activity using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) method of 8 traditional varieties – ‘Kalu Heenati’, ‘Sudu Heenati’, ‘Pachchaperumal’, ‘Maa Wee’, ‘Herath Banda’, ‘Sula’i, ‘Suduru Samba’ and ‘Inginimitiya’, and 3 improved varieties - Bg 360, Bg 352, Bg 358, Bw 272-6B showed that all red pericarp varieties including the improved variety Bw 272-6B had high scavenging ability between 89.3-93.8%. ‘Suduru Samba’ was the only white rice variety to have high scavenging ability. White pericarp Bg 352, Bg 358 and ‘Inginimitiya’ had medium scavenging ability between 34.4-

32.7%. Bg 360 recorded the lowest scavenging ability of 27.0%.

A study was conducted to ascertain whether there is a correlation of amylose content (AC) and gel consistency (GC) to 3 simple sequence repeat/short tandem repeats (SSR/STS) molecular markers- AGPiso (linked to AGPiso gene), GBSS1 and WX (linked to Waxy gene) using 31 rice varieties. Among the tested rice varieties, the AC and GC varied from 14.8% to 27.7% and 3.4 cm to 9.0 cm respectively. Study showed that markers did not show a significant association to AC and GC of the tested rice varieties.

Six food formulae were developed and evaluated for consumer preference. One formula was selected and it was found that it could be mixed with dehydrated vegetables.

Disease Management

Total of 379 entries were screened against BLB disease in both seasons. Among them, 36 entries in Maha and 12 entries in Yala were categorized as resistant or moderately resistant.

Total of 4708 entries were screened against rice blast disease. Among them, 1358 entries in Maha and 1681 entries in Yala were identified as resistant or moderately resistant to rice blast.

Since Silicon enhances the plant vigor, application of Silicon has been identified as an effective measure to control grain discoloration. In an experiment to determine the effect of application of Silicon in the form of Sodium Meta Silicate as a soil amendment at planting found that it has no effect. Application of partially burn paddy husk (500 kg/ha) at planting followed by application of

fungicide at flowering showed a positive effect in controlling grain discoloration.

Two new fungicides (Kresoxim- methyl 44.3% w/w and Tebuconazole 25% WDG) were evaluated for rice sheath blight and found that both fungicides were as good as the recommended fungicide (Tebuconazole 250g/l EW) against *Rhizoctonia solani*.

Pest Management

Green house and field screening was done to identify rice lines and varieties resistant to brown plant hopper. Total of 3625 entries were checked and 1991 entries were identified as resistance or moderately resistance to the gall midge and brown plant hopper damage respectively.

Buprofezin 25 SC, Sulfoxiflor 50WG, Sulfoxiflor 240 SC and Clothidin were tested and found that Buprofezin 25 SC (800 ml/ha), Sulfoxiflor 50WG (80 g/ha), Sulfoxiflor 240 SC (180 ml/ha) and Clothidin (72 g/ha) performed equally with the standard insecticide against brown plant hopper.

44 recommended rice varieties were evaluated for the resistance to brown plant hopper and found that Bg 403, At 353, and Bg 94-1 had higher resistant level.

Temporal variation of rice insect pests was studied using light trap collections. Results showed that the brown plant hopper, white back plant hopper and green leaf hopper populations decreased with increasing rainfall. Populations of stem borer, black bug and paddy bug populations decreased with elevated temperature. All the populations showed positive relationship with relative humidity.

Imidacloprid 70WG and Thiamethoxam 70WG insecticide compounds were re-evaluated against rice thrips and found that application of 20 g of each insecticide for 100 kg of seeds was effective against rice thrips.

Sulfoxaflor 50 WG, Clothianidene were tested against Carbosulfan 1280-1600ml/ha for the control of paddy bug and found that all insecticides were equally effective for paddy bug.

2500 breeding lines were screened to identify suitable rice lines resistant to Gall midge. 1438 lines were identified as promising.

44 recommended rice varieties were screened for rice thrips and found that 12 varieties were tolerant.

Weed Management

Bg 300, Bg 304, Bg 305, Bg 352, Bg 357, Bg 358, Bg 360, Bg 366, Bg 359 and Bg 94-1 were evaluated for their ability to perform under water seeding method of establishment and found that Bg 300, Bg 304, Bg 305, Bg 352, Bg 357, Bg 358, Bg 366, Bg 359 and Bg 94-1 can be used in water seeding.

Efficacy of Cyhalofop-butyl 100g/l EC followed by MCPA, Bispyribac sodium 100g/l SC, Quinclorac 250g/l SC followed by MCPA, Pretilachlor300g/l + Pyribenzoxim 20g/l EC, Pendimethalin 300g/l EC followed by MCPA and Oxyflurofen 240g/l EC were studied. It was found that Cyhalofop-butyl 100g/l EC followed by MCPA, Bispyribac sodium 100g/l SC, Quinclorac 250g/l EC followed by MCPA, Pretilachlor300g/l + Pyribenzoxim 20g/l EC and Oxyflurofen 240g/l EC can be used at the rate of 2 l/ha, 300ml/ha, 800ml/ha, 1.25 l/ha, 500ml/ha

respectively to control weeds in direct dry seeded rice grown under limited soil moisture conditions.

Thiobencarb 400g/l + Propanil 200g/l EC, Triafamone 200SC, Penoxsulam 16 + Trichloropyrbutotyl 120g/l, Cyhalofop-butyl + Pyribenzoxim 8.5% EC, Oxyflurofen 480g/l SL, Bispyribac Sodium 5% + Cyhalofop-butyl 15% OD, Propanil 60% + MCPA 7.5% DF showed significantly higher bio-efficacy over control of grasses, broadleaves and sedges compared to no-weeding plot where as Profoxydim 75g/l followed by MCPA 60% DF showed significantly better bio-efficacy over control of grasses. Since all of the herbicides showed a better bio-efficacy, they were nominated for the pilot scale testing.

Weed controlling ability of glufosinate ammonium 15% SL herbicides in pre plant condition in paddy fields were evaluated. Weed control efficacy of 2 l/ha, 3 l/ha and 4 l/ha of Glufosinate ammonium 15% SL were 51%, 90% and 96% respectively whereas that of 4 l/ha of Glyphosate 36% SL was 80%. 4 l/ha of Glufosinate ammonium 15% SL successfully controlled Panicum maximum which is a more problematic perennial upland weed.

Soil Fertility Management

Most suitable rate of K application to obtain optimum rice yields without depleting soil K was studied in long term basis. Application of rice straw at the rate of 5t/ha is enough to supply K requirement of rice. Application of rice straw with K fertilizer at flower initiation produced the highest grain yield.

Long term application of organic manure and chemical fertilizer on soil fertility and crop

productivity was studied. Yield increases due to application of OM, NPK and OM + NPK were 50%, 112% and 125% respectively in 27th and 28th seasons.

Field experiment conducted to observe long term effect of application of P fertilizer in different methods on soil fertility and crop production revealed that grain yield decreased when P was not applied and, there was no significant yield difference between plots applied with P in every season and alternative seasons for 7 consecutive seasons.

Nano fertilizers are slow release fertilizers meant to reduce fertilizer wastage. It was found that there is a possibility of reducing urea more than 25% when applied in nano form compared to conventional form.

44 recommended rice varieties were tested to see their performance in low fertile soils. It was observed the, Bw 367, Bw 364 and Bg 366 performed well in low fertility conditions.

Forty recommended new improved rice varieties and 8 traditional rice varieties were tested to identify rice varieties suitable for organic farming. Compost 2 t/ha + straw 5 t/ha + green manure 1t/ha-as basal and compost 2 t/ha at 4weeks after transplanting was used. Among 4-4¹/₂ new improved rice varieties ,At 405 , Bg 450, Bw 451, Bw 452, Bw 453, Bg 454 and Bg 379-2 performed well under organic condition and gave 3.45 t/ha average yield. Among 3¹/₂ new improved rice varieties, Bg 352 and At 362 performed well under organic condition and gave 3.4 t/ha average yield. .

Commercial liquid fertilizers; SMC Express, Golf, Compost tea, Anton product and Jiffy product were tested and found that none of the product is superior to that of DoA

recommended chemical fertilizer or DoA recommended chemical fertilizer + 4 t of compost/ha.

Water Management and GIS

Recommended rice varieties of different age classed were tested to identify suitable rice varieties under rainfed and irrigated farming conditions. At 308, Bg 366 and Bg 11-11 gave highest yields among varieties in 3, 3¹/₂ and 4 months age classes under irrigated condition respectively. Bg 300 and Bg 304, At 362, At 401 and Bg 380 respectively in 3, 3¹/₂, 4 and 4¹/₂ months age classes performed well in both Maha and Yala seasons under rainfed condition.

Soil, climate and crop data were used to calibrate the model and simulated for different scenarios. The best period for sowing paddy for rainfed rice cultivation during Maha season at Batalagoda is 1st week of October for 3¹/₂ month, 2nd week of October for 3 month, and 3rd week of October for 2¹/₂ month rice varieties.

Evaluation of alternate wetting and drying (AWD) technique with farmer practice at Polonnaruwa and Dimbulagala indicated that there was no significant yield difference between these two practices. Number of irrigations has reduced in AWD fields saving irrigation water by 14% – 17%.

Three varieties were tested under rainfed condition in different locations and found that Bg 250 performed well followed by At 304.

Agronomy

Thirteen new rice lines were tested with standard check varieties in 12 locations under NCRVT programme. Following lines were

selected based on respective special features for further testing in farmers' fields in VAT.

At 09-898 – 3½ months white samba line – aromatic very small grains

At 08-1024 – 3½ months white nadu line – higher yield and head grain yield than Bg 352 and Bg 366

Bw 03-1198 – 3½ months white nadu line – higher yield and head grain yield than Bg 352 and Bg 366

Ten new rice lines belonging to 3 and 3½ maturity classes were tested under NCRVT programme in Yala 2014.

Trials for testing adaptability of 7 new elite lines were conducted under VAT programme. Among the lines tested, Bg 10-2907 (2½ months line), Ld 08-1530 (2½ months line), Bg 9024 (2½ months line) and Bg 04-91 (3 months line) found to be more adaptable than that of the standard check varieties and promoted to LSVAT.

Four new rice lines were tested under VAT programme in Yala 2014.

Two new elite lines, At 07-695 (3½ months white samba) and Bg 07-997 (4½ months white nadu) were tested under large scale variety adaptability programme (LSVAT) in farmers' fields to evaluate the adaptability. Based on the responses given by the farmers on various characteristics of each line, both lines were confirmed as adaptable.

Nineteen rice varieties (Bg 300, Bg 304, CNI 9024, DSN11, DSN22, DSN56, AR 09/03, Bg 352, Bg 357, Bg 359, Bg 369, AR 9/15, AR 10/5, Black gora, Bg 379-2, Bg 403, Bg 11-11, Moroberecan and Azuzena) were evaluated to identify promising lines/varieties tolerant to intermittent and late drought stresses. Black

gora, Bg 379-2, Bg 403 and Moroberecan were identified as varieties tolerant to intermittent and late drought stress condition.

Tillering ability of 44 varieties was assessed under row seeding and random broadcasting establishment methods. Row seeding produced significantly higher number of tillers and panicles per plant compared to broadcasting. 4-4½ month age class produced highest number of tillers per plant (10-19 tillers/plant) followed by 3½ month age class (5-14 tillers/plant) and 2½-3 month age class (5-9 tillers/plant). Bg 454, Bg 450, Bg 379-2 and Bg 403 produced the highest number of tillers among all varieties.

Ten traditional varieties (Kahamaran Wee, Mada Al -1, Kalu Mada Al, Pachchaperumal, Kahata Wee, Goda Al Wee, Batapola Al, Kalu Wee, Al Wee, Mada Al -2) were screened to identify the germination ability under anaerobic condition as influenced by submerged condition. Kahamaran wee, Mada Al-1, Kalu Mada Al, Pachchaperumal and Batapola Al exhibited high ability to germinate under submerged condition. Highest stand establishment could be achieved when pre germinated seeds by soaking 24 hours and incubating for 48 hours were used.

Germination ability of 4 exotic (Ciherang+Sub1+AG1, Ciherang, IR 64+AG1, IR 64) and 4 local varieties (Bg 366, Bg 358, Bg 352, Bg 94-741) under anaerobic condition as induced by 10 cm of standing water at seeding were tested in a pot experiment. Standing water reduced the germination. Significantly higher germination percentages were observed in IR 64 and IR 64+Sub1 in standing water condition followed by Ciherang+AG1+ Sub1. Bg 96-741 and Bg 352

recorded the lowest germination in standing water condition.

Seedling height of plants grown with 8-10 cm deep standing water for 35 days from seeding & 3-4 cm of standing water until flowering do not differ to that of plants grown with saturated soil condition for 10 days after sowing and 3-4 cm of standing water until flowering. However, leaf greenness was significantly higher from 3rd to 5th week with standing water condition than with saturated condition. Weed density was lower with standing water condition (41 plants/ m²) than with saturated condition (139 plants/ m²). Weed density decreased with increasing seeding density. However, higher yield was obtained with saturated condition (5.66 t/ha compared to 5.01 t/ha).

SEED PRODUCTION

- Following amounts of breeder seeds of recommended rice varieties were produced for the national seed paddy program.

Table 1.4.2: Amount of breeder seeds produced in 2014

Age class and variety	Breeder Seed Quantity (kg)		
	Maha 2013/14	Yala 2014	Total
150-180 days			
Bg 3-5	225.5		225.5
Bg 745	246.0		246.0
Bg 38	184.5		184.5
Bg 407	143.5		143.5
4 months			
Bg 379-2	82.0	61.5	143.5
Bg 450	41.0	61.5	102.5
Bg 403		41.0	41.0
Bg 406	41.0	20.5	61.5

Age class and variety	Breeder Seed Quantity (kg)		
	Maha 2013/14	Yala 2014	Total
3½ months			
Bg 94-1	164.0	225.5	389.5
Bg 352	184.5	205.0	389.5
Bg 357	102.5	82.0	184.5
Bg 358	205.0	266.5	471.5
Bg 359	123.0	143.5	266.5
Bg 360	143.5	143.5	287.0
Bg 366	242.0	242.0	484.0
Bg 369	100	100.0	200.0
Bg 370	143.5	82.0	225.5
3 months			
Bg 300	220.0	220.0	440.0
Bg 310	100	100.0	200.0
80 days			
Bg 250	61.5	61.5	123.0
Total	2753.0	2056.0	4809.0

- The following quantities of purified seeds of traditional rice varieties were produced

Table 1.4.3: Amount of purified seeds produced in 2014

Variety	Seed Quantity (kg)		
	Maha 2013/14	Yala 2014	Total
Sudu heenati	108	140	248
Kalu heenati	79	90	169
Suwandal	94	150	244
Pachchaperumal	75	100	175
Madathawalu	10	145	155
Pokkali	45	100	145
Kuruluthuda	19		19
Suduru samba	15		15
Weda heenati	03		03
Raththal	15		15
Rathsuwandel		40	40

- Bg 304, Bg 305, Bg 96-741 and Bg 1165-6 were multiplied.
- 25,645 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.

- Management of weeds and weedy rice in dry seeded rice in Sri Lanka (Funded by IRRI) - The project aims dissemination of developed integrated approach of technology package to control weeds and weedy rice among farmers through field demonstrations and awareness programs.
- Green super rice (Funded by IRRI) – The project aims to develop and promote rice cultivars with high nutrient efficiency and stress tolerance.
- Closing rice Yield gap in Asia (Funded by IRRI) – The project aims to develop technologies to close yield gaps existing in high productive areas through on-farm adaptive research
- Increasing productivity of direct seeded rice areas by incorporating genes tolerant to anaerobic germination (Funded by IRRI) – The project aims to develop rice varieties that are tolerant to flooding during germination and have superior early seedling establishment for direct seeded rice systems
- Development of rice production technologies for increasing self sufficiency staple food in Sri Lanka (Funded by AFACI – Korea) – The project aims to develop rice production technologies to increase rice production in saline areas in Sri Lanka
- 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.
- 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.
- Development of quality rice varieties and associated technology package for exploiting export market (Funded by Ministry of Agriculture) – The project aims to generate technology for quality rice production.
- Efficient utilization of phosphorous fertilizer in paddy fields (Funded by Ministry of Agriculture) – The project aims to demonstrate use of phosphorous fertilizer in alternative seasons to enhance efficiency.
- Productivity enhancement of Low Country Wet Zone paddies (Funded by Ministry of Agriculture) – The project aims to enhance the productivity in Low Country Wet Zone of Sri Lanka which is constrained by biotic and abiotic stresses like salinity, iron toxicity, submergence and bog soils.

TECHNOLOGY DISSEMINATION

- Eighty four soil samples received under soil test based fertilizer recommendation program were analyzed and test result base inorganic & organic fertilizer recommendations were issued.
- Hundred and twenty demonstration plots were established in Puttlam district to demonstrate the appropriate management practices such as cleaning drainage canal, application of organic manure, maintenance of 2 cm deep standing water up to flowering stage and use of appropriate varieties for salt affected paddy fields. With above beneficial management practices, the average yield of salt susceptible rice variety Bg 352 increased from 2 to 4 t/ha while salt tolerant rice lines Bg 5-110 and Bg 4-91 recorded 6.5 t/ha and 5.0 t/ha yield respectively.
- Eight farmer field demonstrations were conducted on weeds and weedy rice management in rice in Kurunegala and Ampara districts
- Ten awareness programs on efficient fertilizer management in paddy fields were conducted for district agriculture committee members in ten districts.
- Hundred and thirty four awareness programs were conducted for farmers in the Anamaduwa Agriculture Segments on development of soil salinity in paddy fields and measures to alleviate soil salinity.
- Twenty five awareness programs were conducted on weed management for farmers and extension officers.
- Five awareness programs and 1 field day were conducted on alternative wetting and

drying technique for farmers and officers of DOA and Irrigation Department.

- One hundred and six training programs of different levels for different types of trainees were conducted by the Rice Production Technology Center of RRD I for total of 2497 participants as given below.

Table 1:4:3 Summary of training programs conducted in 2014

Type of Programme	No. of Progra mmes	No. of Partic ipants
Farmer trainings (one day)	23	771
Farmer field schools	06	
Agriculture technical officer trainings	56	921
Subject Matter Officer trainings (seasonal)	02	30
Diploma student trainings	07	377
University student visits	06	296
School children visits	06	102
Total	106	2497

- Twenty one samples brought by farmers were inspected for diagnosis of pests and diseases, and appropriate instructions were given for the control of pests and diseases
- Seven farmer fields in different areas in the country were inspected for diagnosis of pests and diseases, and instructions were given for the control of pests and diseases
- Participated in eastern province agriculture exhibition held on 7-8 Oct. 2014 at Kalmunei with a stall of the institute.
- Fifteen radio programs were conducted (2 programs on 'efficient management of fertilizer in paddy fields', 11 programs on

- ‘weedy rice and weed control in rice’, 1 program on ‘water management’, 1 program on ‘Alternative Wetting and Drying’ and 1 live program on ‘rice cultivation in Maha season’).
- Two video programs on efficient management of fertilizer in paddy fields, 1 video program on Alternative Wetting and Drying and 1 video program on pest management were recorded and telecast over National TV.
 - Officers attended two crop clinics conducted at Mahaweli area and ‘Deyata Kirula’ exhibition premises.
 - Officers attended as resource persons for 9 trainings organized by the other units of DOA.

TRAINING, CONFERENCES & WORKSHOPS ATTENDED

Following trainings, workshops and conferences were attended by the officers of RRDI

- Training on Bacteriology. 28 Jan. 2014, Gannoruwa: DOA
- Training workshop on Histology. 5 Feb. 2014, HORDI, Gannoruwa: DOA
- Training on Drought monitoring and early warning. 17 - 21 Feb. 2014, Arthur C. Clarke Institute, Moratuwa: Arthur C. Clarke Institute for Modern Technologies
- First Annual Meeting of Closing Rice Yield Gap Project. 17-21 Feb. 2014, Vietnam: IRRI
- Technological essentials for quality assured seed production in annual food crops in Sri Lanka. 26 Feb. – 01 March 2014, Post

Graduate Institute of Agriculture, Peradeniya: PGIA

- Data Analysis and Experimental Design. 28 March 2014, ISTI, Gannoruwa: DOA
- Workshop on Effective Scientific Writing. 08 April 2014, PGRC, Gannoruwa: DOA
- Training Workshop on Green and Yellow List Preparation for PCCP. 06-08 May 2014, ISTI, Gannoruwa: DOA
- Training Course on Hybrid Rice Seed Production Technology for Asian Countries. 06 June – 04 Aug. 2014, Yuan Longping High-tech Agriculture Co. Ltd., China: Yuan Longping High-tech Agriculture Co. Ltd.
- Regional expert consultation meeting for inception on identification of rice varieties tolerant to abiotic stresses in SAARC countries. 10-11 June 2014, Dhaka, Bangladesh: SAARC Agriculture Center and IRRI
- Regional forum on space technology applications for drought monitoring and early warning. 1 - 2 July 2014, Mt. Lavinia: Arthur C. Clark Centre
- Principal Investigators Meeting on New Pan-Asian and Regional Projects. 08 - 12 July 2014, Manila, Philippine: Asian Food and Agriculture Cooperation Initiative (AFACI)
- Seminar on Mutation Breeding. 18 July 2014, ISTI, Gannoruwa: DOA
- Training on Rice Production Technology. 24 - 30 Aug. 2014, Ikshan, South Korea: RDA

- Training on Nematodes and Its Control. 02 Sep. 2014, RRDI, Batalagoda: RRDI, DOA
- Workshop on Statistical Design and Analysis. 11 Sep. 2014, PGIA, Peradeniya: Young Science Foundation
- Workshop on Water Professional Day. 01 Oct., Post Graduate Institute of Agriculture, University of Peradeniya: PGIA
- Refresh Workshop on Permanent Crop Clinic Program (PCCP). 11 Oct. 2014, PGRC, Gannoruwa : DOA
- Short course on plant protection techniques. 24 Oct. – 04 Nov. 2014, PGIA, Peradeniya: PGIA
- Sustainable Rice Platform 4th annual plenary meeting and stakeholder meeting. 27-28 Oct. 2014, Bangkok, Thailand: IRRI
- 4th International Rice Congress. 27 Oct. – 1 Nov. 2014, Bangkok, Thailand: IRRI
- Eighteenth Council for Partnerships on Research in Asia (CORRA) Annual Meeting. 30 Oct. 2014, Bangkok, Thailand: IRRI
- CORRA – GRISP workshop. 3 Nov. 2014, ICRISAT, India: IRRI
- Short course on Molecular Diagnostics. 17-19 Nov. 2014, University of Peradeniya : University of Peradeniya
- World Biodiversity Congress. 24-27 Nov. 2014, Colombo: Global Scientific Forum and University of Colombo
- Short course on Plant Protection Techniques. 24 Nov. – 04 Dec. 2014, HORDI, Gannoruwa : PGIA
- International Symposium on Agriculture and Environment, 27 Nov. 2014, Mapalana, Kamburupitiya: University of Ruhuna
- International Symposium on Biodiversity, Food & Nutrition. 08 Dec. 2014, Colombo: Wayamba University
- Training on Food Analysis. 9-12 Dec. 2014, Industrial Technology Institute, Colombo : ITI
- International workshop cum training program on Irrigation System and Water Management. 09-18 Dec. 2014, Islamabad, Pakistan: National Centre for Rural Development, Pakistan.

OTHER ACTIVITIES

- Nine hundred and fifty rice accessions including traditional cultivars, introductions and improved lines were established and dried 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 groups on their request.
- Facilities were provided for 11 students of Agriculture Schools to carry out their in plant trainings as a partial fulfillment of the Diploma course under the supervision of officers of RRDI
- Facilities were provided for 4 undergraduate and 1 postgraduate students to carry out their research projects under the supervision of officers of RRDI
- Various publications the DOA (total number 2431) worth of Rs. 189,159.00

were sold at the outlet at Rice Production Technology Center

- As a collaborating organization of the project implemented by Seed Health and Testing Unit at Gannoruwa, different species of rice plant hoppers (RPH) and their natural enemies were monitored in a crop grown under insecticide free condition.

RICE RESEARCH STATION – AMBALANTHOTA

The prime objective of the Rice Research Station, Ambalanthota is development of improved red-pericarped, salinity tolerant, short-maturity and high yielding rice varieties with improved grain quality attributes. The station is also responsible for developing related technologies to improve productivity in saline areas and producing of breeder seeds of recommended “At” varieties.

PROGRESS RESEARCH

Rice varietal improvement

New rice varieties

At 373 –3^{1/2} month white, aromatic small samba grain type variety with good cooking quality and appearance.

3 month age class

Seventy new crosses were made. Forty one early segregating generations were selected and maintained separately. From F₅ generation on wards about 658 progenies were maintained and selected for generation advancement.

Fourteen lines were evaluated in Preliminary Yield Trial and 6 lines were selected to Major Yield Trial. Forteen lines were evaluated in Major Yield Trial and 5 lines were selected to nominate NCRVT. At 10-1374, At 10-1240, and At 10-1327 were identified as promising lines and nominated to evaluate in NCRVT.

3^{1/2} month age class

Sixty eight crosses were made. From F₅ generation onwards, 398 progenies were established and 95 were selected for further evaluation. Twelve promising lines were selected to test yield potential in preliminary yield trials (PYT) and 8 lines were selected from PYT to further evaluate in major yield trials (MYT).

Agronomy

Two trials under NCRVT programmes were conducted in each Maha 2013/14 and Yala 2014. Thirteen new rice lines were tested with standard check varieties. At 10-1350 were found promising.

Trials for testing 07 new elite lines in Maha and 04 new elite lines in Yala were conducted under VAT programme.

Grain quality and post-harvest aspects

Variety At 405 both in un-sprouted and sprouted forms was found to be suitable for producing vegetarian sausages. Developed products contain more fiber and less fat compared to chicken sausages available in the market. Compact filling of sausages to obtain desirable cross sectional appearance is required.

SPECIAL PROJECTS

As a collaborating organization of the ‘Development of rice varieties for abiotic stress; submergence, salinity, drought escape / tolerance and iron toxicity’ project funded by NARP and implemented by RRDI, Batalagoda, about 20 crosses were made to develop salinity tolerant breeding lines. Eight breeding lines with salinity tolerant were selected in BC₃F₁ generation

TECHNOLOGY DISSEMINATION

- Trainings were given to students of Agriculture Schools as a partial fulfillment of the Diploma course
- Officers attended as resource persons for monthly crop clinics arranged by the DOA extension staff
- Information was given to university students, technical staff of DOA, school children, and farmers who visited the institute.
- Facilities were provided to 1 undergraduate student to carry out final year research project.

BREEDER SEED PRODUCTION

Following amounts of breeder seeds of recommended rice varieties were produced for the national seed paddy programme.

Table 1.4.4: Breeder seed production

Variety	Breeder seed quantity (kg)		Total
	Maha	Yala	
	2011/12	2012	
<u>3 months</u>			
At 306	20		20
At 307	120	100	220
At 308	80	80	160
At 309	100	20	120
<u>3½ months</u>			
At 353	20	20	40
At 362	220	220	440
<u>4 months</u>			
At 405	40	-	40

TRAINING, CONFERENCES & WORKSHOPS ATTENDED

- Food analysis, antioxidant bioassay and current trends in food technology. 2014.

RICE RESEARCH STATION – LABUDUWA

RRS – Labuduwa is responsible for developing red-pericarped rice varieties and related technologies to improve productivity in high potential mineral soil rice lands in the Low Country Wet Zone of Sri Lanka.

PROGRESS

RESEARCH

Varietal Improvement

Eleven crosses were made and 15 F₁, 13 F₂, 10 F₃ and 10 F₄ generations were advanced. Two hundred and twenty nine advanced breeding lines were maintained for the development of high yielding adaptable and quality rice

varieties for high potential rice lands in LCWZ.

Six crosses were made for the improvement of rice varieties for grain quality.

Three crosses were made for improvement of rice varieties for the salinity affected flood prone soil conditions of Low Country Wet Zone.

From observational yield trial three lines, Ld 12-2-8, Ld 12-6-22-1-2 and Ld 11-4-3-1-2 (yield > 6.5t/ha) were selected for MYT during maha 2014/15.

Agronomy

Two trials were conducted under NCRVT programme in each Maha 2013/14 and Yala 2014. Thirteen new rice lines were tested with standard check varieties. Bg 09-1088 (3 months white nadu type line), Bg 11-802 (3½ months white nadu line) were found promising.

Trials for testing 7 new elite lines in Maha and 4 elite lines in Yala were conducted under VAT programme.

Soil Science

Evaluated the impact of partially burnt rice husk charcoal (PBRHC) to alleviate iron toxicity in LCWZ rice. 5 levels of PBRHC were evaluated.

Study the affect lime application, rice straw mulch, partially burnt rice husk charcoal (PBRHC) and rock phosphate on performance rice in acid sulphate affected soil in selected site in Matara district.

Tested N response of two promising rice lines.

Plant Protection

Rice lines of International Network for Genetic Evaluation of Rice (INGER) for Bacterial Leaf Blight (BLB) were evaluated further for Bacterial Leaf Blight resistance, quality, yield and other characters. Four lines were promising and selected for yield evaluation trials.

Three herbicides were effective in controlling weeds in Low Country Wet Zone under rain fed condition of rice.

BREEDER SEED PRODUCTION

40 kg of Ld 365, 60 kg of Ld 368, 20 kg of Ld 408 and 60 kg of Ld 371 were produced.

TECHNOLOGY DISSEMINATION

- Distributed 600 leaflets to farmers on weed management
- Educated 721 school students who visited the station about rice research and rice cultivation
- Conducted 4 pre seasonal training programs on plant protection and soil management
- Participated in 4 radio programs on plant protection and soil management

TRAINING, CONFERENCES & WORKSHOPS ATTENDED

Following trainings, workshops and conferences were attended by the officers

- GIS and Applications. 17-22 Feb. 2014, Postgraduate Institute of Science, University of Peradeniya.

- Regional training course on the Use of C-13 in Soil Organic Matter Studies and in Assessment of Plant Tolerance to Abiotic Stress (Drought and Salinity). 04-08 Aug. 2014, Beijing, China.
- Seminar on Agricultural South-South Cooperation for officials of English speaking Countries in Africa. 9 June – 2 July 2014, Beijing, China.

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 has other responsibilities such as producing basic seeds of recommended varieties, conducting trials of NCRVT and finding solution to field problems of rice farmers in the region.

PROGRESS

RESEARCH

Agronomy

Two trials were conducted under NCRVT programme in Maha 2013/14. Thirteen new rice lines were tested with standard check varieties. Bg 09-1851 (3 months white nadu type line), Bg 11-802 (3½ months white nadu line) were found promising.

Trials for testing adaptability of 07 new elite lines in Maha and 04 new elite lines in Yala were conducted under VAT programme.

BASIC SEED PRODUCTION

Produced 1800 kg of seed paddy of Bg 94-1, Bg 250, At 306, At 362, MA 2 and CNI 9024.

TECHNOLOGY DISSEMINATION

- Information was provided to nearly 225 farmers and students who visited the station.
- Three training programs were conducted at the station for farmers, students of Agriculture School, Kundasale and students of HARDI, Ampara.
- 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 on 1. Effective weed management in Ampara district, 2. How to overcome the paddy post harvesting losses and 3. Compost production and usage

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

Two trials were conducted under NCRVT programme in each Maha 2013/14 and Yala 2014. Thirteen new rice lines were tested with standard check varieties. Bg 10-1083 (3 months white nadu type line), At 08-1024 and At 08-1283 (3½ months white nadu lines) were found promising.

26 samples of traditional rice growing in the Northern region were collected and planted for purification and characterization.

Breeding lines were planted and characters were studied.

Growth parameters of tiller per hill and LAI increased with increased row spacing whereas density, height and tiller density decreased. Similarly, yield parameters of panicle length, fertile spikelets, total spikelets, ineffective tiller density, effective tiller per hill, ineffective tiller per hill increased with increasing row spacing whereas panicle weight, sterile spikelets, effective tiller density, yield, biological index and harvest index decreased.

Bg 300, At 308, Bg 358, Bg 360 and At 362 were tested for weed competitive ability. At 308 gave significantly high yield under partial weedy condition and so it had higher weed competitiveness.

Phytotoxicity of Oxyflurofen was investigated and it was found that there is no significant phytotoxic effect of Oxyflurofen on rice.

Significant yield difference was not observed between application of N as urea and Nano fertilizer.

In an experiment conducted to reevaluate common herbicides used in paddy cultivation found that Pyrazosulfuron-ethyl (SIRIUS) performed well to control the sedges; Gulliver and Profit performed well to control the broad leaves and pyroxasulfone performed well to control the grasses. Applications of Pyroxasulfone, Oxadizon + Propanil and Oxyfluorfen significantly reduced the yield loss in paddy than other herbicides.

BASIC SEED PRODUCTION

Produced 5105 kg of Bg 300.

TECHNOLOGY DISSEMINATION

- Fifteen farmer fields in the northern area were inspected and recommendations were given to solve site specific problems on rice.
- Information was provided to about 250 students and 20 teachers of schools from Jaffna, Mullaitivu and Kilinochchi districts who visited the station.
- Officers served as resource person in many training programs conducted by DATC, Vaddakachchi, Kilinochchi.
- Exhibits were provided for the Northern Province Agricultural Exhibition held in DATC, Vaddakachchi, Kilinochchi.

TRAINING, CONFERENCES & WORKSHOPS ATTENDED

- First Annual Meeting of Closing Rice Yield Gap Project. 17-21 Feb. 2014, Vietnam: IRRI

RICE RESEARCH STATION

- MURUNKAN

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

Two trials were conducted under NCRVT programme in each Maha 2013/14 and Yala 2014. Thirteen new rice lines were tested with standard check varieties. Bg 10-3375 (3 months white nadu type line), At 08-1024 and At 08-1283 (3½ months white nadu lines) were found promising.

Fipronil 0.3G, Virtako 40WG and 2 Diazinon 5G formulations were found effective for the control of yellow stem borer.

BASIC SEED PRODUCTION

Produced 252 kg of Bg 360, 458 kg of At 308 and 250 kg of Bg 352.

TECHNOLOGY DISSEMINATION

- Twenty field visits were made by the officers to solve regional site specific problems on rice.
- Exhibits were provided for the Northern Province Agricultural Exhibition held in DATC, Vaddakachchi.

- Advice and recommendations were given for about 65 farmers who visited the station.
- Two radio programmes were conducted on pest management by using natural pesticides and conserve natural enemies in the paddy field during crop cultivations.
- One officer participated as a National Master Trainer to train the Agriculture Instructors of North and Eastern provinces as resource person for plant clinic programme organized by the DOA.
- Two training programmes were conducted for officers and farmers on Plant protection under FAO programme.
- One training class was conducted on plant protection for 60 students and 120 government officers.

PLAN FOR 2015

RRDI, BATALAGODA

Research

- Hybridization and selection of lines of 2½, 3, 3½, 4-4½ and 5-6 months age groups
- Evaluation of elite rice lines of 2½, 3, 3½, 4-4½ and 5-6 months age groups in Preliminary Yield Trials and Major Yield Trials
- Multiplication of elite rice lines (advanced generations) of 2½, 3, 3½, 4-4½ and 5-6 months age groups
- Back crossing and marker assisted selection 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
- Conservation of germplasm through multiplication
- Screening of rice varieties for salinity, drought, high temperature, submergence and anaerobic germination tolerance
- Screening of breeding lines and new introductions for important pests and diseases
- Evaluation of pesticides for major pests of rice
- Assessment of pest dynamics
- Investigation of methods to control rice diseases
- Evaluation of herbicides in rice crop
- Investigation of methods to control weeds in rice
- Phenotypic screening of traditional rice lines to develop mini core collection
- Evaluation of factors affecting grain discoloration
- Evaluation of AG tolerant varieties
- Evaluation of grain quality characters of new breeding lines
- Evaluation of breeding lines for Nitrogen response
- Evaluation of fertilizers and application time for rice cultivation
- Mapping of fertility status
- Evaluation of Alternate Wetting and Drying (AWD) technique
- Crop simulation and modeling for rice cultivation

Seed Production

- Production of breeder seeds of recommended rice varieties (Bg 250, Bg 251, Bg 300, Bg 310, Bg 94-1, Bg 352, Bg

357, Bg 358, Bg 359, Bg 360, Bg 366, Bg 369, Bg 370, Bg 38, Bg 745, Bg 3-5, Bg 403, Bg 406, Bg 407, Bg 450, Bg 454, Bg 379-2)

- Production of purified seeds of selected traditional rice varieties
- Production of commercial seeds of popular rice varieties

Special Projects

Following small scale research and development projects funded by international agencies, NARP and Ministry of Agriculture will be implemented.

- Management of weeds and weedy rice in dry seeded rice 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
- Development of rice production technologies for increasing self sufficiency staple food in Sri Lanka
- Development of rice varieties for abiotic stress; submergence, salinity, drought escape / tolerance and iron toxicity
- Assessment of water availability in rainfed paddy fields in Kurunegala district for optimum utilization of water in rice production
- Determination of Phosphorus fertilizer requirement for rice based on soil Phosphorus map of Sri Lanka

- Development of technology for export quality rice production
- Productivity enhancement of Low Country Wet Zone paddies

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

RRS, AMBALANTOTA

- Hybridization and selection of lines of 3 and 3¹/₂ months age groups
- Evaluation of elite rice lines of 3 and 3¹/₂ months age groups in Preliminary Yield Trials and Major Yield Trials
- Multiplication of elite rice lines (advanced generations) of 3 and 3¹/₂ months age groups
- Production of breeder seeds of recommended rice varieties
- Conducting trials of NCRVT and VAT

RRS, LABUDUWA

- Selection of bulk populations to identify promising lines
- Conducting trials of NCRVT and VAT
- Production of basic seeds

RRS, SAMMANTHURAI

- Selection of bulk populations to identify promising lines
- Conducting trials of NCRVT and VAT
- Production of basic seeds

RRS, PARANTHAN

- 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
- Development of high yielding resistant to major pest & disease, short-intermediate duration rice varieties
- Carrying out coordinated variety testing and adaptability testing trials

RRS, MURUNKAN

- Testing the efficacy of *Calotropis* leaves for the management of rice leaf-folder (RLF)
- Reevaluation of Diazinon to control of rice stem borer
- Testing the allelopathic effect by different rice varieties on weeds
- Evaluation of performance of herbicides through change the time of application
- Modifying of pre emergence herbicides application free from phytotoxic effect
- Conducting national coordinated herbicide trials
- Testing of Nano nitrogen fertilizer on rice plant

STAFF LIST

RRDI, Batalagoda

Designation	No.
Director	01
Additional Director	01
Deputy Director	01
Research Officer	19
Agricultural Economist	01
Assistant Director of Agriculture	01
Agriculture Officer	03
Agricultural Monitoring Officer	01
Programme Assistant (Agriculture)	06
Agricultural Instructor	18
Research Assistant	10
Research Sub Assistant	04
Administrative Officer	01
Public Management Assistant	12
Development Officer	07
Office Assistant	01
Earth Mover Operator	02
Farm Clerk	01
Technician	01
Mechanic	01
Carpenter	01
Driver	09
Lorry Cleaner	01
Circuit Bungalow Keeper	01
Cook	02
Watcher	13
Labourer (Permanent)	148
Labourer (Contract)	02
Total	269

RRS, Ambalantota

Designation	No.
Deputy Director (Research)	01
Research Officer	03
Agricultural Instructor	01
Research Assistant	03
Research Sub Assistant	02
Development Officer	03
Public Management Assistant	01
Farm Clerk	01
Driver	02
Watcher	03
Earth Mover Operator	01
Labourer (Permanent)	33
Labourer (Contract)	05
Total	59

RRS, Labuduwa

Designation	No.
Research Officer in Charge	03
Agricultural Instructor	04
Research Assistant	05
Program Assistant (Agriculture)	01
Development Officer	02
Public Management Assistant	02
Driver	02
Earth Mover Operator	01
Watcher	04
Labourer (Permanent)	16
Labourer (Contract)	02
Total	42

RRS, Sammanthurai

Designation	No.
Research Officer in Charge	01
Agriculture Officer	01
Agricultural Instructor	01
Research Assistant	01
Development Officer	05
Technical Assistant	02
Public Management Assistant	02
KKS	01
Driver	01
Earth Mover Operator	01
Watcher	05
Labourer (Permanent)	10
Labourer (Contract)	03
Total	34

RRS, Paranthan

Designation	No.
Research Officer in Charge	01
Research Assistant	01
Agricultural Instructor	01
Research Sub Assistant	01
Development Officer	01
Driver	01
Earth Mover Operator	01
Watcher	01
Labourer (Permanent)	05
Labourer (Contract)	02
Total	15

RRS, Murunkan

Designation	No.
Research Assistant	01
Technical Assistant	01
Watcher	02
Labourer (Permanent)	09
Total	13

1.4.1 REGIONAL RICE RESEARCH AND DEVELOPMENT CENTRE (RRRDC) – BOMBUWELA

Regional Rice Research and Development Centre (RRRDC), Bombuwela which is one of the sub stations of Rice Research and Development Institute (RRDI) is located in agro ecological zone WL1b. RRRDC is mandated to carryout research and development activities to address the problems related to paddy cultivation particularly in five

administrative districts i.e. Kalutara, Colombo, Gampaha, and part of Galle and Ratnapura. Accordingly it aims to develop high yielding red and white pericarped rice varieties with iron toxicity tolerance, technologies suitable for increasing productivity and production of breeder seeds of varieties suitable for the area.

BUDGET

Table 1.4.1.1: Annual Budget – 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	5,275,000	2,990,328	57
Recurrent	10,676,043	9,200,920	86
Projects			
• Varietal development for abiotic stresses	230,000	197,394	86
• Rice land productivity improvement	624,000	463,829	74
• Quality rice varieties for export market	1,165,000	1,048,009	90
• Testing of soil and compost.	900,000	818,127	91
• Testing of liquid fertilizers	212,000	212,000	100
• Testing of new fertilizers	50,000	48,650	97
Total	19,132,043	14,979,257	78

PROGRESS

RESEARCH

Rice varietal improvement

Bw 11-3403, a rice line belonging to 3 months maturity group was nominated to NCRVT in Maha2014/15. It is a red pericarped line with intermediate bold type grains.

Thirteen lines from 3½ months maturity group were selected for Preliminary Yield Trial (PYT) and Major Yield Trial (MYT). Another 3 lines and 5 lines were selected respectively from 3 months and 85 day maturity groups for MYTs.

Eight popular traditional rice varieties were multiplied.

Disease Management

A total of 77 rice lines developed under rice improvement programs of Bomбуwela and Labuduwa were screened against rice blast disease. Of them, 45 resistant lines and 13 moderately resistant lines were identified.

Sixty six lines nominated for NCRVT were screened for rice blast. Twenty one resistant lines and one moderately resistant line were identified.

Seventy seven entries received under International Network for Genetic Evaluation of Rice (INGER) program were screened against rice blast. Forty two highly resistant varieties and 8 moderately resistant varieties were identified. Among them, 26 highly resistant /tolerant varieties were identified and characterized. Eleven lines were multiplied.

Pest Management

Forty nine rice lines/ varieties being tested in NCRVT were screened under green house condition against brown plant hopper (BPH) (*Nilaparvata lugens*). Of them, 1 resistant line (At 08-1283), 1 resistant /moderately resistant (R/MR) line (Bw 03-1198) and 10 moderately resistant lines were identified.

The same rice lines were also screened for rice gall midge (RGM) (*Orseolia oryzae*) under field condition.

Fifty two entries received under International Network for Genetic Evaluation of Rice (INGER) programme were screened for BPH in green house and 4 entries and 16 entries were identified as R/MR and MR respectively.

Occurrence of Rice Sheath Mite (RSM) (*Steneotarsonemus spinkii* Smiley) in the

region has increased during the past few years. Study on host range of RSM revealed that, wild rice (*Oryza nivara*) and graminaceous weed (*Sacciolepis interrupta*) are good alternate hosts of RSM while *Echinochloa crus-gali* and *Leptocloa chinencis* play a minor role.

Profenophos 40 EC is a tentatively recommended acaricide that is toxic to non target organisms including natural enemies. Three new eco-friendly acaricides were evaluated with the objective of identifying alternatives and found that two of them were promising.

A study started in December 2012 to develop forecasting model for RSM was continued.

Soil Fertility Management

Study conducted to assess heavy metals and trace elements present in rice varieties revealed that Pb, Cd and Cu were not present in detectable levels in both rice grain and bran of tested Bg and Bw varieties. It was also found that, the highest contents of Fe and Zn were present in grains and bran of Bw varieties while the highest Mn content was observed in Bg varieties. Furthermore, Fe, Zn and Mn contents in rice bran were higher than that of rice grains. The highest content of Fe was detected in rice bran of red pericarped varieties.

Study on split application of existing phosphorus recommendation under LCWZ conditions indicated that there is a potential to reduce the current phosphorus recommendation by 20% without losing the grain yield.

Generally, organic matter content in soil and compost are determined by using Walkely and Black Method which is expensive and environmentally hazardous. Another procedure called Loss on Ignition Method is cost effective and environmentally sound but not very accurate as it is a gravimetric method. So, a study was conducted to develop a regression equation to correlate these two methods.

Agronomy

Study to determine different harvesting intervals on yield and quality of Bw rice varieties confirmed that harvesting at 30 days after 50% flowering minimizes the shattering % of Bw 364.

Total of 13 promising lines were evaluated in Maha 2013/14 and 10 lines were evaluated in Yala 2014 under NCRVT program.

Under VAT program, 6 lines were evaluated in Kalutara, Colombo, Gampaha and Ratnapura districts.

Weed Management

Nine new herbicides were evaluated along with already recommended herbicide for grass, sedge and broadleaf weeds and found that 2 herbicides were effective in suppressing grasses while 1 was effective in controlling both broadleaves and sedges.

Five already recommended herbicides were re-evaluated and results showed that, Bensulfuron – methyl 8.25% + Metsulfuron methyl 1.75% was still effective in controlling all weeds.

Application of seed bed manipulation method for controlling weeds indicated positive results.

SEED PRODUCTION

Following amounts of breeder seeds of recommended rice varieties were produced for the national seed paddy programme.

Table 1.4.1.2: Amount of breeder seeds produced in 2014

Variety	Breeder seed quantity (kg)		
	Maha 2013/14	Yala 2014	Total
<u>3.5 months</u>			
Bw 364	41	41	82.0
Bw 361	41	41	82.0
Bw 367	71.5	123	194.5
Bw 363	-	20.5	20.5
Bw 267/3	20.5	20.5	41.0
Bw 372	61.5	61.5	123.0
<u>3 months</u>			
Bw272-6b	20.5	41	61.5
Total	256	348.5	04.5

SPECIAL PROJECTS

The following special small scale projects were implemented and respective activities were completed.

Rice productivity improvement for Wet Zone

Rice productivity improvement program for wet zone was initiated in 2012. Its main objective is to meet the seed paddy requirement of Bw varieties in order to ease out the shortage. During the year 2014, a total of 4285 kg of seeds (registered, certified and commercial seeds) were produced and were handed over to the relevant District Extension Offices.

Development of rice varieties for submergence tolerance and iron toxicity tolerance

Progenies from six crosses were evaluated for iron toxicity tolerance and lines with better grain quality and phenotypical acceptance were selected for generation advancement. Two breeding lines were selected for yield evaluation.

Progenies of sixteen crosses were evaluated for submergence tolerance and advanced for the next generation.

Improvement of Ld 99-12-38 high yielding rice line for Bacterial Leaf Blight resistance through marker assisted back cross breeding

178 plants of BC₁F₁ generation were planted in the field and artificial inoculation was done with BLB solution by clipping method and resistance plants were identified.

36 back crosses were done and seeds were collected for the next season.

Development of quality rice varieties and associated technology package for exploiting export market

Six rice varieties/breeding lines namely Bw 367, Bw 272-6b, Bw 11-722, Bw, Bs 1-2-3-1, Bw 98-1262 and IRLON 1-11 were multiplied to evaluate with other varieties in the next season. Mean while they were screened for iron toxicity tolerance, rice blast and bacterial leaf blight resistance.

Evaluation of different types of liquid fertilizers on rice cultivation

Two liquid fertilizers namely SMC and Golf were tested on rice. It was found that, they were not effective in increasing rice yield

Quality testing of commercially produced compost and analysis of soils for soil test based fertilizer recommendation

52 compost samples and 230 soil samples were received for analysis. Out of them, 80% of samples were analyzed.

Construction of epidemiology information interchange system for migratory disease and insect pests in Asia region

As a collaborating organization of the project implemented by Seed Health and Testing Unit at Gannoruwa, different species of rice plant hoppers (RPH) and their natural enemies were monitored in a crop grown under insecticide free condition.

Testing of nitrogenous nano fertilizer on rice cultivation

Testing of a nitrogenous fertilizer developed by Sri Lanka Institute of Nano Technology was carried out as a collaborating organization of this project implemented by Sri Lanka Institute of Nano Technology.

TECHNOLOGY DISSEMINATION

- Nine training programs were conducted for Agriculture Instructors and Agriculture Research and Production Assistants on various aspects of paddy cultivation. A total of 110 participants were trained.
- Ten lectures were delivered for agriculture teachers in 3 training programs.
- One officer participated as a resource person in a training program held by the DOA for farmers engaged with organic farming.

- Four officers participated as resource persons in 6 pre seasonal training programs for Agriculture Instructors.
- Industrial trainings were offered for 2 university students and two technical college students.
- A total of 121 students from Schools of Agriculture were trained on various aspects of paddy cultivation
- Two radio programs and two field days were conducted on different aspects of rice cultivation
- One officer participated in Permanent Crop Clinic Program of DOA as a master trainer for data validation and training of Plant Doctors
- Thirty seminars were conducted by the technical staff on different subject areas at the Center
- Several field visits were made during the year in traditional seed paddy production fields and other paddy fields for identification of pest and disease problems

RICE RESEARCH STATION

- BENTOTA

Rice Research Station (RRS), Bentota which is located in LCWZ is a substation of RRRDC, Bombuwela. The mandate of the Station is to identify adaptive varieties and associated technologies for flood prone rice cultivation.

PROGRESS

RESEARCH

Several local and exotic varieties were evaluated for flood tolerance and Bg 96-741 was identified as a flood tolerant rice line. It is a red pericarped long grained variety.

Research to identify appropriate crop establishment methods for submerged conditions revealed that, sowing of 2 days soaked and one day incubated seed paddy is a good establishment method for water logging paddy fields.

Study on seed priming (pre germination seed treatment) methods on the emergence and field performance of rice varieties under saline condition was conducted. Saline conditions in the field prevailed only during the first part of the trial period. The results indicated that, priming increases the germination percentage, root length and shoot length of seedlings under saline conditions.

Traditional rice varieties were evaluated for saline condition in the area. However, the study need to be repeated as the research field was not subjected to coastal salinity during the trial period.

Under NCRVT, 10 rice lines of 3½ months age group and 7 lines of 3 months age group were tested in Maha 2013/2014 while 7 lines of 3½ months age group and another 7 lines of 3 months age group were tested in Yala 2014.

Variety Adaptability Testing (VAT) program was also conducted with 3½ months age class in two locations.

SEED PRODUCTION

Commercial seeds of Bg 96-741, Bw 364 and Bw 367 varieties were produced during the year and handed over to the Agriculture Extension Offices of Galle, Matara, Gampaha and Rathnapura districts to strengthen the regional seed production programme.

Table 1.4.1.4: Commercial seed paddy production in 2014

Variety	Quantity of seed paddy (kg)		Total
	Maha 2013/14	Yala 2014	
Bg 96-741	526	1053	1579
Bw 364	285	171	456
Bw 367	81	286	367
Total	892	1510	2402

TECHNOLOGY DESSEMINATION

- Three lectures were delivered to Zonal Directors of Education Department on rice production.
- One Officer participated as resource person in pre seasonal training program.
- Four lectures were delivered for farmers on sorjan method.

PLAN FOR 2015

RRRDC, BOMBUWALA

Rice varietal improvement

- Conventional rice breeding
- Development of rice varieties for submergence tolerance and iron toxicity

- Development of rice varieties for export market
- Improvement of Ld 99-12-38 for BLB resistance
- Breeder seed production
- Rice productivity improvement for wet zone

Agronomy

- Leaf age development and alternative phosphorous usage on rice
- Testing of new lines under VAT and NCRVT in Wet Zone areas
- Evaluation of Bw varieties for different soil types in LCWZ

Weed Science

- Evaluation of new herbicides for rice
- Testing of seed bed manipulation on weed control

Pathology

- Screening of NCRVT lines for rice blast disease
- Screening of INGER lines for rice blast disease

Entomology

- Pilot testing of selected promising acaricides for rice sheath mite (RSM) at farmers field
- Development of Forecasting model for RSM
- Continuation of AFACI IPM project
- Screening of NCRVT nominated rice lines for BPH and RGM
- Screening of INGER lines for BPH

Soil Fertility Management

- Assessment and identification of heavy metals in rice varieties
- Evaluation of different liquid fertilizers on rice cultivation
- Evaluation of the effect of long term application of organic and inorganic fertilizers on rice grown in LCWZ
- Characterization of spacial variability of selected physical and chemical properties of soils in RRRDC, Bombuwela
- Evaluation of composition of nutrient uptake of some rice varieties grown in different agro ecological regions.
- Testing of the effect of different types of new fertilizers on rice grown in LCWZ

Water Management

- Evaluation of recommended rice varieties under rainfed conditions in LCWZ
- Evaluation of the effect of water management during land preparation on alleviation of iron toxicity in rice

RRS, BENTOTA

- Evaluation of submergence tolerant rice varieties
- Screening of selected quality rice varieties/lines for submerged condition
- Identification of appropriate rice establishment methods for submerged condition
- Testing of zero tillage for rice cultivation in half bog soil
- Study on nutrient up take of different rice varieties in half bog soil

- Evaluation of seed priming methods for different rice varieties under saline condition
- Study on microbial activity in rice rhizosphere under drained & water logging conditions
- Evaluation of 3 ½ month rice varieties for coastal water logging condition
- Production of commercial seeds of Bg 96-741, Bw 372 and Bw367 varieties
- Demonstration of sorjan system in 1 ac land
- Testing of new rice lines under NCRVT and VAT programs.

STAFF LIST

RRRDC, Bombuwala

Designation	No.
Deputy Director (Research)	01
Research Officer	07
Farm Manager (Acting)	01
Agriculture Monitoring Officer	02
Program Assistant (Agriculture)	05
Development Assistant	01
Research Assistant	09
Agricultural Instructor	06
Public Management Assistant	08
Farm Clerk	01
Earth Mover Operator	01
Machine Operator	01
Driver	03
Watcher	04
Circuit Bungalow Keeper	01
Labourer	51
Labourer (Projects)	02
Total	104

RRS, Bentota

Designation	No.
Research Officer In-Charge	01
Research Officer	01
Development Officer	02
Research Assistant	01
Agricultural Instructor	02
Technical Assistant	01
Driver	01
Watcher	02
Labourer (Permanent)	15
Labourer (Contract)	02
Labourer (Projects)	02
Total	30

1.5 NATURAL RESOURCES MANAGEMENT CENTER (NRMC) - PERADENIYA

The Natural Resources Management Centre (NRMC) is mandated to optimize the use of land and water resources on scientific basis to improve national agricultural productivity in a sustainable manner. Changes in land use pattern with increasing population pressure diminish both the quality and quantity of land and water resources while climate change and its extreme situations are exerting additional pressure on them. These issues are leading to accelerated soil erosion, declining soil fertility, salinization, water availability and soil and water pollution. Therefore, development of technologies targeting judicious utilization while conserving the natural resources, particularly land and water resources is a vital task.

The NRMC conducts research and development programs covering several disciplines. Research thrust areas of the Centre are soil conservation and watershed management, land suitability evaluation, agrometeorology and climate change, geo-spatial analysis and remote sensing, productivity enhancement, soil and water quality assessments and on-farm irrigation management. Main development programs include implementation of the Soil Conservation Act, maintenance of the agrometeorological observation network of the country, technology dissemination on related disciplines, and provision of technical assistance on related subjects including services associated in environmental impact assessment of various development projects.

BUDGET

Table 1.5.1: Annual budget – 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	10,147,160	4,556,576	45
Recurrent	3,985,672	3,195,092	80
Projects			
• Implementation of Soil Conservation Act	14,000,000	13,222,390	94
• NARP	2,857,284	2,091,505	73
• CCAFS	2,556,721	1,168,230	46
• AFACI – ALMSF 1-7	1,166,844	1,094,982	94
• AFACI – AMIS - 8	1,771,455	748,282	42
Total	36,485,136	26,077,058	68

PROGRESS

RESEARCH

Use of Agro-ecological information to enhance the agricultural productivity in Sri Lanka

With the objective of harnessing the potential of country's agro-ecological diversity to cultivate some important crops at different parts of the country at different times of the year so that production of those crops to come to the market at different time intervals, a study was conducted in the entire Western province identifying different cropping systems and cropping calendars for five AERs in Gampaha district (WL₃, WL_{2b}, WL_{1a}, WL_{1b} and IL_{1a}), five AERs in Kalutara district (WL_{1a}, WL_{1b}, WL_{2a}, WM_{1a} and WM_{1b}) and four AERs in Colombo district (WL_{1a}, WL_{1b}, WL_{2a}, and WL₃).

Drought occurrence in the DL_{1b} agro-ecological region of Hakwatuna Oya watershed

Occurrence of a drought event in a growing season will not only affect the rainfed cultivation, but also leads to serious implications on reservoir replenishment and consequently, irrigated paddy cultivation. The availability of water for cultivation has decreased in the recent years with crop failures possibly due to high incidence of droughts. To test this assumption, a study was conducted to find whether the occurrence of drought over the years has changed thus affecting the water availability of the Hakwatuna Oya watershed. Daily rainfall for a period of 50 years from 1961 at Maha-Illuppalama station, representing

the Hakwatuna Oya watershed, in the DL_{1b} agro ecological region was used in the study. A consecutive 15 days or more with less than 0.3mm rainfall was considered as an absolute drought event. Linear regression analysis was carried out for annual absolute drought events, total number of drought days per year and severity of droughts. Though a statistical significance could not be established, the trend of annual absolute drought events, total absolute drought days per year and severity of drought had an apparent increasing trend during last 5 decades. These trends would have serious implications on the replenishment of the water bodies that is used for irrigation purposes in addition to rain fed crop cultivation and also the perceptions of farmers.

Relationship of climate events with the incidence of weeds and insect pests in rice (*Oryza sativa* L) cultivation in Sri Lanka

Weeds and insect pests are the key yield determinants of rice (*Oryza sativa* L.) that can be influenced by climatic parameters. The changes of ambient temperature and rainfall regime from 1982 to 2012 during two major growing seasons, Yala (March to August) and Maha (September to February) and their relationship with incidence of weeds and insect pests of rice were studied in three major rice growing districts of Sri Lanka, namely Anuradhapura, Polonnaruwa and Kurunegala. Occurrence of extreme climatic events during the study period was identified in relation to the base period (1961–1990) and their relationship with El Niño and La Niña events (ENSO) was examined. Costs of weed control and insect pest control published by the

Department of Agriculture were used as proxies to the changes of weed and insect pest incidence, respectively. The difference in day and night ambient temperatures has significantly increased in Polonnaruwa (Yala: 0.066°C/ year, Maha: 0.0465°C/ year) and Kurunegala (Yala: 0.034°C/ year; Maha: 0.024°C/ year) districts. Cost for weed control has significantly decreased in Polonnaruwa district during Yala and Maha seasons at a rate of 0.81 and 0.42 US\$/ ha/ season, respectively, in spite of increasing temperature regime. All extreme rainfalls events were recorded in ENSO years in Anuradhapura, Polonnaruwa and Kurunegala districts during the Yala season. The highest weed control costs have recorded during ENSO years in Anuradhapura and Polonnaruwa districts and insect pest control cost was recorded during ENSO years in Kurunegala district. There was no distinct linear correlation between climatic variables and, weed and insect pest incidences. However, an apparent relationship was evident between occurrence of extreme rainfall events and ENSO events. Moreover, it is likely that weed and insect pest incidences would be relatively higher during ENSO years.

Forecasting paddy extent and yield based on high resolution satellite imageries

National Agriculture Research Program (NARP) funded study aiming at developing a real time national forecasting system for rice cultivation extent and production in Sri Lanka through preparation of digital maps of paddy cultivation lands, developing a rapid assessment approach for identification and demarcation of paddy cultivated lands in

each season and for quantification of yield levels in paddy cultivated land, and producing regional maps showing forecasted yield levels was initiated.

Paddy land maps were updated in Ampara, 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 project 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

CGIAR Climate Change Agriculture and Food Security (CCAFS) Program - South Asia through IWMI funded study was initiated to develop a tool to monitor and forecast the crop condition with natural and changed climatic conditions.

CRAFT toolkit which is a specially designed software for mapping crop conditions using crop model – DSSAT and operating grid by grid looping with given model parameters and time setting was used for this purpose. Sri Lanka was divided into 891 grids (0.5 minutes; 9.25 km) and data sets of weather, soil properties, crop parameters, fertilizer application, historical yields and planting dates separately for each grid were developed for operating the software. Weather data sets were developed by special interpolation of 30 years (1981- 2012) daily data covering whole Sri Lanka in ArcGIS software.

Preliminary yield maps were generated for testing for each grid cell and evaluation of CRAFT toolkit was done. The prediction can be done on district basis and CRAFT software calibration and validation need to be completed.

A Management Information System (MIS) on Crop Suitability Recommendation for Grama Niladari Divisions in Sri Lanka

A user guide on crop recommendation pertaining to each Grama Niladari Divisions based on agro ecology depicted by the Agro-Ecological Region map of 1975 was developed by the Department of Agriculture in 1990 enabling to select most suitable crops thus to help increasing agriculture production in the country. However, this guide has not been updated since a long period and extracting information from this book is not user friendly for quick reference. Therefore, Management Information System (MIS) for crop recommendation was developed as desktop software "CropRec" and made available as a free web base information system. The information on crop recommendations were updated based on recent publications and information collected from experts. Agro Ecological Region map of 2003 was used as base map. The "CropRec" software can be downloaded from the DOA web site (www.agridept.gov.lk) and installed in to the personal computers as free software.

A web hosted application was also developed with a web interface to direct access from the web for web users to quick reference. As web base software, it can be used for easy and fast

dissemination, sharing, displaying and data processing which helps information in dissection making for selecting suitable crops, cropping patterns at commercial scale farming systems.

Soil fertility status of rice lands in the lower Nilwala river basin in the Matara district

The lower Nilwala river basin has been identified as acid sulphate affected area causing low productivity rice lands. A Study was conducted to identify soil fertility limitations in the above rice lands and their geographic spread to develop strategy for enhancing productivity of rice. Low pH and salinity constraints were identified and mapped. Frequent flooding and high organic soils are the other major factors limiting productivity of rice lands in the area. Low pH (2.7 – 4.9) was recorded in the entire rice growing area (3303 ha). Available P levels in soil were also very low (0.01 – 5.3 mg/kg) in the entire area. Significant spatial variations were observed in electrical conductivity (0.03 – 4.20 dS/m), exchangeable potassium (63 – 275 dS/m) organic matter (3.85 – 30.0 %) and texture (Sandy clay loam to sandy loam). 42 % rice growing lands showed high salinity status, 12% of the lands showed very low exchangeable potassium and 45% of the lands showed high to very high levels of organic matter. Construction of sea water barriers to prevent sea water intrusion during the dry period and use of salinity resistant varieties are possible measures to overcome salinity affected situation. Proper identification of different land classes and

development of management practices for each land classes have to also be done to overcome the problem.

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 the degree of soil erosion in major agricultural land uses in central highlands and to provide conservation guidelines at land use level. Soil erosion assessment was conducted in selected land uses at Heelpankandura. The assessment methodology consisted of preparation of base maps showing different land uses (natural forest, planted forest, chena lands and home gardens), different characterization of salts (pH, EC, OM, texture, P and K) in different land uses setting Cs inventories in representative sites, preparation of thematic maps based on Cs inventories, identification of soil erosion zones based on thematic maps and formulation of conservation guidelines for different land uses. A total of 48 samples were collected and are being analyzed at laboratories of Atomic Energy Authority, Colombo.

Monitoring water quality of Mahaweli river in central highlands in Sri Lanka

The study was initiated to assess the causes of land degradation and time it occurs by assessing water quality of rivers. Contribution from tributaries to the main stream of Mahaweli ganga provides information on soil erosion severity and

fertilizer use in major agricultural land uses in river catchment. For this purpose, water quality (pH, Electrical conductivity and turbidity) monitoring program was commenced in October 2014 comprising of 11 sampling locations of the main stream (Dik Oya, Hatton, Watawala, Ginigathhena, Nawalapitiya, Mawathura, Gampola, Peradeniya, Katugastota, Tennekumbura and Mahayanganaya) and 16 of 16 tributaries (Hangaran Oya, Kothmala Oya, Atabage Oya, Nillmba Oya, Geli Oya, Nanu Oya, Thalathu Oya, Kivullinda Oya, Pallega Oya, Belihul Oya, Pannal Oya, Kurudu Oya, Mala Oya, Uma Oya, Badulu Oya and Loggal Oya). Results showed that high turbidity (23.5 NTU) in the main stream while lower turbidity (10.7 NTU) in tributaries. The reason for this difference could possibly be attributed to direct disposal of soil, particularly from non agricultural earth excavations in urban areas. The mean electrical conductivity in water was 0.068 and 0.17 dS/m in the main stream and tributaries respectively. It shows that water in tributaries had more soluble salts than the main stream. The pH of water was 7.13 and 7.27 in the main stream and tributaries respectively, showing similarities in water of both main stream and tributaries with respect to pH.

Development of land management guidelines for agro-well based farms

Agro-well based small holder farms are very common on rain-fed uplands and suitable land management technologies are not fully adopted in this farming system. Hence, development of land management

technologies for increasing irrigation efficiency and soil fertility was conducted for this system at farmer fields. Baseline study showed that organic manure use of this system is very low. Farmers do not follow scientific guidelines in selection of water lifting devices. Soil test based fertilizer use is not practiced. Therefore, farmer awareness programs were arranged on micro irrigation techniques for improving irrigation efficiency, compost making for promoting organic manure use and soil testing for identifying soil fertility limitations. Soil samples have been collected from 52 farmer plots and are being analyzed. Awareness programs on micro irrigation techniques have been completed for 7 Agrarian Service Centers. Study tours on micro irrigation techniques are to be organized in year 2015.

Development of multifunctional soil conservation bunds for rain-fed uplands in the Dry Zone

With the introduction of farm machinery for rain-fed upland farming, farmers prefer to cultivate larger extents as commercial farming and reluctant to adopt presently recommended contour soil bunds. Hence, a study was initiated to develop a permanent soil bund system which is taller and wider than recommended soil bunds and having a permanent tree component, and can be accommodated with wider spacing. Treatments of the research were soil bund alone (Control), soil bund with Kathurumurunga + Jasmine, Kathurumurunga + Pomegranate, Kathurumurunga + Lime, Mitimurunga + Jasmine, Mitimurunga + Pomegranate,

Mitimurunga + Lime. The experiment was established in September 2014 in the fields at Field Crop Research and Development Institute, Maha Illuppallama. Data on soil erosion status and crop growth are being collected.

TECHNOLOGY DISSEMINATION

Issuing of long-term weather forecasts at regular intervals

Altogether, ten weather communiqué were issued at regular intervals during the year explaining probable weather conditions on approaching months. These information were disseminated to regional stations and all district level offices of the department and provinces through the departmental communication network to plan the field activities accordingly and aware the farmers.

Trainings

- A 5 day training was conducted for 38 SL Army personnel on soil conservation, land development and Soil Conservation Act.
- A 3 day training programme was conducted for the Subject Matter Officers (SMO) working in the 'Soil Conservation Area' demarcated under Soil Conservation Act on soil conservation, GIS technology and implementation of Soil Conservation Act.
- Four 2 day programmes were conducted for the officers of the Sabaragamuwa, Central, Uva provinces and Mahaweli Authority. Altogether 127 officers were trained on soil conservation, land development and soil conservation Act.

- One field level 2 day training programme on soil conservation, implementation of soil conservation structures and farm planning was conducted for 33 officers of government farms of the Nuwara Eliya district.
- Two 2 day programmes on ‘Soil Conservation and Preparation of Soil Conservation Plan’ were conducted for students of National Vocational Training of the DTC, Naula, and Nawayalathanna. 38 students participated.
- Two programmes on soil conservation and Soil Conservation Act for tea cultivators and commercial contract farmers at Ragala, Nuwara eliya. Number of participants - 23.
- One programmes on ‘Soil conservation and Soil Conservation Act’ for Tea Instructors of the Tea Small Holding Development Authority. Number of participants – 42
- Five programs on ‘Soil and water conservation for medicinal plant cultivation’ for Aurvedic doctors and medicinal plants cultivators of Galaha, Udadumbara, Giragama, Kotmale, and Angammana. Number of participants - 176
- Three programs on ‘Soil and water conservation for sustainable agriculture’ for government officers and selected farmers at Kotmale watershed. Number of participants - 220
- One programme on ‘Soil and water conservation for sustainable agriculture’ for government officers and selected farmers at Galewela. Number of participants - 91
- One programme on ‘Soil conservation and Soil Conservation Act’ for officers of the Divisional Secretariat, Haputale. Number of participants – 42

Workshops

- Two 2-day National Workshops on Land Degradation Assessment in Dry Land was conducted under the LADA project. Officers 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.
- "World Water Day Workshop" on the theme of “Water and Energy” was organized and held at ISTI, Gannoruwa. One hundred and forty eight (148) persons were participated including officers of DOA, Provincial Agricultural Departments and teachers of the central province were participated.
- World Soil Day Workshop on the theme of “Soil: Foundation for Family Farming” was organized and held at PGRC, Gannoruwa. Two hundred and ninety eight (298) were participated from University Academics, Department Heads, Higher Officials and representatives from Non-Governmental Organizations. It was sponsored jointly by the Soil Conservation Act project of the Department of Agriculture and Food and Agriculture Organization (FAO) of the United Nations.

Exhibitions

Demonstration on Soil Conservation and a Stall was established at the National Farmer Week Exhibition, Telijjawila in September 2014.

Printed materials

Following printed materials were prepared and produced.

- 7000 large and 10,000 small size posters on soil conservation
- Handbook on Soil and Water Conservation 10,000 copies of Sinhala Version were printed.

TV Programmes

Following TV programmes were produced for respective channels.

- Soil: Foundation for family farming - for Rupavahini
- Soil erosion and conservation - for Rupavahini

Radio Programmes

Radio program was conducted in National Broadcasting Service on the theme of “Soil: Foundation for family farming”.

Technical Assistance

Following technical assistances were provided during the year.

- Establishment of soil and water conservation measures for conserving erodible section of Pilawala Maha Vidyalaya, Menikhinna.
- Soil conservation work for preparation of Medicinal Garden at Governors Secretariat Office, Kandy.

- Establishment of Soil and Water Conservation Demonstration Site at Thelijjawila Research Station.
- Conservation of lands at Nikagolla and Agathapitiya.

Representation in Technical Committees

- Served as a member of the National Expert Committee on Climate Change Adaptation. Ministry of Environment.
- Served as a Technical Advisor to the project on Community Based Adaptation to Climate Change in Sri Lanka, United Nation’s Development Programme (UNDP).
- Prepared Soil Conservation and Storm Water Management Plans for Environmental Clearance for various National and Regional development Projects; ie. Land Blocking out & Hotel projects (65), Metal quarries (138), Mini Hydro power Projects (40) and Tree felling Project (84).
- Represented in EIA Technical Evaluation Committees of Uma Oya Multipurpose Development project, Morana Reservoir project, Yan Oya Reservoir project, Moragahakanda project and Bibila Sugar Cultivation project
- Served as a member of the Committee on Land Use Planning, LUPPD.

Soil Conservation Act

Responsibility of the implementation of Soil Conservation Act is vested upon the Centre on behalf of the Director General. Activities under the Soil Conservation Act were accelerated significantly during the recent past under two

categories; a).Legal aspects & their improvements and b).Technology Transfer & awareness creation.

Legal aspects & their improvements

The existing provisions of the Soil Conservation Act No. 25 (1951) & Amended No. 24 (1996) are not at all sufficient to address the present problems of soil erosion and land degradation in the country. Therefore, the Centre has already submitted a draft new act, namely “Soil Conservation and Land Degredation Prevention Act” to the cabinet covering a broader spectrum of land degradation prevention process. It is under consideration of a Cabinet sub Committee.

Implementation of the Soil Conservation Act at field level needs the services of relevant Authorized Officers. Thus, identification, training and necessary documentations with respect to the appointment of Authorized Officers in the Central, Uva and Sabaragamuwa Provincial Departments were completed.

In addition, orders were issued to Tea Estates who are violating the Soil Conservation Act. Impact of the action was significant as most of those who received such orders expressed their willingness to abide by the law. Further action is in progress in this regards.

Technology Transfer and awareness creation

Field level implementation of soil conservation is a devolved subject under the Constitution of Sri Lanka. Therefore, technology transfer and awareness creation on soil conservation related matters were implemented through the Provincial Departments of Agriculture (PDA).

The Centre paid attention to develop human and other infrastructural resources of PDAs particularly in Central, Uva and Sabaragamuwa during the year. The Centre directed PDAs to emphasize more on field level implementation soil conservation measures, and required trainings were provided at field level itself, if and when necessary by training classes and field days.

Nearly 60 Soil Conservation Demonstrations in farmers’ fields were completed through Provincial Agriculture Departments. Two demonstrations were established by the Centre, in Tholangamuwa and Thelijjawila Exhibition site.

Maintenance of the national agro-met observation network and its database

Agro meteorological observation network consisting of 28 agro-meteorological observation stations along with 70 rain gauging stations was maintained according to the WMO standards.

- New meteorological equipment replacing broken ones in stations at Kundasale, Gannoruwa, Maduruketiya, Bibile, HCTDI Bibile, Kalpitiya, Eluawankulama, Pasyala, Walpita, Makandura and Kantale were established and necessary actions to improve data collection procedure were taken.
- Two new Agro-met station at Kilinochchi and Thelijjawila Agriculture Research Stations were established.
- The rainfall stations maintained by estate sector at Kenilworth, Carolina, Strathdon, Mount Jean and Lonack were visited and

arrangements were made to complete missing data.

- The database on agro-climate, land and water resources was collected, computerized and maintained for providing information to various clients.
- Arrangements were made to demonstrate daily rainfall variability in computerized display at NRMC.

PLAN FOR 2015

Research

- Monitoring of weather and current state of climate change in Sri Lanka
- Seasonal climate forecasting as a mean of adaptation to climate change and variability
- Continue the study on Use of Agro-ecological information to enhance the agricultural productivity in Sri Lanka for other provinces
- Harnessing the potential of agro ecological diversity to increase the agricultural productivity.
- Monitoring of weather and current state of climate change in Sri Lanka
- Seasonal climate forecasting as a mean of adaptation to climate change and variability
- Study on Use of Agro-ecological information to enhance the agricultural productivity in Sri Lanka
- Development of drought monitoring and crop condition assessment system using time series satellite imageries.
- Recent variations of rainfall climatology in Sri Lanka
- 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 major rice growing districts.
- Development, evaluation and application of a toolkit for regional crop yield forecasting and climate change impact assessment.
- Development of web GIS portal for Agriculture information dissemination.
- Development of web base map of growing degree days (GDD) for rice.
- 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
- Testing rainwater harvesting techniques for supplementary irrigation for upland vegetable farming systems in Mid Country Intermediate Zone.

STAFF LIST

Designation	No.
Director	01
Acting Additional Director	01
Deputy Director	01
Research Officer	06
Agriculture Officer	03
Subject Matter Specialist	01
Research Assistant	03
Agricultural Instructor	10
Soil Surveyor	04
Programme Assistant (Agriculture)	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
Total	59

2.1. SEED CERTIFICATION AND PLANT PROTECTION CENTRE (SCPPC) - GANNORUWA

The mandatory task of Seed Certification & Plant Protection Centre (SCPPC) comprise of taking all possible measures in protecting the agriculture sector in the country by preventing enter of alien pests, promoting the environmentally friendly, technically feasible and economically viable pest management strategies, ensuring quality pesticides for pest control, assuring safe use of pesticides, promoting of seed industry assuring seed quality, conserving of genetic resources of food crops and supporting their utilization.

The above functions are performed by the following institutes under their purview, Seed Certification Service (SCS), National Plant Quarantine Service (NPQS), Plant Protection Service (PPS), Office of the Registrar of Pesticide (ROP) and Plant Genetic Resources Centre (PGRC). NPQS and its sub units have been brought under the purview of SCPPC again from October 2014 and the change over was completed on 3rd December 2014. From 2015 onwards SCPPC will again serve as the National Plant Protection Organization (NPPO), the national inquiry point for phytosanitary information and plant pest or disease outbreaks.

The SCPPC has regulatory functions pertaining to the following Acts.

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 Pesticides 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 further spread of the Weligama wilt disease in Coconut.

The draft new regulations of the Plant Protection Act No. 35 of 1999 have been submitted to the Legal Draftsman Department in 2013 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 relevant officers of SCPPC and SCS draft regulations have been prepared under the Seed Act No. 22 of 2003.

BUDGET

Allocation given and expenditure incurred under recurrent capital are given bellow.

Table 2.1.1: Annual budget – 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	24,777,625	14,784,958	60
Recurrent	46,820,641	40,473,480	86
Total	71,598,266	55,258,438	77

PROGRESS

Seed testing data were analyzed for the Vegetable seeds for the Divineguma programme

This information generated through data analysis will be very valuable for policy makers, extension workers as well as researchers when planning programmes for the future. The Ministry of Agriculture is requested to submit these data for procurement procedure.

Vegetable and Fruit Seed Import Database

A national database has been developed on vegetable seed imports for easy retrieval of vital information. This would facilitate to provide all the information relevant to import permits issued and the details of actual seed imports through Plant Quarantine Units of Seaport and Airport during the last six years.

Eight hundred and seventy three (873) Vegetable Seed Import permits have been issued during 2014 by the National Plant Quarantine Service (NPQS). The following tables indicate the quantities of vegetable and fruit seeds imported during 2014.

Table 2.1.2: Total quantity of vegetable seed imported via Sea Port and Air Port during 2014

Crop	Quantity (kg)		
	Sea Port	Air Port	Total
Bean	25100.00	-	25100.00
Beet	18910.67	1000.00	19910.67
Bitter gourd	2602.65	79.30	2681.95
Broccoli	22.00	3.00	25.00
Cabbage	938.97	605.00	1543.97
Carrot	45841.42	50.00	45891.42

Crop	Quantity (kg)		
	Sea Port	Air Port	Total
Cauliflower	137.53	19.00	156.53
Celery	10.00	-	10.00
Chinese cabbage	132.00	-	132.00
Chinese kale	540.00	-	540.00
Cucumber	1656.17	708.32	2364.49
Egg plant (Brinjal)	361.10	19.36	380.46
Knol khol (Kholrabi)	1946.50	1050.00	2996.50
Leek	12561.45	1000.00	13561.45
Lettuce	336.50	-	336.50
Luffa	4713.93	485.08	5199.00
Okra	1176.00	6620.00	7796.00
Packchoi	156.80	-	156.80
Pepper/ Sweet pepper/ Bell pepper etc.	2950.22	62.00	3012.22
Hot Pepper/ Chili	1941.47	756.36	2697.84
Pumpkin	8357.99	723.00	9080.99
Big Onion	19350.00	1247.25	20597.25
Red Onion	1200.00	-	1200.00
Radish	9375.00	200.00	9575.00
Squash	9015.00	-	9015.00
Tomato	732.66	325.81	1058.47
Water Convolvulus (Upland Kang Kung)	997.71	-	997.71
Yard Long Bean	5300.00	-	5300.00

Table 2.1.3: Total quantity of fruit and other seed imported via Sea Port and Air Port

Crop	Quantity (kg)		
	Sea Port	Air Port	Total
Papaya	-	27.29	27.29
Water Melon	7549.20	347.53	7896.73
Seed Potato	1837239.00	-	1837239.00
Melon	3.00	-	3.00
Sweet corn	175.00	-	175.00
Flower Seeds	18610.33	116.17	18726.50
Maize (H. Corn/ Corn)	1199305.00	29.00	1199334.00
Grass seeds	7500.00	-	7500.00

OTHER ACTIVITIES

Draft Regulations of Seed Act No. 22 of 2003

Prepared guidelines for importation of seeds and preparation of draft standards for proposed seed laboratories are on progress. Two group discussions were conducted with relevant SCS and PGRC officers and one 2 day workshop was organized to streamline the draft regulations of Seed Act No. 22 of 2003 with the help of resource persons in relevant fields.

New Regulations of Plant Protection Act No. 35 of 1999

New Regulations of Plant Protection Act No. 35 of 1999 were submitted to the legal draftsman and now it is in the final stage.

A New online Database on Seed

According to the instructions of the Director General of Agriculture a new database has been developed to cover all important aspects of seed production programme of the Department of Agriculture and seed imports. Financial support was given by JICA-Vegetable Seed Project. Several workshops were held during 2014 with the participation of relevant stakeholders.

The main responsibility of developing this database was entrusted with the Director Information & Communication Centre.

Staff Database Development

Database was developed for storing staff information of SCPPC and easy retrieval of staff information.

Collaborative research with HORDI

Research work was initiated on introduction of improved hollow cone nozzle to optimize the bio efficiency of foliar application of insecticides used in high volume knapsack sprayers. A field was selected at Matala and an experienced farmer was selected to carry out this research. This activity has been already started for Bean and Tomato crops in Maha season, 2014.

Seminars / Awareness Programs / Trainings

- Several workshops, Trainings, group discussions and Awareness Programmes were organized and conducted in various locations for police officers, pesticide dealers, officers in DOA and other relevant officers from Government institutes and private sector, seed handlers, Seed dealers, contract seed growers, university students and school children. Twelve training programmes were conducted and around 900 personnels were trained on matters pertaining to Seed Act and also discussed current issues of Plant Protection Act and Control of Pesticide Act in several locations, including North Central, Central & Southern Provinces.
- Several live Radio programmes (one hour) were conducted at “Wayamba, Kandurata and Rajarata Sevaya” on Seed Act.
- SCPPC technical officers served as resource persons in several programmes on regulatory activities of plant protection and seed certification conducted for extension officers in DOA.

- SCPPC Technical Officers conducted several lectures on Regulatory Activities of Plant Protection and Seed Certification in Pre season Training Programmes organized for Extension Officers in Department of Agriculture.
- A computer Training programme on MS Excel was conducted for 23 officers from Seed Certification Service at ISTI Gannoruwa on 28 to 30 April and 9 to 11 June 2014.
- Establishment of National Plant Protection Organization (NPPO) at SCPPC under the Director (SCPPC)
- NPQS and entry points will be monitored and supervised by the Director (SCPPC)
- Plant import permits will be issued at SCPPC again to facilitate the stakeholders.
- Evaluation of the system of official control for the export of plants and plant products to the European Union.
- Development of farm certification scheme in order to address current EU concern for fruits and vegetables.

PLAN FOR 2015

- 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 final draft regulations for Seed Act No. 22 of 2003 which is to be submitted to legal draftsman.
- Formulating appropriate plans and policy decisions related to the production of high quality seeds and planting materials.
 - Upgrading 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
Assistant Director of Agriculture (Development)	01
Programme Assistant (Agriculture)	01
Agricultural Instructor	01
Administrative Officer	01
Development Officer	03
Public Management Assistant	09
Storeman	01
KKS	02
Driver	04
Labourer	08
Labourer (Contract)	02
Total	35

2.1.1 SEED CERTIFICATION SERVICE (SCS) - GANNORUWA

The seed certification service (SCS) performs regulatory functions pertaining to assuring the quality of seeds and planting materials available to farmers.

Responsibilities:

- Implementation of Seed Act No. 22 of 2003.
- Certification of the quality of commercial seed 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 all over the island.
- 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 programmes for Seed growers, Nurserymen, Seed men and Officers on quality seeds and planting material production in relation to Seed Act.
- Finding out solutions to overcome field 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 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 - 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	15,300,000	3,780,000	25
Recurrent	23,000,000	20,900,000	91
Projects			
• Strengthening of seed certification activities	50,000,000	28,940,000	58
• Seed Act	20,000,000	14,660,000	73

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
• Promotion of traditional paddy varieties	360,000	211,000	59
• Divineguma National Development Programme	3,600,000	660,000	18
• Seed and planting material development	4,000,000	2,940,000	74
• Other field crop production program	1,800,000	1,780,000	99
• Rice Export program	6,700,000	4,100,000	61
Total	124,760,000	77,971,000	62

PROGRESS

- Inspection of 4177 ha of rice, 1138 ha of OFC, 177 ha of vegetables and fruits and 79 ha of potato fields cultivated for seed production.
- Testing of 14238 seed samples representing 10192 mt of seed paddy, 749 mt of OFC seeds 92 mt of vegetable seeds and 1114 mt of seed potato.
- The registered extent of Paddy and Vegetables decreased by 15% and 43% respectively in 2014 when compared to 2013 due to the adverse climatic conditions which affected the Yala season dramatically. But the registered extent of OFC increased slightly by 4%.
- Production of OFC, Vegetables and Potatoes also increased by 68%, 35% and 52% respectively along with the increase of extent. Paddy production decreased by 49%.
- Registration and inspection of 431 horticulture nurseries producing certified planting materials and quality certified by labeling 783,140 grafted fruit plants.
- Evaluation of 11 rice, 27 OFC, and 3 vegetables crop varieties under DUS testing program.
- Testing of 979 post control samples of rice, OFC, vegetable and potato in post control units PC 1- PC 4 situated at Gannoruwa, Sita Eliya and Mahailuppallama.
- 70 samples of imported vegetable seeds that represent 47.06 mt were taken and tested.
- Registration of 588 and renewal of registration of 482 seed handlers under the Seed Act.
- Granting approval for 264 labels used by different seed and planting material producers under the Seed Act.
- Training of 1490 Government and private sector officers, Nurserymen, seed farmers and Seed handlers on Seed Act and production activities.
- New seed testing procedures
- New circular for certification of big onion and red onions
- Completed the SCS website for public awareness, to improve information dissemination on seed certification programme and for efficient and easy access to our service.
- A five year JICA Project on "Enhancement of Production system of

Certified Vegetable Seed" commenced from May 2012. Four SCS regional offices and 3 seed testing laboratories are contributing as main counterparts.

- SCS staff was increased by appointing 3 technical assistants during 2014 and 56 contract labourers were granted permanent appointments through the special decision taken by the government.
- Construction of a seed health testing laboratory was undertaken during this year.
- Construction of the fence of Kardiyanaru office premises and post control field of Bataatha and germination room of Aluththarama STL were completed under the project on SCS strengthening during the year 2014.
- Essential repairs on vehicles and buildings of all units of SCS were completed.
- A new regional office was opened at Mathugama during the year 2014.

Seed Paddy Certification

During the year 2014, 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 4177 ha of which the share of private sector was 79%. Extents registered for certified seed paddy production under different sources and seed classes are given in Table 2.1.1.2. A slight reduction was observed in extent registered for seed production of rice in the year 2014 when compared to the year 2013 due to the adverse effects of climate.

Table 2.1.1.2: Extents under Seed Paddy production in 2014

Source	Seed class	Extent registered (ha)	Extent inspected (ha)
Research stations	Breeder's	5.94	5.38
Govt. farms	Foundation I	54.8	45.2
	Foundation II	1.8	1.4
	Registered I	624.6	546.4
	Registered II	45.9	45.9
	Certified I	79.3	44.1
	Certified II	13.1	12.9
Contract growers	Commercial II	0.2	0.2
	Registered I	6.88	0.81
	Certified I	92.31	72.9
	Certified II	10.9	7.89

Source	Seed class	Extent registered (ha)	Extent inspected (ha)
Private growers	Foundation I	7.3	7.3
	Registered I	110.5	79.8
	Registered II	0.8	0.8
	Certified I	2832.4	2229.3
	Certified II	271.4	203.2
	Commercial I	17.6	8.9
	Commercial II	2.23	0.4
Total		4177.96	3312.78

During the year 2014, a total of 10197 mt of seed paddy was sampled of which the quality standards of 8043 mt of seed paddy were accepted by laboratory tests (Table 2.1.1.3). DOA farms with contract grower programme produced 3565 mt (35%), while Private growers produced 6627 mt (65%).

Table 2.1.1.3: Quantities of seed paddy tested and % accepted in 2014

Source	Quantity tested (mt)	Accepted %
Research stations	4.49	100
Govt. farms	3430.8	91
Contract growers	134.3	73
Private growers	6627.8	72
Total	10197.4	

Certification of Other Field Crops (OFC) seeds

The total registered extent under OFC seed production was 1138 ha of which contract growers accounted for 88%. Maize, Green gram, Ground nut, Sesame, Cowpea, Finger millet, Horse gram, Mustard, 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 4% increment in registered extent for OFC seed production when compared to 2013.

Table 2.1.1.4: Extents under OFC seed production in 2014

Source	Seed Class	Extent registered (ha)	Extent inspected (ha)
Research stations	Breeders	2.84	2.84
Govt. farms	Foundation	27.4	18.0
	Registered I	26.5	26.3
	Registered II	3.4	3.4
	Certified I	20.9	15.4
	Certified II	0	0
	Hybrid	1.6	1.6
	Commercial	3.5	

Source	Seed Class	Extent registered (ha)	Extent inspected (ha)
Contract growers	Foundation	4.4	3.1
	Registered I	73.6	62.0
	Registered II	0.8	0.2
	Certified I	764.1	526.5
	Certified II	134.7	101.9
	Commercial I	25.1	15.1
	Commercial II	0.7	0.4
Private growers	Foundation	1.76	
	Registered I	5.2	3.4
	Certified I	23.2	15.4
	Certified II	11.5	8.5
	Certified III	7.1	4.5
Total		1138.3	808.54

In the year 2014, total OFC seed production was 751 mt and 88% of the productions were certified. It was a 68% increase when compared to the 2013, 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 2014

Source	Quantity tested (mt)	Accepted (%)
Research stations	2.404	100
Govt. farms	72.3	91
Contract growers	662.2	87
Private growers	14.7	76
Total	751.6	

Certification of vegetable seed production

Registered extent for vegetable seed production was 177 ha of which private and contract growers accounted for 72%. 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 2014

Source	Seed Class	Extent registered (ha)	Extent inspected (ha)
Research stations	Breeder	1.5	1.3
Govt. farms	Basic	9.7	8.1
	Standard I	30.9	24.9
	Standard II	1.1	0.1
	Hybrid	5.5	4.6

Source	Seed Class	Extent registered (ha)	Extent inspected (ha)
Contract growers	Basic	1.5	1.3
	Standard I	61.9	41.5
	Standard II	24.9	21.5
	Commercial	1.5	
Private growers	Standard I	30.5	23.6
	Standard II	8.9	7.9
Total		177.9	134.8

Table 2.1.1.7: Quantities of vegetable seed production in 2014

Source	Quantity tested (mt)	Accepted (%)
Research stations	1.11	100
Govt. farms	10.3	92
Contract growers	56.3	95
Private growers	26.1	60
Total	93.8	

During the year, total vegetable production was 93 mt of which 78 mt were certified. It was a 35% increase when compared to year 2013. Quantities tested and percent accepted from different sources are given in table 2.1.1.7.

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 79 ha and a total amount of 1114 mt of seed potato of one popular potato variety (Granola) was certified. Although there was a slight reduction of extent registered, production increased by 52% in the year 2014 when compared to year 2013. Also, 6,09,949 mini tubers were produced which is a 90% increase compared to that in the year 2013 under special seed potato program in poly tunnels were certified.

Table 2.1.1.8: Extents under seed potato production in 2013 and 2014

Source	Class	Extent registered (ha)	Extent accepted (ha)
Govt. farms	Pre-basic	0.22	0.22
	Basic	10.51	10.04
	Certified	49.91	46.71
Private growers	Pre-basic	0.04	0.04
	Basic	2.23	2.23
	Certified	16.5	16.5
Total		79.41	75.74

Seed Testing

An amount of 14238 seed samples were tested for quality certification at the DOA seed testing laboratories at Peradeniya, Mahailuppallama, Aluttarama and Batatha.

Seed Health Testing Unit

New seed health testing laboratory is currently being constructed and Laboratory facilities are improved for seed health testing. Testing protocols were developed for maize stalk Rot and seed health testing was carried out for 14 locally produced seed samples (vegetables, rice, and legumes) and 4 imported seed samples.

Identification of seed borne pathogens

Xanthomonas campestris pv. *campestris* causing black rot of cabbage and *Rhizoctonia* sp. causing web blight disease of mung bean were identified as important seed borne pathogens in cabbage and mung bean cultivation respectively.

Techniques developed

- Techniques were developed for the detection of *Erwinia carotovora* and *Erwinia chrysanthemi* on maize seeds (Stalk rot causing pathogen) and *Rhizoctonia* sp. on mung bean seeds.
- Mushroom seed certification procedure has been developed and mushroom seed production guideline has been prepared.

Certification of Planting Material

A total of 7,83,140 fruit plants produced in government nurseries and private nurseries were certified and labeled (Table 2.1.1.9).

Table 2.1.1.9: Number of grafted fruit plants certified in 2014

Species	No. of Plants certified
Mango-grafted	4,18,725
Rambutan-grafted	6,6,604
Orange-grafted	2,86,859
Avacado	5,108
Durian	1,487
Jak	2,057
Pears	1,693
Others	607
Total	7,83,140

Registration of nurseries

Total number of nurseries registered in the year 2014 was 431.

Mother plant certification

Also during the year 2014, a total number of 89 Mango, Rambutan, Citrus, and Jak mother plants were selected and registered.

Table 2.1.1.10: Number of mother plants registered in 2014

Species	No. of plants registered
Mango-grafted	72
Rambutan-grafted	15
Avacado	02
Total	89

Post Control Testing

Post control tests were conducted to evaluate 979 seed samples. These include DOA-certified seed samples and imported seeds of different crop varieties and Seed Potatoes. 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	142
OFC	541
Vegetables	139
Potato	155
Fruit	02
Total	979

Distinctness, Uniformity, and Stability (DUS) Testing

Eleven rice varieties, (At 676, Ld 3-6-12, At 06-631, Ld 1-5-15, Bg 465, Ld 8-6-7, Bg 4-91, CIC Rathu Suduru, Bg 96-741, Bw 452, At 7-800) were tested for DUS at post control field at Gannoruwa. Three vegetable varieties and 27 OFC varieties were also tested. DUS testing of 10 Rice and 9 OFC varieties 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	11	10
OFC	27	9
Vegetables	3	0
Total	41	19

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 this country which is a vital sector of the country's agriculture. Nearly 6300 seed handlers have been registered with the Seed Act since 2008. 588 Seed handlers have been registered and 482 renewals under the Seed Act during the year 2014. Twelve complaints were received; inquired and remedial actions were taken to safe guard the farmers.

Ninety four 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.

Research and Development

Research Projects

- Migratory rice pest population data were collected; paper was presented and submitted to AFACI, Korea. Data were shared among member countries. Among the tested locations i.e. Aralaganwila, Samanthurei, Batalagoda and Bombuwala highest BPH population was collected from Batalagoda area. However, number of BPH was less than 700. It is also to be noted that, incidences of BPH associated viruses were not reported from any location. Up to now rice plant hopper population is below economic threshold level.

- Purple seed stain disease is considered as the most destructive seed borne disease of soybean cultivation. Seeds of soybean variety MISB - 01 were evaluated with the seeds of recommended variety PB – 01 under artificially inoculated condition for purple seed stain. Results revealed that both varieties are susceptible to purple seed stain disease.
- The effect of seed borne diseases on the seed growth quality parameters, immediately after harvesting or after storage has not been worked out under local conditions. Experiment has been started to study the effect of major seed borne pathogens and to determine the role of different seed borne pathogens on various seed quality parameters (germination, vigour, viability, stand establishment) of vegetable seeds and length of storage period.
- Diseases of maize reported from Monaragala district were identified as *Erwinia* stalk rot disease caused by *Erwinia carotovora* and *Erwinia chrysanthemi*. Remedial measures were recommended and seed samples were tested found to be free from *Erwinia* spp.
- A research trial has been started to determine the Influence of sowing time and steckling size on seed yield and seed quality of Radish var. Beeralu under conditions prevailing in WL, WM and WU Agro-ecological Zones.
- A research trial has been started to determine the most suitable pod picking range for the seed production of Okra.

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 1490 Seed farmers/ Nursery men, Officers Government and private sector and seed handlers were trained.

SCS Database Management System

A new PC based database was created from MySQL with Java system for analyzing certified seed production annually.

Foreign Training

Three officers were trained in Japan on Seed Testing in collaboration with JICA.

PLAN FOR 2015

- Empowering seed certification service to achieve 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 especially on seed packaging, storing and expiry dates.
- Completing construction of the laboratory facility for seed health testing and supplying requirements
- Expansion of seed health testing all imported seed samples and important locally produced seeds
- Conducting a survey for identification of major seed borne pathogens
- Development of detection techniques for seed borne pathogens of major crops

- Studies on effect of seed borne pathogens on health and storability of stored seeds of vegetable crops.
- Collaboration in the Construction of Epidemiology Information Interchange System for Migratory Disease and Insect Pests in Asia Region (AFACI/IPM).
- Facilitate essential requirements such as sprinkler irrigation system and protected houses for the post control fields.
- 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 guidelines on quality seed and planting material production to distribute among all the seed handlers.
- Preparation and distribution of seed producer's directory and planting material producer's directory in each growing season.
- Publishing crop guidelines for seed handlers.
- Construction of new seed testing laboratory and office complex in Paranthan, SCS regional office buildings in Murunkan and completing construction of the office building of Jaffna and Post Control Unit No.V at Batatha .
- Strengthening all SCS units with staff and equipment is highly required
- SCS is a complex administrative structure consisting 24 regional offices, four seed testing laboratories and presently four post

control fields scattered island wide launching three main national programmes namely seed certification, fruit plant certification and implementation of Seed Act. It should be restructured so as to be administrated by a Director/Additional Director under the direct supervision of the Director General of Agriculture.

STAFF LIST

Designation	No.
Deputy Director	01
Assistant Director (Research)	03
Assistant Director (Development)	14
Agriculture Monitoring Officer	05
Programme Assistant (Agriculture)	01
Development Officer	17
Agricultural Instructor	101
Research Assistant	01
Research Sub Assistant	06
Public Management Assistant	09
Driver	16
Electrician	01
Watcher	37
Seed Technician	22
Seedman	28
Storeman	03
Circuit Bungalow Keeper	01
Earth Mover Operator	02
Labourer	94
Sanitary Labourer	01
Total	363

2.1.2. PLANT PROTECTION SERVICE (PPS) – GANNORUWA

The main mandate of the Plant Protection Service revolves around regulatory activities within the country as stated in Plant Protection Act No: 35 of 1999. When an alien pest enters the country and begins to affect the crops in a detrimental manner the responsibility of dealing with it lies with the Plant Protection Service.

The core activities of Plant Protection Service can be stated as control of pest/disease outbreaks, implementation, monitoring and evaluation of field level IPM programmes in rice and vegetables, managing pests in bulk seed storage in Department of Agriculture farms through fumigation, conducting research in pest management and pesticides.

In addition mitigating the impact of aquatic weeds and other invasive flora on agricultural habitats, training of officers and farmers, evaluation of new pesticides including botanicals at pilot scale, revalidating efficacy of recommended pesticides to ensure the plant

health of agricultural crops are also mandatory functions assigned to the Plant Protection Service.

Furthermore the Plant Protection Service has been given the task of coordinating the activities of Permanent Crop Clinic Programme (PCCP) which is a collaborative programme with CABI (Center for Agricultural Bioscience International) and currently implemented in 16 districts in the country.

Vision

Achieve excellence in Agriculture through safe and effective Plant Protection strategies.

Mission

Adopting the provisions of the Plant Protection Act No.35 of 1999 while promoting effective pest management strategies which cause least harm to the environment ensuring protection of local agriculture.

BUDGET

Table 2.1.2.1: Annual budget -2014

Vote	Allocation (Rs)	Expenditure (Rs)	Expenditure (%)
Capital	1,611,400	1,544,014	96
Recurrent	2,499,376	2,156,703	86
Projects			
• Permanent Crop Clinic Program	918,035	639,878	70
Total	5,028,811	4,340,595	84

PROGRESS

Implementation of Plant Protection

Act No. 35 of 1999

Nineteen authorized officers were directly appointed to control the Weligama Coconut Wilt Disease. All the 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 with quarantine significance in Sri Lanka

Permanent Crop Clinic Programme

Permanent Crop Clinic Program (PCCP) was assigned to PPS since March 2013 by Department of Agriculture (DOA). It is a collaborative programme with the Center for Agricultural Bio Science International (CABI) in United Kingdom and DOA.

The programme aims to strengthen national plant health system through developing local capacity to establish and manage PCCP.

The partnership with CABI aims to promote sustainable agricultural practices that enhance productivity, improve the livelihood of small-holder farmers and protect biodiversity.

PPS has been given the responsibility as the National Responsible Organization (NRO) to coordinate 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.

20 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 green and yellow lists
- Monitoring and Evaluation of crop clinics

576 Agriculture extension officers were trained as Plant Doctors in twelve districts namely Kandy, Anuradhapura, Hambantota, Rathnapura, Polonnaruwa, Matale, Trincomalee, Nuwaraeliya Batticalo, Puttlam, Kurunagala and Gampaha (Table 2.1.2.2).

The Plant Protection Service was coordinating the PCCP which is sustained by many stakeholders in agriculture sector who have a role in the Plant Health System (PHS) in the country. Therefore a stakeholder analysis workshop was held in Randholee Resorts, Kandy with the participation of many stakeholders in-order to strengthen the links between them which will benefit the plant health system in the country. Three special plant clinics were held to disseminate in the “Deyata kirula” exhibition at Kuliapitiya, “Govi Sathiya” exhibition at Telijjawila, Matara and fruit exhibition at Horana. In addition two data management training workshops were held to train data coordinators of different districts on the processing of data in these respective districts. Also a progress review and way forward meeting on this Permanent Crop Clinic Program (PCCP) was held in the Hotel Amaya Hills, Kandy with the participation of Additional Secretary of the Ministry of Agriculture, Additional Director General (Research) of Agriculture, Directorate

of the DOA, Provincial Directors and all other Deputy Directors in the agriculture extension system.

Table 2.1.2.2: Details of trainings conducted

District	Module No.	Number of trained plant doctors
Hambanthota (IP)	01	26
Matale	01	17
Kandy	01	18
Trincomalee	01	39
Nuwaraeliya	01	20
Batticalo	01	40
Puttalam	01	21
Kurunagala	01	71
Anuradapura (PRV)	01	26
Gampaha	01	39
Rathnapura	01	36
Anuradapura (IP)	02	32
Kandy	02	39
Polonnaruwa	02	21
Gampaha	02	39
Rathnapura	02	57
Nuwaraeliya	02	20
Jaffna	02	23

Promotion of Integrated Pest Management (IPM) and Good Agricultural Practices (GAP)

This was conducted to improve the knowledge of extension officers and farming communities in IPM and GAP giving special attention to minimize the use of pesticides as well as to apply non chemical pest management strategies in farmer field level. The programme focused on three crop categories namely paddy, vegetables and leafy vegetables.

• Rice IPM / GAP program

White revolution is the new concept of department of Agriculture which aims to promote judicious use of pesticides. Main objective of this program is reducing pesticide usage to combat pesticides induced health problems and environmental pollution. Three season long officer training programs were conducted at RRDC Bathalagoda, ISTI Bombuwala and DATC Poddiwela (Galle District) throughout one season at different crop stages. Around 90 extension officers participated at these trainings. Those were focused to identify pests and natural enemies at each growth stage and manage pest population below economic injury level, by applying different strategies which are applicable under farmer field conditions. It was also aimed at conservation of natural enemies in the agro-ecosystem and managing the pest population.

Two IPM introductory programs were conducted along with Yaya 2 training program for extension officers who are involved in Yaya 2 program.

• Vegetable IPM / GAP program

This was implemented to develop low cost, environmental friendly and practicable IPM packages for vegetables and to promote them among extension officers and farmers. Eleven training programmes for extension officers were conducted at different locations where total of 175 officers were trained. 700 farmers were trained by organizing three farmer training programs. One television program was also telecasted to promote this technology.

- **Leafy vegetable IPM / GAP program**

This was mainly conducted in the Western Province and organized by Bombuwala wing of the PPS. 186 relevant farmers were trained. Forty selected extension officers from Gampaha district were trained for two-days to promote these techniques.

Pilot scale testing of weedicides

Ten new herbicides were evaluated under farmer field conditions for their bio-efficacy, which were better than the already recommended herbicides in their target specificity and lower application rates. Four recommended herbicides 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* as well as *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 35 infested reservoirs in many districts.

About 5,000 leaflets on biological control on the above weeds were distributed at “Deyatakirula” exhibition at Kuliypitiya and “Govi Sathiya” exhibition at Telijjawila, Matara.

Technical Assistance in Fumigation of Seed Storages of DOA Farms

1056 mt of seed material was fumigated to control storage pest attack in Ambalantota, Pelwehera, Polonnaruwa, Kantale, Murunkan, Kilinochchi, Maha Iluppallama, Nikaweratiya and Aluttarama.

Technical Assistance in Field Rat Management

Twenty DOA officers and 438 farmers were trained to manage rice field rats in Kurunagala, (Kahapathwela) district. Farmer field day was organized to promote these techniques with the participation of 50 officers and 150 farmers.

Technical Assistance to Control Invasive Weeds

Invasive weed control programmes on Parthenium (*Parthenium hysterophorus*), Alligator (*Alternanthera philoxeroides*), Giant mimosa (*Mimosa pigra*), Lantana (*Lantana camara*) and Arunadevi weed were technically assisted in many areas. 300 posters and 1000 leaflets were also distributed in exhibitions.

Pest surveillance programs

Paddy pest infestation data were collected from extension areas of all the districts and these data were utilized to prepare a summary with graphical presentation, which was distributed back to 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 plant extracts having pesticidal properties

1600 farmers from various districts were trained to promote the use of herbal pesticides as an alternative to synthetic pesticides. Large scale field days were organized at Ambanpola, Ahetu wewa (North Western Province) and around 250 farmers and officers of DOA, AG office and other relevant departments.

Control of pest / diseases in sacred “Bo” trees

Three 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 Kuliyaipitiya and Govi Sathiya exhibition in Telijjawila, Matara.

PLAN FOR 2015

- 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
Agricultural Instructor	07
Programme Assistant (Agriculture)	01
Development Officer	01
Public Management Assistant	04
Driver	04
Lorry Cleaner	01
Store Labourer	01
Labourer	03
Total	29

2.1.3 OFFICE OF THE REGISTRAR OF PESTICIDES (ROP) – PERADENIYA

The registration of pesticides and associated activities is the legal mandate of the Office of the Registrar of Pesticides given under the Control of Pesticides Act No. 33 of 1980. During the year, the registration and post-registration activities were significantly strengthened by instigating new fee structures for existing services and also proposed new activities; the newly proposed company registration scheme would ensure responsible, eco- and human health-conscious marketing of pesticides in the country.

Extensive vigilance on market activities helped to create awareness through market sources for legal compliance in number of ways including a significant progress in licensing of pesticide traders, reduction of unscrupulous trade practices etc. Legal prosecutions and subsequent media explication have brought up additional impetus to ensure responsible pesticide management in the country. A multi-sectoral approach was chosen representing government, semi-government, and private and community sectors in creating awareness on safe and responsible use of pesticides in the country.

Several court actions were pursued for strict regulation of pesticides benefitting human health and the environment. Meanwhile, the critiques of environmental lobbying and pressure groups on the use of pesticides and their potential environmental and health risks in the country were highly volatile in the recent past. In response to further strengthening the safer initiatives, five pesticides were prohibited from sale, offer for sale & use in several administrative areas in the country due to potential risks to the farming community.

The analytical laboratory served as the key element in the regulatory system for compulsory compliance monitoring. It has been significantly strengthened with key essential instruments and skills development in the last year. The key thrust has been to upgrade the laboratory system to international standards in line with the requirements of the ISO 17025:2005.

BUDGET

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

Table 2.1.3.1: Annual budget – 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)	Income
Capital	1,460,000	530,945	36	-
Recurrent	3,501,644	3,108,219	89	-
Minimize potential adverse effects of pesticides in Sri Lanka (Special Grant)	50,000,000	47,172,069	94	-
1. Registration & Re-registration fees	-	-	-	5,833,000
2. Pesticide Dealer License fee	-	-	-	647,350
3. Pest Control Service Registration fee	-	-	-	80,000
4. Pest Control Service Renewal fee	-	-	-	175,000
5. Import License fee	-	-	-	360,000
6. Company Registration fee	-	-	-	250,000
Total	54,961,644	50,811,233	92	7,345,350

PROGRESS

No.	Item/Activity	Total Annual Physical Target	Achievement up to End of the Year	%
01. Program for management of pesticides in the country				
1	Evaluation of original registration applications/Acceptance of dossiers accordingly	30	89	297
2	Acceptance of applications for registration after screening & allocation of application numbers	150	85	57
3	Evaluation of registration dossiers for registration	30	44	147
4	Evaluation of re-registration applications	140	92	66
5	Evaluation of secondary registration applications	140	78	56
6	Preparation of registration certificates for approval	280	280	100
7	Pesticides Technical & Advisory Committee Meetings (PeTAC)	06	03	50

No.	Item/Activity	Total Annual Physical Target	Achievement up to End of the Year	%
8	Meetings with industry representatives to inform PeTAC decisions	06	0	0
9	Pesticide sub-committee meetings on Agriculture, Public Health and Domestic categories	18	11	61
10	Coordination of pesticide testing with DOA (bio-efficacy)	30	34	113
11	Evaluation & preparation of data for sub-committee discussions	30	56	187
02. Program for awareness on all relevant target groups for assurance of safe use and judicious marketing of pesticides & collection & compilation of pesticide- related data				
1	Media Programs:			
	a) TV programs	02	03	150
	b) Radio programs	06	0	0
	c) Print media programs	04	0	0
2	Training / Certification of Agrochemical Sales and Technical Assistants (ASTA)	750	28	4
3	Awareness exhibition	03	03	100
4	Awareness programs for Authorized Officers	02	03	150
5	Dealer training classes	15	22	147
6	Publishing revised guidelines for registration of pesticides and new companies	02	09	450
7	Participation as resource personnel on invitation by other institutions	10	57	570
8	Collection, compilation & dissemination of import statistics (Central Bank, Universities, Researches, Govt. Institutes etc.)	40	12	30
03. Program for compliance monitoring (Product quality and residues in environmental compartments and action against violation of the Control of Pesticides Act No. 33 of 1980)				
1	Preparation of import license for ROP approval	1400	580	41
2	Issue of import approvals	1400	97	70
3	Evaluation of quality certificates	1400	302	22
4	Screening of labels for approval	750	959	128
5	Screening of advertising materials for approval	250	270	108

No.	Item/Activity	Total Annual Physical Target	Achievement up to End of the Year	%
6	Inspection of factories	12	08	67
7	Inspection of approved repacking facilities & stores	12	04	33
8	Inspection of premises of fumigation & household pest control operators	30	20	67
9	Registration of pest control services	30	06	20
10	Approval of obtaining CH ₃ Br for quarantine & pre-shipment treatments on accountable basis	50000	48585	97
11	Development and implementation of programs for empty container disposal	02	05	250
12	Issue of packing clearance as per the quality analysis of samples on consignment basis	800	441	55
13	Dispatch samples to MRI & ITI for obtaining test reports on suitability for acceptance of applications	25	13	52
14	Inspection of sales outlets	140	201	44
15	Issue of dealer training certificates	450	529	118
16	Issue of dealer certificates	2000	1177	57
17	Field complaints	06	22	367
18	Legal prosecution	04	08	200
19	Formulation analysis`	800	255	32
20	Number of residue analysis	200	107	54
21	Number of heavy metal analysis	2000	540	27
22	Random checking of pesticide impurities	12	23	192
23	Other activities (such as field surveys)	04	03	75
04. Program for participation as technical experts/members/resource personnel in intra- & inter-departmental organization meetings				
1	Ozone unit (Montreal Protocol)	04	01	25
2	Basal, Stockholm & Rotterdam Conventions	02	04	200
3	Department of Custom	02	01	50
4	Ministry of Health	04	02	50
5	Ministry of Agriculture	04	01	25
6	National Library Services Council	03	01	33
7	Sri Lanka Tea Board	02	02	100

No.	Item/Activity	Total Annual Physical Target	Achievement up to End of the Year	%
8	Ministry of Environment & Renewable Energy/CEA	04	04	100
9	Sri Lanka Standard Institute	02	0	0
10	Other	06	07	117
05. Program for income generation				
1	Logistics of acceptance of applications, processing , credit cheques & money order received as	140 cheques of Rs. 5,000.00 (Fee was later revised as Rs. 4,000)	Rs. 427,000 (67 cheques of Rs. 5,000 & 23 cheques of Rs. 4,000)	64
a	-Fees for registration and re-registration	150 cheques of Rs. 6,500.00 (Fee was later revised as Rs. 75,000)	Rs. 2,851,000 (104 cheques of Rs. 6,500 & 29 cheques of Rs. 75,000)	89
		60 cheques of Rs.4,000.00 (Fee was later revised as Rs. 25,000)	Rs. 523,000 (62 cheques of Rs. 4,000 & 11 cheques of Rs. 25,000)	177
b	-Fees for licensing of pesticide dealers	2000 Money Orders/ cheques of Rs.550.00	(1177) 647,350.00	59
c	-Fees for licensing of Pest Control Services	10 Money Orders/ cheques of Rs.20,000.00	(4) 80,000.00	40
d	-Fees for renewal of license (Pest Control Services)	20 Money Orders/ cheques of Rs.5,000.00	(35) 175,000.00	175
e	-Fees for issuing import licenses	1400 Bank slips/cheques of Rs.1,000.00	(360) 360,000.00	26
f	-Fees for company registration	10 Bank slips/ cheques of Rs.50,000.00	(6) 250,000.00	50
Total			7,345,350.00	

REGISTRATION OF PESTICIDES

Status of registration

During the year 2014, 28 new registration applications were screened. In this process, relevant information and documents are evaluated upon submission by the Registrant. During the year 2014, the total revenue collected in this activity was Rs. 421,000.00. A new structure for submission of fees for registration of pesticides was legalized by the Gazette Extraordinary No. 1870/63 dated 10.07.2014 instigating Rs. 100,000.00 per product for general and domestic categories. However, the total fee for restricted pesticides remained unchanged at Rs. 10,500.00.

New fees for post-registration services

The following new fee structures were adopted since the publication of Gazette Extraordinary No. 1870/63 dated 10.07.2014 in order to strengthen some of the post-registration matters, in particular for the appeals made against cancellation of registration and/or cancellation, suspension or modification of licenses under the Sections 7 and 11, respectively. The instigated fee under this category was Rs. 10,000.00. Further, every import license is subjected to a fee of Rs. 1,000.00.

In perspective, the new fee structures covering registration and post-registration aspects are pivotal for uplifting the regulatory management of pesticides and more specifically for the maintenance of quality aspects of submissions.

Coordination with other institutions in registration matters

The Office of the Registrar of Pesticides has taken steps to implement certain regulatory determinations by taking services of expertise of other institutions. In addition to the discussions & recommendations come through technical sub-committees, represented by Cosmetic Devises and Drug Control Authority (CDDA) and Veterinary Drug Control Authority (VDCA), the expert opinions of the Medical Research Institute (MRI), National Center for Toxicology (NCT) and the Central Environmental Authority (CEA) were requested on safety assessments of certain household pesticides (e.g. cockroach gel) and pesticides of public health concern (e.g. mosquito repellent patches). The new directives decided to undertake certain bio-efficacy tests for e.g. termiticide products under the local conditions, hitherto adopted the recommendations proposed under simulated or similar tropical conditions by the manufacturer.

Alternatively, the technical sub-committees have been functioning as the preliminary screening and approval mechanism for candidate pesticides (Annual Performance Report 2013), without which applications for registration of pesticides will not be accepted. During the year, agro pesticide sub-committee screened 108 applications, and 63 pesticide formulations were decided as annulled due to high toxicity (e.g. WHO Hazard Class II), availability of sufficient alternatives, and/or technical support documentations have not been met.

In September 2014, the custom classification of pesticides was revisited for corrected

Harmonized System (HS) headings and sub-headings for stringent compliance at the point of entry.

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 phase-out of hazardous products available in the market. Three (3) agricultural pesticide formulations were evaluated during the year and none of the products complied stringent evaluation criteria for registration. Further assessments are being carried out.

Removal of high risk pesticides

In March 2014, an official notification was came out on banning five (5) pesticides, viz. alachlor, cyromazine, paraquat, dimethoate & fenthion by the Government Gazette Extraordinary No. 1854/47 dated 21.03.2014. This has been a breakthrough outcome for efficient management of pesticides of high risk category; especially 3 out of the 5 pesticides had been misused for intentional poisonings i.e. suicides in the past.

In consequent to the decision to temporarily suspend the importation of four conventional pesticides, i.e. chlorpyrifos, carbaryl, carbofuran and propanil (Ref. Admin. Report 2013), the Government Gazette Extraordinary No. 1894/4 dated 22.12.2014 imposed new regulations under the Section 11 of the Control of Pesticides Act to prohibit use, sale and offering for sale of glyphosate including four pesticides mentioned above in several administrative areas such as Districts of Anuradhapura, Pollonnaruwa, Kurunegala, Moneragala and Divisional Secretariat

Divisions of Mahiyangana, Rideemaliyadde and Kandaketiya of Badulla District. The Registrar of Pesticides deemed it necessary, under the advice of the Pesticides Technical & Advisory Committee, in the interest of public to do so, considering popular repercussions linking some of the human health concerns in specific areas.

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, 170 applications were processed under this category. Total revenue realized under this category was Rs. 5,412,000.00. Under this scheme, product safety, quality and the performance will be assessed from freshly generated toxicity and product quality tests. The fee under this category remained unchanged at Rs. 4,000.00 per product.

A new decision published in June, 2014, required industry to obtain a comprehensive bio-efficacy test report from a government research institution for every pesticide in every 6 years of its re-registration.

Table 2.13.: The overall status of the evaluation of pesticides for registration during the year 2014

Category	Status of registration	Number
New pesticides	Evaluations completed	09
	Registration granted	06
Conventional pesticides	Evaluations completed	19
	Alternate sources registered	15
	New formulations registered	04
	Registration for label expansion	11

Registration of companies

Registration of companies engage in pesticide business was a new legal mandate that has been instituted under the Control of Pesticides Act. The new regulations came into force on 10.07.2014 by the Government Extraordinary Gazette No. 1870/63. The regulations pre-requisite every pesticide company to undergo a comprehensive field evaluation to certify that no hazard would occur in the marketing and distribution to safeguard the human health, environment and wildlife. In this effect, a formal application and necessary guidelines were prepared and submitted for wider publicity in the DOA Web in November, 2014.

Consequent to the above, a new revenue category has been created, which will be called upon to pay Rs. 100,000.00 in two installments, Rs. 50,000.00 each with every application. During the year, 03 applications were received and the revenue realized was Rs 250,000.00.

Field enforcement

As an ongoing program, the Office of the Registrar of Pesticides continued to coordinate with the Provincial, Inter-provincial and Mahaweli Authority staff to implement the Pesticide Dealer Certification & Licensing Scheme. Pesticide dealer licenses are valid for one year unless cancelled for specific reasons. A fee of Rs. 550.00 is charged as a part of the regulatory requirements for issuing a license. Total revenue realized under this category was Rs. 647,350.00. The number of dealer shops licensed was 1,177.

Besides the formal training qualifications required by the Law to undertake a pesticide business, for which a new recruitment mechanism is being launched (Ref. Item 1.1.7), a significant time & efforts had to be allocated for the conductance of additional training programs for pesticide dealers during the transitional period. During the year, twenty two (22) pesticides dealer training classes were conducted and 529 certificates were issued.

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 for pesticides upon receipt of requests from the

companies on consignment basis, and the period of validity would be limited to 3 months from the date of its issue. A considerable effort and time is required to undertake such requests. This process ensures that products are imported from the correct source of supply conforming to the required quality standards and prevents importing excess volumes. During the year, 302 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 enabling dissemination of proper information to the end user has been a recurrent activity. More than 950 labels and over 270 advertising materials have been screened during the year.

Actions against unethical pesticide promotions

Presently, the supermarket chain has been one of the significant consumer sectors in the country attractive for product promotions in household category. There were instances in the past for indiscriminate advertising campaigns in the form of promotional competitions. Based on the current directives to minimize unnecessary promotions over pesticides, all promotional forms of seasonal offers, raffle draws and/or seasonal rewards were prohibited in line with the opinion that pesticides should not be treated as fast moving consumer goods (FMCG).

In November 2014, a wider publicity was given to the supermarket chain in the country on illegal and counterfeited pesticides and compliance on advertising etc.

Training and awareness programs

Awareness of the public and officers through electronic & print media program on pesticide-related issues were conducted in several occasions. At the same time, following awareness programs on thematic issues were conducted on demand basis.

- *Minimizing pesticide usage for increasing quality produces in agriculture:* 06 programs for Farm Women in Kegalle District.
- *Newly recommended pesticides and safe use practices:* 15 programs for Mahaweli and DOA officers.
- *Legal aspects of pesticide management and safe use initiatives:* 05 programs for Police Officer of the Sri Lanka Police Department.
- *Legal aspects of pesticide management and safe use initiatives:* 02 programs for VIDATHA Technical Officers, Ministry of Science & Technology.
- *Pesticide management and formulation technology:* 02 programs for university undergraduate students.
- *Role of pesticide management and adoption of good agricultural practices:* 04 programs for farmers, technical officers and stakeholders (organized separately by the DOA, SLAAS & Ceylon Chamber of Commerce).

Five (5) thematic posters were designed in order to promote safe and efficient use of pesticides. The poster campaign is used as a mechanism to increase awareness to prevent irresponsible and unethical use of pesticides among farming communities. Initially,

100,000 posters were printed and are ready for wider publicity from November, 2014.

Training program of Agrochemical Sales and Technical Assistants (ASTA)

For the year 2014, Rs. 2.915 million was granted as a refreshment fund by the Ministry of Agriculture for the continuation of necessary training programs in collaboration with the National Apprentice and Industrial Training Authority (NAITA), island wide. During the year 2014, 200 new applicants (out of 349 applications) were selected by interviews for the training by the regional officials of the DOA & NAITA covering the districts of Kilinochchi, Hambanthota and Pollonnaruwa. Depending on the fund availability and mobility of master trainers, 100 applicants commenced training in regional centers. During the year, 200 old recruits from 2013 successfully completed the training program.

The program has faced a deadlock to some extent in achieving timely objectives since the conductance of national competency assessment for National Vocational Qualification (NVQ) Level IV certificates by Tertiary & Vocational Education Commission (TVEC) has dragged on. The situation has remained standstill in spite of the national competency standards for ASTA (Code: D24S001) has been prepared by NAITA and endorsed by the TVEC and the competency-based assessment resources for ASTA (Code: A01S001) has been prepared and validated by NAITA during 2014. This is a recurrent program.

Skills development for laboratory staff

Training is the process of enhancing the skills, capabilities and knowledge of employees for doing a particular job. Increasing specialized knowledge of the laboratory staff in the analytical field is very important to develop their analytical skills. One of the major objectives of the Technical Collaborative Project of the Food and Agriculture Organization (FAO) was to develop instrumentation training for the laboratory staff. During 22 & 23 September 2014 and 02 & 03 October 2014, comprehensive analytical in-house trainings were conducted on hardware, software and application training on 6890 Gas Chromatograph/5975B Mass Spectrophotometer, 1100 Agilent High Performance Liquid Chromatography System and 6890N Gas Chromatograph system including hands on experience on Electron Capture Detector (ECD), Flame Ionization Detector (FID) & Nitrogen Phosphorus Detector (NPD).

Two additional hands-on state-of-the-art laboratory trainings on pesticide formulation and residue analysis were given to the staff during the month of December, 2014 in two accredited laboratories in Sri Lanka, viz. Industrial Technology Institute, Colombo-07 and Bureau Veritas Consumer Product Services (Pvt.) Limited, Boralasgamuwa.

Outcome/Benefits

The 6890GC/5975B MS System is being currently used for Residue Analysis, while 1100 Agilent HPLC System and 6890 N GC system for formulation analysis. Knowledge

gathered from the above training is a massive advantage to develop the instrumentation handling techniques of pesticide analysis for the laboratory staff.

Laboratory quality can be defined as accuracy, reliability, and timeliness of the reported test results. The laboratory results must be as accurate as possible; all aspects of the laboratory operations must be reliable. So, this knowledge will be helpful to improve the total quality of the results as well as trouble shooting of instruments when required.

Quality control of pesticides

Quality control of pesticides is one of the major undertakings at the laboratory of the Office of the Registrar of Pesticides. It has been functioning for compliance monitoring purposes with the existing capacity, which is being ungraded for service--oriented activities upon receiving the status of laboratory accreditation ISO 17025:2005.

During the year 2014, 282 pesticide formulations (i.e. production batches) were analyzed for quality and performance parameters (Ref. Annual Performance Report 2013) and 279 production batches were confirmed valid on quality grounds & approved for marketing. Meanwhile, three (3) pesticide consignments imported were re-shipped to the manufacturer on the failure of quality standards.

Measurement of quality standards using ICP-MS instrument

During the last quarter of 2013, the laboratory acquired an Inductively-coupled Plasma-Mass Spectrophotometer (ICP-MS), which is one of the most sophisticated analytical instruments

for heavy metal analysis in any environmental media. The instrument has been initially calibrated to analyze 17 trace metals including arsenic, cadmium, mercury, lead and chromium. At the very inception, the service provider has given two hands-on trainings on instrumentation and analytical techniques.

Currently, several trial analyzes have been performed in tandem with quality compliance on pesticide formulations, including trace metal contamination in 59 glyphosate formulations (which is one of the leading weedicides in Sri Lanka and its use has been debated on human health grounds), and confirmed negligible on arsenic, cadmium and mercury. More analytical works are being carried out on water and rice samples from the field.

Accreditation road-show

The laboratory is being upgraded with a newly-renovated space for pesticide residue analysis in order to meet the ISO 17025:2005 laboratory standards. Already acquired new ancillary equipments and accessories were installed for efficient conductance of analytical work. Some critical components in this process were calibration and documentation of each piece of equipment. A team of assessors from the Sri Lanka Accreditation Board (SLAB) visited the laboratory for the initial assessment in August 2014. The system requires an inter-laboratory comparison for major complements, which has been the thrust in the course of time. The scope of accreditation will initially be restricted to physical parameters of pesticide formulations and heavy metal analysis in pesticides and environmental samples.

SPECIAL ACTIVITIES

Technical collaboration from Food & Agriculture Organization to improve pesticide management in the country

In July 2014, Food & Agriculture Organization (FAO) declared a technical collaborative grant aid for 270,000.00 US\$ (~ Rs. 35,100,000.00) under the TCP/SRL/3402 to improve “Management of Risks Associated with Pesticides Used in Agriculture” through the Ministry of Agriculture. The project has been designed for one year, which will end in July 2015 with the possibility to extend until end of the year.

The project is designed on three main objectives to 1) improve laboratory system to undertake compliance monitoring on quality of pesticide formulations; 2) develop methods to assess crop residue monitoring; and 3) ensure that proper procedures are adopted in management of empty pesticide containers and disposal of obsolete/outdated pesticides. To achieve those objectives, by October 2014 the project executive work plans with time frames were developed in consultation with the FAO. In order to implement project objectives 1 & 2, some of the procurements and laboratory renovations were undertaken through the donor agency. Detailed project activities will be included in Financial Year 2015.

Regional shop inspections revealed illegal sale of pesticides

Control of Pesticides Act No. 33 of 1980 prohibits all pesticides manufactured, formulated, sold and used in the country unless

they are registered and obtain a valid license obtained. As an ongoing activity, actions were taken to inspect over 200 pesticide sales outlets in several administrative districts covering Hambanthota, Rathnapura, Matara, Anuradhapura, Puttlam, Mannar & Jaffna for compliance as per the requirements laid down under the Control of Pesticides Act. During such investigations, the Office of the Registrar of Pesticides found some illegal pesticides in the market, including pesticides smuggled from India. However, few such reported cases (e.g. Star-20® containing acetamiprid 20% SP) were not materialized, indicating insignificant scale of business.

Court actions and ongoing proceedings against illegal pesticides

Though past attempts to track down some illegal pesticide manufacturers through market/product-based information were unsuccessful (Ref. Annual Performance Report, 2013), consumer complaints received to this office were highly instrumental in tracking down some of the illegal activities. The Office of the Registrar of Pesticides made progress on revealing some counterfeit pesticides designed to look like legitimately registered pesticide products of popular brands, illegal & adulterated pesticides and selling of outdated and banned pesticides of popular demand.

Examples of significant enforcement actions over the past year include:

- In March 2014, a person distributing illegal pesticides smuggled from India (viz. malathion) with another stock of fake pesticides of popular brands [viz. acetamiprid (Mospilan®), thiophanate-methyl+thiram (Homai®)] were

confiscated at Dambulla. The person was convicted at the Dambulla Magistrate Court (MC) and fined a sum of Rs. 200,000.00.

- In April 2014, a pesticide seller at Suriyawewa area was convicted at the Hambanthota MC for selling outdated and banned pesticides and fined a sum of Rs. 50,000.00.
- In May 2014, a distributor of fake pesticides was confiscated at Kuttigala area. The person was convicted at the Embilipitiya MC and fined a sum of Rs. 50,000.00.
- In June 2014, a pesticide seller at Balapitiya area was convicted at the Hambanthota MC for selling a banned pesticide containing paraquat and fined a sum of Rs. 8,000.00.
- In December 2014, a pesticide manufacturer at Kelaniya area was convicted at the Mahara MC for manufacturing unregistered pesticides and fined a sum of Rs. 60,000.00.

The following court proceedings have been instituted during the year as follows:

- In August 2014, a distributor of a fake pesticide of a popular brand, viz. Bistar® was confiscated at Dambulla area and court proceedings are ongoing at the Dambulla MC.
- In September 2014, a distributor of a fake pesticide of a popular brand, viz. Round up® was confiscated at Nawalapitiya area and court proceedings are ongoing at the Nawalapitiya MC.

Learned evidence for illegal transboundary transport of pesticides banned in Sri Lanka

On 18.09.2014, the Office of the Registrar of Pesticides detected a case of illegal trade of extremely toxic pesticides containing 2% methyl parathion in the name of Dethyl 2% DP in Jaffna (Northern Sri Lanka).

Evidence presented that this highly powerful insecticide had been sold in retail quantities after opening the original container. The product was without any label preventing its identity, which is extremely dangerous for anyone using the product and/or exposed to the product, especially the children and uninformed persons. Even though the illegal trade is very limited, the cases like this can tarnish our safe actions and the initiatives in the past by banning almost all extremely toxic pesticides of WHO hazard Class I category from general purpose pest control.

Before 1985, the use of this pesticide in Sri Lanka was limited to few commercial products (i.e. Metacide®, Folidol M®) containing 500 g/l or 46.7% methyl parathion. All pesticides containing methyl parathion have been banned from import to Sri Lanka since 1985 and the official declaration of prohibition has been published in the Government extraordinary gazette No. 1190/24 of 29.06.2001 under the Control of Pesticides Act No. 33 of 1980.

Annex III of the Rotterdam Convention declares that all pesticide products containing methyl-parathion (CAS No. 298-00-0) in the form of Emulsifiable Concentrates (EC) at or above 19.5% active ingredient and dusts (DP) at or above 1.5% active ingredient are extremely toxic which warrants international action.

Actions on pesticide empty container management program

In July & October 2014, the consortium efforts brought about a significant progress on environmentally sound management of empty pesticide containers. The relevant stakeholders including the Office of the Registrar of Pesticides, the Ministry of Environment and Renewable Energy & the pesticide industry association (i.e. Crop Life, Sri Lanka) agreed to launch a public-private partnership project with significant contributions from key parties. As initially agreed upon, Ministry of Agriculture would serve as the funding source, with proposed Rs. 2 million from the government consolidated budget and additional Rs. 5.2 million from the FAO-TCP/SRL/3402 Grant, and the implementation support by the Central Environment Authority. For this purpose, an inter-ministerial agreement was prepared and submitted for approval by relevant Ministers in December 2014.

Awareness programs for Officers-in-Charge of Environmental Protection Divisions, Sri Lanka Police Department

A series of awareness programs were held for 188 Officers In-Charge (OIC) of Environmental Division, Department of Police, Sri Lanka covering three provinces in the country, namely North Western, South and Western (Colombo District) to help curtailing the environmental pollution through pesticide trade and use in Sri Lanka. The present human resources at the Office of the Registrar of Pesticides are barely sufficient for finding the

perpetrators of the Control of Pesticides Act and it is alleged that environmental pollution due to pesticides is rampant in the country. The move strengthens the Office of the Registrar of Pesticides' 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. Further, it is proposed that certain issues in the trade could be better addressed by devolving certain functions by the Registrar of Pesticides with the authority he may have under the Act. In this respect, new proposals were presented to the Inspector General of Police in October, 2014. They are under legal scrutiny.

The Office of the Registrar of Pesticides in collaboration with the Sri Lanka Police organized the event, which is a step forward of the proposed island wide awareness programs under the above project. The Food and Agriculture Organization (through Sri Lanka Representative Office, Colombo) facilitated the workshop by providing necessary funds for conducting the workshop under the Technical Collaboration Project (TCP/SRL/3402) on "Management of Risks Associated with Pesticides Used in Agriculture". This is an ongoing activity.

Highlights of heavy metal contaminants in pesticides

The international chemical conventions required reporting the status of lead and cadmium usage in Sri Lanka, as a part of the

global assessment. There is no lead, cadmium, arsenic-based pesticides in Sri Lanka. However, some elemental and/or heavy metal contamination in pesticide formulations is a global phenomenon. The amounts of trace elements in pesticides decreased in the order: Pb>Cr>Hg>As in studies conducted in Brazil (Campos, 2011). The situation was comparable in Sri Lanka as well.

There is a 50% probability to contain lead (Pb) at or below 100 ppb and Cadmium (Cd) at or below 50 ppb in pesticide formulations in general (N = 184). Further, the data on heavy metal contamination in pesticide formulations in Sri Lanka revealed, all products of elevated impurity levels above average were-

- WP or WG for Hg (<50% of formulations)
- WP or WG for As (100% of formulations)
- WP or WG for Pb (100% of formulations)
- WP or GR for Cd (<50% of formulations)

Note: WP = Wettable Powder, WG = Water dispersible Granules, GR = Granules

This gave the impression that As and Pb were general source contaminants in pesticides with geological origin and/or contain some formulants of natural origin. It appears that pesticide compounds with geological origin were subjected for declaration of heavy metal impurities by the FAO/WHO, e.g. As. However, no mercury (Hg), lead (Pb) or cadmium (Cd) levels were declared as impurities in pesticide formulations by the FAO/WHO.

Update of international conventions on pesticides

The United Nations executed Rotterdam, Stockholm & Basel Conventions (“BRS Conventions”) have direct relevance to pesticides and their wastes with direct and/or indirect impact to human health and the environment, needing international action, for which Sri Lanka has been a signatory, the earliest had been in 1992. The Conventions list pesticides for international action based on their intrinsic toxicities (e.g. persistence and bioaccumulation etc.) and/or risk of pesticides are not adequately manageable under prevailing conditions.

At present, the enforcement of BRS Conventions with respect to pesticides is undertaken at very satisfactory level in the light of existing pesticide Law of the country, i.e. Control of Pesticides Act No. 33 of 1980 and the regulations there under. Sri Lanka had been neutral in the past in reaching decisions on future imports and use of pesticides listed under the Conventions, as almost all of the listed compounds and/or products were banned long time before the Conventions came into adoption.

The mandatory registration and import and export control mechanism will prevent import of pesticides if the pesticides are no longer registered or used in the country or pose hazards to health and the environment or if alternatives are available and unlikely to cause an economic impact in case the imports are prohibited. The Office of the Registrar of Pesticides effectively participated in submitting the progress reports on the status of compliance to the BRS Secretariat in October,

2014. The National Implementation Plan (NIP) of the Stockholm Convention is currently being updated (September 2014-March 2015) on or after the previous assessment in June 2006, and expert participation by various forms of discussions, deliberations and reports were some of the key aspects in this particular assessment.

Dr. J.A. Sumith (Research Officer attached to the Office of the Registrar of Pesticides) was nominated to the BRS Secretariat for rendering expertise on the assessment of pesticides proposed under the Conventions.

- Persistent Organic Pollutant Review Committee (POPRC) under the Stockholm Convention (Term May 2014-May 2017)
- Small Intersessional Working Group (SIWG) on the Basel Convention (Term 2014-2015)
- National Implementation Plan (NIP) of Sri Lanka under the Stockholm Convention (September 2014-March 2015)

Field Demonstrations on Weedicides at Hasalaka (Interprovincial District) during 2014/2015 Maha and 2015 Yala Seasons

Field complaints on herbicide inefficiency/inefficacy are frequent in the recent past. In the last season (2014 *Yala*), several farmer organizations in Hasalaka/Mahiyangana areas have been complaining about cases of herbicidal inefficiency of several weedicides marketed by agrochemical companies. A team from the Office of the Registrar of Pesticides joined the Deputy

Director of Agriculture (Extension), Inter-province (Hasalaka) in a field observational visit on affected fields and confirmed a case of 40-60% loss of success in weed control, in spite of field conditions (water management) and the doses applied were up to the recommendation. However, application irregularities on the farmers' perspective were not highlighted but field observations decipher another in most situations.

In view of the above, in order to establish effective participation while addressing field complaints regarding inefficiency on common weedicides available in the field, a program was launched in November, 2014 (2014/2015 *Maha*) to establish several demonstration fields in selected farmer fields. The program designed to include 20 farmer plots from 10 Agricultural Instructors (AI) divisions. A half of the prospective farmers were given open choices for application of weedicides according to the "farmer method" while the other half of the farmers were given the "recommended method" of application under the direct observations of the field staff. A complementary survey has also been designed to record performance parameters for future decision making process. The Office of the Registrar of Pesticides expects that the overall outcome of this exercise would bring a better perspective with respect to most of the field complaints on the use of weedicides in rice. The program will be continued during *Yala* 2015 as well.

PLAN FOR 2015

- Acceptance of applications for registration, pre-evaluation of original registration applications, evaluation of secondary registration and re-registration applications
- Evaluation & preparation of data for sub-committees
- Preparation of import license and issue of import approvals
- Evaluation of pesticide quality certificates
- Screening of labels, advertising material for approval
- Inspection of factories, approved repacking facilities and stores
- Inspection & certification of premises of fumigation & house-hold pest control operators
- Registration of pest control services
- Obtaining approval for CH₃Br for quarantine & pre-shipment treatment on accountable basis
- Inspection of sales outlets
- Issue of packing clearance as per the quality analysis of samples on consignment basis
- Conducting media programmes
TV - 2
Radio - 6
Print media – 4
- Training / Certification of Agrochemical Sales and Technical Assistants
- Conducting awareness exhibitions and programmes for authorized officers
- Issue of dealer certificates
- Attending field complaints/ legal prosecutions
- Conducting Pesticides Technical & Advisory Committee (PeTAC) meetings, meetings with industry representatives and Pesticides sub-committee meetings (agriculture, public health, domestic & industrial)
- Formulation analysis
- Random checking of pesticide impurities
- Risk assessment on pesticide impurities including heavy metals
- Evaluation of effects on non-target organisms in the environment by pesticides
- Monitoring of resistance development of pesticides
- Establish a compliance monitoring scheme to assure the levels of pesticide residues in vegetables and fruits
- Evaluation of house-hold pesticides to find their field effectiveness
- Development and implementation of programmes for empty container disposal
- Providing services as technical experts/ members/resource personnel in intra- and inter-departmental organization meetings
- Collection & compilation dissemination of import statistics (Central Bank, Universities, Researches, Govt. Institutes etc.)
- Publishing revised guidelines for registration of pesticides/guidelines for registration of pesticide companies

STAFF LIST

Designation	No.
Registrar of Pesticides	01
Research Officer	05
Agriculture Officer	02
Agricultural Instructor	07
Research Assistant	05
Agriculture Monitoring Officer	01
Program Assistant (Agriculture)	02
Public Management Asst. Service	04
Development Officer	02
Driver	03
Watcher	02
Labourer	02
KKS	01
Labourer (Contract)	02
Total	40

2.1.4 PLANT GENETIC RESOURCES CENTER (PGRC) - GANNORUWA

Since its inception in 1989, the Plant Genetic Resources Center (PGRC) continued its efforts to ensure the conservation of the country's Plant Genetic Resources (PGR) of food crops and to promote their use for the benefit of present and future generation. To achieve this Plant Genetic Resources center continues to collect, introduce, conserve, evaluate and

document the genetic diversity of food crops and their related species. The biotechnology research facilities of the center are used for advanced research in PGR evaluation and enhancement.

This report presents a summary of the progress achieved by PGRC in the year 2014.

BUDGET

Table 2.1.4.1: Annual budget - 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	3,145,000	2,481,139	79
Recurrent	13,435,959	12,566,931	94
Projects			
• Asian Food and Agriculture Cooperation Initiative (AFACI)	800,000	748,531	94
• National Agriculture Research Plan (NARP)	1,161,200	1,050,351	90
• Biodiversity Adaptation for Climate Change (BACC)	480,841	480,841	100
Total	19,022,999.99	17,327,793	91

PROGRESS

Germplasm Exploration and Collection

Following Plant Genetic Resources samples were collected from the districts of Nuwara Eliya, Gampaha, Moneragala, Kurunegala, Kandy and Kegalle and research institutes of Batalagoda, Mahailuppallama and Bandarawela in 2014 (Table 2.1.4.2). A total of 380 samples were collected in 2014.

Table 2.1.4.2: Number of germplasm samples collected in 2014

Crop Group	No. of samples
Rice	22
Vegetable	264
Grains	03
Maize	17
Oil crops	14
Root and tubers	20
Fruits	40
Total	380

Survey and collection of traditional cultivars

A survey was conducted to find out available traditional cultivars in three agro ecosystems namely Kandyan Home Garden at Udukumbura in Kandy District, Owita at Millaniya in Kalutara District and Small Tank System at Gampola in Kurunegala district. Available traditional cultivars have been collected for conservation.

Currently seed multiplication and farmer participatory selection programme is being implemented at three project sites namely, Milleniya (Owita System), Gampola (Cascade System), and Udukumbura (Kandyan Home Garden) under the Biodiversity Adaptation for Climate Change (BACC) project at PGRC. The following traditional landraces were distributed among farmers in three project sites to find out the adaptability and suitability according to climatic condition of the target project sites (Table 2.1.4.3)

Table 2.1.4.3: The number of traditional landraces distributed among farmers

Crop	Millaniya	Gampola	Udukumbura
Rice	14	13	13
Maize	03	15	03
Hyacinth bean	02	02	02
Brinjal	11	03	03
Yard long bean	26	07	05
Winged bean	06	10	03
Okra	37	19	14
Luffa	01	14	-
Lima Bean	02	03	-
Chilli	06	01	01
Pumpkin	-	15	-
Bitter gourd	04	03	02
Cucumber	10	07	-
<i>Capsicum</i> (Nai miris)	10	01	-
Proso millet	-	01	-
Finger millet	-	21	04
Mustard	-	11	-
Sesame	-	12	-
Cowpea	-	06	-
Horse gram	-	03	-
Foxtail millet	-	02	-
Beans	-	05	20
Ash pumkin	-	02	01

Conservation of Seed Materials

During the year 2014, a total of 282 accessions were conserved in the gene bank. The total number of gene bank holdings at the end of the year 2014 is 13,470 (Table 2.1.4.4).

Table 2.1.4.4: The present conservation status of the gene bank

Crop Group	No. of Accessions
Rice and related spp.	4622
Other cereals and related spp	1693
Grain Legumes	2113
Vegetable Legumes	1440
Solanaceous vegetables & Condiments & related spp.	1334
Cucurbit vegetables	814
Brassicaceae vegetables	31
Alliums	21
Other vegetables	399
Leafy vegetables	171
Root and Tubers	09
Mustard and related spp.	131
Oil crops	434
Fibre crops	66
Medicinal plants	27
Fruits	165
Total	13,470

Distribution of germplasm

During the year 2014, a total of 1705 accessions of crops were distributed to local research institutes, NGOO, and Universities on their request.

Research on seed behavior

One thousand eight hundred and seventy four yard long bean samples in the active collection were tested for their viability. The result revealed that there were no drops in viability of the conserved accessions of yard long bean.

Germplasm multiplication

Following crop germplasm were multiplied for conservation in the genebank (Table 2.1.4.5)

Table 2.1.4.5: Number of accessions multiplied in 2014

Crop	No. of accessions
Rice	16
Maize	07
Foxtail millet	06
Finger millet	07
Cowpea	16
Green gram	08
Black gram	68
Soybean	04
Lima bean	04
Cluster bean	02
Common bean	05
Hyacinth bean	05
Winged bean	27
Yard long bean	152
Jack bean	01
Sword bean	02
Brinjal	30
Chilli	82
Ash pumpkin	03
Cucumber	15
Luffa	03
Bitter gourd	01
Bottle gourd	02
<i>Cucumis melo</i> (Kekiri)	16
Okra	94
<i>Amaranthus</i> sp.	03
<i>Celosia argentea</i> (Kirihandha)	01
Spinach	02
Sesame	01
<i>Cardiospermum halicacabum</i> (Penela)	02
Cotton	01
<i>Averrhoa bilimbi</i> (Bilin)	01
Wild passion fruit (Dhalhonda)	01
Sunflower	01

Characterization and Evaluation

Some promising accessions of yard long bean, chili and tomato were identified after characterization of 152 yard long bean, 52 chili and 55 tomato accessions respectively. Twenty three different red onion accessions have been multiplied and maintained for further evaluations. A total of 25 accessions of banana collected from farmer fields were characterized.

Biotechnology

Phenotypic and molecular characterization of rice germplasm for drought tolerance

The objective of this study funded by NARP was to identify drought tolerant accessions based on phenotypic and molecular characterization data for development of drought tolerant lines. A few putative drought tolerant accessions were selected for further studies, according to the phenotypic data of Gannoruwa and Batalagoda. Molecular analysis is in progress.

Identification of genetic variation in different seed lots of tomato variety Thilina

The objective is to identify the DNA level variation in different seed lots of Thilina. Molecular analysis was done using eight SSR primers and some of the populations showed genetic differences from original Thilina which was conserved at PGRC. Further studies are in progress to find genetic variations of Thilina in farmers' fields. This study was done on request of HORDI, Gannoruwa..

Development of a mini core collection of selected traditional varieties conserved at PGRC

PGRC collection of germplasm may consist of several redundant accessions and there is a need to identify them for efficient evaluation program for different traits. Also, there is an increasing demand for traditional varieties for organic culture thus correct identification is necessary for certification of seed paddy by the seed certification service. In this study molecular characterization of 11 accessions of 'Suduru Samaba' cultivar using 31 genome wide SSR markers along with seed characterization were done and representative accessions of 'Suduru Samaba' were identified. A similar work on 11 'Suwandal' accessions was initiated and molecular characterization was completed for 20 SSR markers.

Identification of true mango hybrids using molecular characterized data

Hybridity of six mango hybrids developed at FCRDC, Horana was tested at molecular level using six SSR primers. As the parents are not inbred lines, distinct allelic variation was not shown to identify true hybridity. More number of primers which represent whole genome has to be checked to identify such polymorphism.

Tagging of Yellow Vein Mosaic Virus (YVMV) resistant genes in wild Okra

A NRC funded study was initiated to tag the resistant genes in wild okra using molecular techniques to incorporate YVMV resistant character from wild okra species to available okra varieties. Crosses were done between

Okra variety MI7 and *Abelmoscus angulosus*. Field evaluation was carried out to identify virus resistant lines. This work is in progress.

Conservation of PGR of *Dioscorea*, sweet potato, potato and banana species under *in-vitro* and plant house conditions

The objective of this work is to conserve and maintain crop germplasm under *in vitro* and *in vivo* form. Sixty five accessions of *Dioscorea* species, 104 accessions of sweet potato, 05 accessions of banana and 04 potato accessions are being maintained.

Identification of long passage period for *in-vitro* conservation of banana

The objective of this study is to identify long passage period for local banana accessions under *in-vitro* conditions. It was found that banana accessions ‘Rathambala’, ‘Embon’, ‘Pulathisi’ can be conserved for a period of ten months in half MS medium with 15g/L sucrose and 1% sorbitol under *in-vitro* form.

Effects of different levels of Auxin for high efficiency callus induction of four *Dioscorea* spp.

Callus is the basic material for mutation breeding in *Dioscorea*. Chemical mutation induction and plant regeneration through callus culture is an easy pathway to reach mutant production. Therefore, this research is initiated to identify the best Auxin level for callus induction. The Auxin level of 1.5 mg/l 2,4-D was identified as the best level of 2,4-D for high frequency callus induction on *D. alata* and *D. bulbifera* varieties.

Collaborative work

The biotechnology unit is collaboratively working with following projects of Institutes/Universities

- Development of rice varieties for abiotic stresses; submergence, salinity, drought escape/tolerance and iron toxicity , NARP Grant, RRDI , Batalagoda
- Identification of genomic regions associated with phosphate deficiency tolerance in Sri Lankan rice germplasm for marker assisted breeding, NRC Grant, Department of Biotechnology, Faculty of Science/University of Peradeniya.
- Molecular Mapping for Improved Salinity Tolerance in Rice. NSF grant, Department of Biotechnology, Wayamba University.
- Analysis of Genetic diversity of eating and cooking qualities and nutritionally important starch fraction of representative germplasm of rice in Sri Lanka. NRC grant, Department of Agriculture Biology, University of Peradeniya.
- Phenotypic and molecular characterization of rice germplasm for drought tolerance, NARP funded collaborative research with RRDI, Batalagoda and FCRDI, Mahalluppallama
- Tagging of Yellow Vein Mosaic Virus (YVMV) resistant genes in wild Okra. NRC funded research project which collaborate with FCRDI, Mahalluppallama and Department of Agriculture Biology, Faculty of Agriculture, University of Peradeniya.

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 programmes

Awareness programmes are conducted by the Exploration unit of the centre. These programmes are organized as one day training programmes and some university student and diploma holders attend for one month to six months in in-plant training programmes (Table 2.1.4.6).

Table 2.1.4.6: Number of training programmes conducted at PGRC

Category	No.
Workshops	2
Training programmes	172
Field demonstrations	2

In addition officers participated in 3 exhibitions and 3 other programmes.

Providing facilities for seminars and trainings

The PGRC provided its conference hall, seminar room and facilities for the Department of Agriculture and other institutes (Table 2.1.4.7)

Table 2.1.4.7: Institutions and number of programmes conducted at PGRC conference hall

Department/ Institute/ Organization	No. of programmes
Department of Agriculture	11
University of Peradeniya	01
Central Province Ministry of Agriculture and Environment	02
Mahaweli Development Authority	01
Ministry of Buddha Sasana	01
Educational programmes	04

Undergraduate Thesis supervision

The following programmes were supervised by the staff of the biotechnology unit.

- Genome wide genetic diversity analysis of Suduru samba rice (*Oryza sativa* L.) based on SSR polymorphism. 2014. K. Dalshini, Department of Agriculture Biology, Faculty of Agriculture, University of Peradeniya.
- Effects of different levels of Auxin for high efficiency callus induction and callus growth of four *Dioscorea* spp. Salika S.M.P.R., Department of Crop Science, Faculty of Agriculture, University of Ruhuna.

PLAN FOR 2015

- 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.

- Continuation of distribution of Plant Genetic Resources.
- Conducting research on storage behavior of seeds.
- Development of a minicore collection of selected traditional rice varieties conserved at PGRC is continued with ‘Kaluheenati’, ‘Suduheenati’, ‘Suwandel’, ‘Madatawalu’, ‘Pokkali’, ‘Pachchaperumal’ and ‘Kuruluthuda’.
- Multiplication of three hundred accessions of crop germplasm.
- Characterization and evaluation of chilli germplasm.
- Maintain banana and other perennial crop germplasm.
- Selection of land races suitable for different agro ecosystems.
- Phenotypic and molecular characterization of rice germplasm for drought tolerance is continued with molecular analysis.
- Identification of genetic variation in different seed lots of tomato variety Thilina is continued.
- Tagging of Yellow Vein Mosaic Virus (YVMV) resistant genes in wild okra will be continued under NRC grant.
- Conservation of PGR of *Dioscorea*, Sweet Potato, Potato and Banana species under *in-vitro* & plant house conditions will be continued incorporating more banana accessions and molecular characterization of *Dioscorea* accessions to develop a core collection
- Collaborative work with RRDI and Wayamba University and Department of Agriculture Biology, Faculty of agriculture will be continued.
- Collaborative work with HORDI on ‘Characterization of *Annona* germplasm in

Girandurukotte under a NARP (National Agriculture Research Plan) will be initiated.

- Characterization, evaluation and promotion of Capsicum, *Dioscorea* and *Centella asiatica* (Gotukola) germplasm in Sri Lanka will be initiated in collaboration with HORDI, under 2nd phase of IMPGR (Integrated Management System of Plant Genetic Resources) funded by AFACI (Asian food and agriculture cooperation Initiative)
- Maintenance and improvement of the data management system of PGRC
- Conducting awareness programme on PGR conservation and management

STAFF LIST

Designation	No.
Deputy Director of Agriculture	01
Research Officer	08
Agricultural Instructor	03
Research Assistant	05
Program Assistant (Agriculture)	02
Research Sub Assistant	05
Public Management Assistant	07
Store man	01
KKS	01
Driver	03
Lorry Cleaner	01
Earth Mover Operator	01
Electrician	02
Technician	01
Circuit Bungalow Keeper	01
Watcher	05
Labourer	32
Labourer (Contract)	04
Total	83

2.1.5 NATIONAL PLANT QUARANTINE SERVICE (NPQS) – KATUNAYAKE

The mandate of the National Plant Quarantine Service of Sri Lanka is to facilitate the import and export of pest free plants and plant products, for the development of agriculture and related industries in the country. To achieve this, emphasis was given to both research and service oriented quarantine activities.

Phytosanitary certification, inspection and treatment of imported and exported 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. This report gives the achievements made on financial, technical and service oriented activities carried during 2014.

BUDGET

Allocation given and expenditure incurred under recurrent, capital and projects are given in Table 2.1.5.1.

Table 2.1.5.1: Annual budget –2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	7,435,954	3,288,029	45
Recurrent	11,339,721	11,095,633	98
NARP Projects	500,000	478,514	96
Total	19,275,675	14,862,177	77

PROGRESS

PLANT QUARANTINE OPERATIONS

Activities carried out by the Plant Quarantine Operation Division within the year 2014 are listed in the Table 2.1.5.2.

Table 2.1.5.2: Activities carried out in 2014

Activity	Achievement
01 Registration of interceptions	386
02 Number of interception reports sent	355
03 Registration of inspections	1309
04 Number of inspection reports sent to entry points	1248
05 Registration of coir products for testing	455

Activity	Achievement
06 Reports for tested coir products	395
07 Registration of submitted samples for testing	36
08 Issue of phytosanitary certificates	11
09 Number of questionable consignments destroyed	291

In addition to these activities which are related to plant quarantine operations, the division has coordinated and carried out 20 comprehensive training programmes on plant quarantine activities and procedures.

ENTOMOLOGY

Testing for insect pests, mites nematodes in export and import consignments

a) Exports

- 12,943 export foliage plant samples were collected from 19 export foliage nurseries and tested for plant parasitic nematodes. 142 samples were contaminated with plant parasitic nematodes.
- 17,179 export foliage plant samples were tested for insect pests and mites. 19 samples were contaminated. 428 export coir samples collected from 21 coir factories were tested for insect pests, mites and plant parasitic nematodes. No contaminations were recorded.
- 67 other special samples submitted by the foliage exporting nurseries were tested for plant parasitic nematodes and insect pests for the facilitation of their pest monitoring program.

b) Imports

- 26 imported seed potato consignments were inspected at the sea port. These samples were collected and tested for insects, pests and plant parasitic nematodes. No contaminations were recorded.
- 612 imported plant materials including hybrid maize, ground nut, cashew nut, *sphagnum* peat moss, fermented cocoa beans were tested for insect pests, mites and plant parasitic nematodes and 38 samples were found to be contaminated with common stored pests, mealy bugs and aphids. Further Arecanut imported from Indonesia was found to be infected with *Araecerus fasciculatus* (Betel nut Weevil)

PATHOLOGY

Testing for pathogens in export and import consignments

a) Exports

Foliage and coir

- 9796 samples were tested and following pathogens were found; *Mucor* sp., *Aspergillus* sp., *Fusarium* sp., *Colletotrichum* sp., *Thalaviopsis paradoxa*, *Curvularia* sp., *Pestalotia* sp, (-) *Bacteria*, *Geotrichum* sp. Out of these pathogens *Thalaviopsis paradoxa* is considered as a quarantine important pest.

Tissue culture plants

- 3,028,529 plants were examined during 89 inspections. Contaminated containers with samples were rejected during inspections and necessary instructions were given to improve the quality of products.

Food, Fruit and vegetables

- 1202 samples were tested and following pathogens were found; *Mucor*, *Aspergillus* sp., *Fusarium* sp., *Colletotrichum* sp., *Rhizopus* sp, *Alternaria* sp, *Curvularia* sp. *Pestalotia* sp., *Rhizoctonia* sp, (+) *Bacteria*.

b) Imports

Seed potatoes

- 85 seed potato samples were tested and following pathogens were found, Silver scurf, Common scab, Soft rot, Black scurf, Netted scab and *Erwinia* sp. No quarantine pathogens were found.

Seed and other plant materials

- 348 samples were tested and following pathogens were found; *Mucor*, *Rhizoctonia* sp, *Erwinia* sp, *Geotrichum* sp, *Fusarium* sp, *Colletotrichum* sp, *Cylindrocarpan* sp, *Curvularia* sp. No quarantine pathogens were found.

Testing of submitted samples

- 517 samples were checked and suggestions/findings were given to the responsible parties.

WEED SCIENCE

Testing for pests in export and import consignments

a) Exports

- 2472 export coco peat products and 743 food items were tested.
- Out of that 94 coir items and 03 food items were found to be non compliant with the importing country requirements.

b) Imports

- 87 import consignments were tested and 27 of them were found to be contaminated with weed seeds. Among them *Euphorbia dentataare*, *Parthenium hysteroporus* were of quarantine significant.

Maintenance of reference collection

- Seeds of 28 new weed species were collected during the year.
- 18 herbarium specimens were collected.

TREATMENT TECHNOLOGY

Services

Commercial fumigations

Export plants and plant products

50 consignments of plant & plant products exported by different Companies were fumigated at NPQS using Methyl Bromide.

Import Plant and plant product

02 Consignments of assorted flowers, intercepted by the plant quarantine units at the airport were fumigated before releasing to the importer.

Table 2.1.5.3: Commercial fumigations done at NPQS Katunayaka during 2014

Commodity type	No. of fumigations
Coir & coir products	10
Wood & wooden Items	14
Fruit (Pineapple)	11
Cut foliage	07
Flowers	02
Spices	02
Herbs	03
Other	03
Total	52

Online approval for Methyl Bromide Fumigation for Export commodities under Montreal protocol

Examined the 15783 requests for suitability of methyl bromide fumigations. Some of the consignments

were approved for other treatments (Phospine). Some of the requests were rejected due to unsuitability of the fumigation.

Fumigation Supervision

565 Methyl Bromide fumigations and 02 Heat treatments for wooden pallets were conducted by private fumigators upon requests by exporters were supervised by the officers of treatment technology division for phytosanitary certification purpose.

Facility Approval for alternative treatments

Heat treatment facility approval for ISPM 15

Examined the two heat treatment facilities for standards and approval was given to use ISPM 15 logo.

JSR Audit for AFAS Fumigation

06 Fumigation companies were audited for AFAS standards and the companies suspended during the previous audit during the year 2013 were reinstated.

TRAINING PROGRAMMES

- A large number of students from universities, technical colleges and schools were trained at the Entomology division
- 16 training programmes, five workshops and two awareness programs were conducted and 12 undergraduate students / diploma students were supervised by the Pathology Division.

- More than 200 students visited the Weed Science laboratory for one day field visits. Four students were engaged in long term training (03 to 06 months)
- 20 training programmes were conducted for various stakeholders on plant quarantine treatments.
- Four students were engaged in long term training on plant quarantine (03 to 06 months)
- Two Days training programs were conducted for students in pest control with practical fumigation.
- The staff of the Weed Science division has received training on improvement of export quality of fruits and vegetables in Sri Lanka.
- Evaluation of the allelopathic effects of *Clidemia*, *Xanthium* and *Antigonon* on germination of Solanaceous crops
- *Fallopia convolvulus* (L.) Á. Löve Polygonaceae: Predicting potential environmental and economic impact to Sri Lanka.
- Effects of physical and chemical treatments to eliminate the *Thelaviopsis paradoxa* in coir products in Sri Lanka.
- Investigation on fruit quality of Methyl Bromide treated pineapple.

PLAN FOR 2015

Promotion of export of quality plants and plant products

- Export nursery inspections
- Factory inspection of export plants & plant products
- Other agriculture related export inspections (individual tissue culture plant evaluation)
- Sampling
- Document check
- Laboratory testing plant pathogens
- Laboratory testing plant insects
- Laboratory testing plant nematodes
- Laboratory testing weeds/soil
- Submission of final test reports

Ascertaining the quality of imported seed potato

- Entry point inspection of seed potato
- Sampling
- Document check
- Laboratory testing plant pathogens

RESEARCH PROGRAMMES

- Effect of Solarization for Eliminating *T. paradoxa* from Export Coir Products,
- Elimination of *Agrobacterium* spp causing crown gall in *Ficus benjamina* by biological control, Detection of Maize streak virus, Maize strip virus and Maize dwarf mosaic virus by ELISA,
- Detection of potato viruses (PVA,PVM and PVS) in imported seed potatoes using serological methods,
- Molecular Detection of *Clavibacter michiganensis sub sp sepedonicum* in Seed Potatoes.
- Development of an identification key for the seeds of family Nyctaginaceae based on morphological data
- Development of an identification key for the seeds of family Polygonaceae based on morphological data

- Laboratory testing plant insects
- Laboratory testing plant nematodes
- Submission of final test reports

Ascertaining the quality of imported plant and plant products

- Entry point inspection
- Sampling
- Document check
- Receipt of samples submitted by entry points to NPQS
- Laboratory testing plant pathogens
- Laboratory testing plant insects
- Laboratory testing plant nematodes
- Laboratory testing weeds
- Submission of test reports
- Submission of final test reports
- Treatment recommendation
- Re-export or destruction

Ascertaining the quality of imported seeds, fruits and vegetables

- Entry point inspections
- Sampling
- Document check
- Receipt of samples submitted by entry point to NPQS
- Laboratory testing plant pathogens
- Laboratory testing plant insects
- Laboratory testing plant nematodes
- Laboratory testing weeds
- Submission of test reports
- Submission of final test reports
- Release
- Treatment recommendation
- Re-export or destruction

Prevention of imports done without fulfillment of phytosanitary Requirements

- Document check
- Sampling
- Testing for pathogens in intercepted plants
- Testing for insect pests in intercepted plants
- Testing for plant parasitic nematodes
- Testing for weeds
- Submission of test reports
- Submission of final test reports
- Treatment recommendation
- Treatment supervision
- Re-export
- Destruction

Post Entry Quarantine

- Field inspection
- Keeping plants at DOA premises
- Reports/ recommendations
- Submission of final reports

Treatment for eradication of pests found in exported and imported plants and plant products

- Fumigation at NPQS
- Supervision of fumigation done outside NPQS
- Issuance of fumigation reports
- Online approval for fumigation companies

Maintenance of reference collections

- Weed species and weed seed species
- Insects
- Disease specimens
- Live aquatic plants

Training and awareness programmes for stake holders

- Trainings
- Supervision of undergraduates/Diploma students
- Awareness programs
- Workshops
- Seminars

Quarantine related research

- Pest surveys
- Pest Risk Analysis
- Weed control research
- Pathological research
- Entomological research
- Quarantine treatment research

Registration of plant nurseries

- Exporting plants to designated countries
- Field inspections
- Auditing
- Submission of reports

Evaluation of facilities available with treatment providers

- Inspection of sites
- Auditing

Issuing of phytosanitary certificates

- Issuing of phytosanitary certificates

Issuing of import permits

- Issuing of import permits

STAFF LIST

NPQS, Katunayake

Designation	No.
Additional Director	01
Research Officer	04
Agriculture Officer	04
Agriculture Monitoring Officer	02
Programme Assistant (Agriculture)	07
Research Assistant	06
Agricultural Instructor	16
Management Assistant	06
Driver	03
Electrician	01
KKS	01
Watcher	06
Labourer	09
Labourer (Contract)	02
Total	69

PQS, Seaport

Designation	No.
OIC (RO)	01
Agriculture Officer	04
Agricultural Monitoring Officer	03
Programme Assistant (Agriculture)	02
Research Assistant	06
Agriculture Instructor	09
Management Assistant	01
Labourer	01
Total	17

PQS, Airport

Designation	No.
Officer In Charge (AO)	01
Agriculture Officer	01
Research Assistant	06
Agricultural Instructor	16
Management Assistant	01
Labourer	02
Total	27

2.2 SEED AND PLANTING MATERIAL DEVELOPMENT CENTRE (SPMDC) - PERADENIYA

High quality seed and planting material are the most important inputs to increase yield and quality of the produce and minimize the unit production costs in Agriculture. The Seed and Planting Material Development Centre (SPMDC) plays a vital role in producing, distributing & marketing seeds and planting materials effectively throughout the country. The SPMDC has 24 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 14 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 of the Director (SPMD), Additional Director (Paddy and OFC), Additional Director (Vegetable, Planting Material and Marketing), Additional Director (Potato), Head quarter Deputy Directors and Assistant Director of Agriculture.

Mission of the SPMDC is to assure the supply of quality seed and planting material at competitive prices to the farming community of Sri Lanka. Production of basic, 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.

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 in acceptable quantities are the main challenges faced by the SPMDC.

Objectives:

- To ensure production and distribution of basic and certified seed.
- To provide technical assistance and support for the development of 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 the stakeholders.
- To achieve seed and planting material security in the country.
- To maintain buffer stocks of seeds.

The following activities were conducted during the year 2014, which includes Maha 2013/14 and Yala 2014 seasons in order to fulfill the objectives of the Centre.

BUDGET

Table 2.2.1: Annual budget – 2014

Vote	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure (%)
Capital	67.49	63.28	94
Recurrent	52.08	191.74	368
Projects			
• Seed production and processing programme	250	254.9	102
• Seed potato promotion programme	30.5	26.72	88
• Farm development programme	150	149.11	99
• Seed & planting material development programme	68.84	67.46	98
• Other field crop production programme	34.3	11.13	32
Total	653.21	764.34	117

PROGRESS

PRODUCTION AND SUPPLY OF SEED PADDY

Basic seed paddy production

Basic seed paddy (seed paddy of Foundation and Registered classes) of 27 varieties is produced in government seed farms. Foundation seed paddy is produced using breeder seeds supplied by Rice Research and Development Institute Bathalagoda and its sub stations. Registered seed paddy (RSP) is produced by using so produced Foundation seed paddy (FSP). Certified Seed Paddy (CSP) which is used for the production of consumption paddy is produced by using Registered Seed Paddy.

In a Yala season the cultivated extent of paddy is about 500 000 ha and in a Maha season it is about 780 000 ha. Therefore about 1 280 000

ha of paddy is cultivated annually. For the cultivation of this extent, the annual certified seed paddy requirement is about 6400000 bu and for the production of this amount of CSP, 160 000 bu of Registered Seed Paddy is required.

In Maha 2013/14 the production of RSP is about 80400 bu and in Yala 2014 it was about 49133 bu. Therefore the total annual production of RSP was 129540 bu. The severe drought that prevailed during the year 2014 affected the production of RSP. However, despite bad weather, The Department of Agriculture has supplied more than 80% of the total national RSP requirement which is well over the planned and widely accepted healthy supply of 25% of the total national RSP requirement.

The Table 2.2.2 shows the basic seed paddy production in ten government seed farms in 2014.

Table 2.2.2 Basic Seed Paddy Production in government seed farms during 2014 (bu)

Farm	2013/14 Maha			2014 Yala			Total			Grand Total
	FSP	RSP	CSP	FSP	RSP	CSP	FSP	RSP	CSP	
Aluththarama	496	6695	548	398	5308	1482	894	12003	2030	14927
Malwatta	466	11149	0	317	3978	358	783	15127	358	16268
Polonnaruwa	737	21394	1284	779	14213	0	1516	35607	1284	38407
Bataatha	147	2450	399	254	1671	461	401	4121	860	5382
Ambalanthota	125	2901	1883	382	3114	1013	507	6015	2896	9418
MahaIlluppallama	922	20012	1029	1052	9550	667	1974	29562	1696	33232
Kanthale	423	9646	884	395	8908	176	818	18554	1060	20432
Murunkan	41	2944	524	0	0	0	41	2944	524	3509
Paranthan	118	2949	1033	181	2248	468	299	5197	1501	6997
Karadiyanaru	0	268	3659	0	143	401	0	411	4060	4471
Total	3475	80408	11243	3758	49133	5026	7233	129541	16269	153043

Certified Seed Paddy Production

Some amount of the national requirement of Certified Seed Paddy is produced by the department of Agriculture through its contract seed paddy production programme. It was not implemented during last several seasons due to some decisions taken by the ministry, it was resumed in Yala 2014. Although there was a target of purchasing 100,000 bushels, it was limited to about 23,000 bushels due to limited cultivation of paddy as a consequence of the bad weather that prevailed during the season.

Table 2.2.3 shows the purchasing of certified, commercial, and emergency seed paddy during 2014.

Table 2.2.3: Purchasing of certified, commercial, and emergency seed paddy during 2014 (bu/ mt)

DDA Region	2014 Yala		
	Certified	Emergency	Commercial
Aluththarama	284	-	-
Ampara	1133	-	6191
Bata-Atha	5187	2381	2739
Kanthale	172	-	-
Nikawaratiya	1806	290	1652.5
Palwehera	-	-	304
Polonnaruwa	508	-	-
Total	9090	2671	10887
Total (mt.)	186.3	54.8	223.2

Issue of Seed Paddy

For Yala 2014, about 58150 bu of seed paddy and for Maha 2014/15, 103760 bu of seed paddy have been issued. Therefore during the year 2014, about 161910 bu of seed paddy have been issued by the Department of Agriculture (Table 2.2.4). Relatively reduced issue of seed paddy for Yala 2014 is a result of the limited extent of paddy cultivation due to drought.

Table 2.2.4: Issue of seed paddy in 2014 (bu)

Seed Class	Yala 2014					Maha 2014/2015					
	For Farm Programs	For Contract Growing	For Private sector seed production	For Extension	Total	For farm Programs	For Contract Growing	For private sector seed production	For Extension	Total	Grand total
Foundation	985	41	152	74	1252	1880	61	143	217	2301	3553
Registered	403	1341	7522	38519	47785	281	2340.5	17172	51696	71489.5	119275
Certified	2336	79	762	5939	9116	446	0	546	21310	22302	31418
Commercial									5887	5887	5887
Emergency seeds									2671	2671	2671
Total	3724	1461	8436	44532	58153	2607	2401.5	17861	81781	104651	162804

Production and Distribution of Seeds of Other Field Crops

With the use of breeder seeds supplied by the Field Crop Research and Development Institute and its sub stations, thirty eight varieties of twelve Other Field Crops were multiplied and produced four different classes of seeds namely Foundation, Registered, Certified and Commercial.

Basic Seed (Foundation and Registered) Production

Foundation seed production is done only in government seed farms while registered seed production is done in both government seed farms and through the contract seed production system.

In the year 2014, 16297 kg of foundation seeds and 99833 kg of registered seeds were produced through both these systems. The table 2.2.5 shows the OFC seed production in government seed farms.

Table 2.2.5: Basic seed production of OFC in government farms

Crop	Variety	Production in Maha 2013/14 (kg)				Production in Yala 2014 (kg)				Total
		Foundation	Registered	Certified	Commercial	Foundation	Registered	Certified	Commercial	
Black Gram	MI1	601	1180	0	0	0	0	0	0	1781
	Anuradha	0	541	607	0	250	599	0	0	1997
Chilli (pods)	KA2	0	0	0	0	0	0	0	0	0
	MICH 3					55.2				55.2
	Galkiriyagama					36.5				36.5
	Weraniya					21.1	48			69.1
	MI 2	0	0	0	0	0	250	0	0	250
	MI Green	0	0	0	0	0	0	0	0	0
	MI Hot	0	0	0	0	0	0	0	0	0
Cowpea	MI 35	0	419.2	0	0	72.5	105.5	0	0	597.2
	MICP1					86.8	473			559.8
	Bombay	574	203	0	0	0	924.5	0	0	1701.5
	Waruni	410	717	1855	0	626.5	595.5	0	0	4204
	Wijaya	0	0	0	0	0	1376.8	0	0	1376.8
	Dhawala	293	91	0	0	95	703	407	0	1589
Gingelly	MI 1	0	0	0	0	0	0	0	0	0
	Uma	0	0	237	0	0	0	226.6	0	463.6
	Mali	0	0	0	0	0	0	0	0	0
Green Gram	MI 5	518	591	0	0	89	945	0	0	2143
	MI 6	217	0	315	0	842	0	921	0	2295
	Ari	489	1027	0	0	0	1295	0	0	2811

Crop	Variety	Production in Maha 2013/14 (kg)				Production in Yala 2014 (kg)				Total
		Foundation	Registered	Certified	Commercial	Foundation	Registered	Certified	Commercial	
Ground nut	Tissa	0	717.5	430.5	0	300	4256	1683	0	7387
	Walawe	95	0	0	0	63	248	0	0	406
	Tikiri	294	0	0	0	414	0	0	0	708
	Indi	0	0	0	0	190	0	0	0	190
Finger millet	Ravi	0	0	0	0	0	0	0	0	0
	Oshadha	1522	821	0	0	400	572	0	0	3315
	Rawana	0	0	968.5	0	0	1791	0	0	2759.5
Maize (cobs)	Ruwan	0	2501	1227	0	700	2789	0	0	7217
	Badra	5000	1000	0	0	1424	2300	0	0	9724
	MI Hybrid 1	0	0	0	0	70	0	0	0	70
	Sampath	0	0	1700	0	0	0	0	0	1700
Soybean	PB 1	571	1226	0	0	247	296	0	0	2340
	PM 13	0	0	0	0	0	0	0	0	0
	PM 25	0	0	0	0	0	0	0	0	0
Sunhemp		0	0	0	985	0	0	0	3373	4358
Sesbenia		0	0	0	0	0	0	0	0	0
Big Onion (Bulbs)		0	0	0	0	0	8500	0	0	8500
Big Onion (Seeds)		0	0	0	0	0	0	0	269	269
Total		10584	11034.7	7340	985	5982.6	28067.3	3237.6	3642	70873.2

Certified Seed Production

Seeds of certified class are mainly produced through the contract seed production programme and a considerable proportion of the requirement of certified seeds of OFC is supplied by the Department of Agriculture. Small amount of certified and commercial seeds is produced as a result of down grading of seed lots in the process of production of higher classes of seeds in farm and contract seed production programmes.

In the year 2014, 713920 kg of certified and commercial seeds were produced and the production of green gram, ground nut, and soy

bean was outstanding. Considerable amount of green gram seeds was purchased in order to supply for the expected mid-season cultivation. Moreover the drought during the year 2014 induced purchasing of more OFC seeds to supply for the potential need of OFC cultivations.

During the year 2014, there was also more emphasis on the production of Big Onion seeds to supply for off season cultivations. About 270 kg of big onion seeds was produced in government seed farms in Yala 2014.

OFC seed production under contract programme is shown in Table 2.2.6.

Table 2.2.6: OFC seed production under contract programme

Crop	Variety	Production in Maha			Production in Yala 2014			Total
		2013/14 (kg)			(kg)			
		Reg.	Cert.	Com.	Reg.	Cert.	Com.	
Black gram	MI 1	1888	29081	10112	0	1396	6515	48992
	Anuradha	0	2091	1350	162	593	0	4196
Chilli (Pods)	MI 2	0	211	0	0	7634	0	7845
	KA 2	0	0	0	0	50	0	50
	Galkiriyagama selection	0	177	0	746	286	0	1209
	MI Green	0	1329	0	0	0	0	1329
Cowpea	MI 35	0	1581	76	0	514	0	2171
	Bombay	598	132	2815	0	211.5	0	3756.5
	Waruni	197	3407	5216	1745	2284	4234	17083
	Dhawala	3075	6068	146	1926	8209	0	19424
Sesame	Uma	0	224	1021	0	1296	0	2541
	Malee	0	0	0	0	0	0	0
green gram	MI 5	1225	3252	363	2831	64353	4249	76273
	MI 6	298	14325	9897	8448	99293	24781	157042
	Ari	0	1017	0	0	1927	0	2944
Ground nut	Thissa	7173	7276	90529	5321	31663	31353	173315
	Walawe	0	0	0	0	0	0	0
	Tikiri	0	0	439	0	0	0	439
	Indi	1529	7278	2325	2341	2468	0	15941

Crop	Variety	Production in Maha			Production in Yala 2014			Total
		2013/14 (kg)			(kg)			
		Reg.	Cert.	Com.	Reg.	Cert.	Com.	
Finger millet	Ravi	0	0	0	0	0	0	0
	Oshadha	38	4368	4141	354	400	0	9301
	rawana	0	0	0	0	0	0	0
Maize (Cobs)	Ruwan	1933	23143	680	0	0	0	25756
	Bhadra	0	81146	0	0	6932	0	88078
	Sampath	0	0	0	0	0	0	0
Soy bean	PB 1	3594	35711	15542	15831	30771	835	102284
Total		21548	221817	144652	39705	260280.5	71967	759969.5

Issue of OFC seeds

Issue of OFC seeds for Yala 2014 and Maha 2014/15 is shown in the following table. Due to lack of water during Yala 2014, expected demand for OFC seeds was not created. Although there were large stocks of green gram and soy bean available, the expected mid-season green gram cultivation was not fully implemented as in the previous year.

Also, the expected soy bean production programmes were not implemented. Only a considerable amount of ground nut seeds was issued.

Issues of OFC seeds during year 2014 amounted to 307,364 kg comprising of 146,000 kg issued during Yala 2014 and 160,875 kg issued during Maha 2014/15. (Table 2.2.7)

Table 2.2.7: Issue of OFC seeds (kg) during year 2014

Crop	2014 Yala (kg)						2014/15 Maha (kg)						Year 2014 (kg)					
	Br.	Fd/Ba	Rg	Ct./St/ F ₁	Cm.	Total	Br	Fd/Ba	Rg	Ct./St/ F ₁	Cm	Total	Br	Fd/ Ba	Rg	Ct./St/ F ₁	Cm	Grand Total
Black gram	38.0	72.0	779.0	6615.8	2164.5	9669.3	10.0	75.0	1039.0	19442.5	4488.0	25054.5	38.0	147.0	1818.0	26058.3	6652.5	34723.8
Chilli	55.5	790.2	0	253.5	0	1099.6	1.25	8.2	0	2094.3	5.1	2108.8	56.8	798.4	0	2347.8	5.1	3208.4
Cowpea	72.8	307.5	1280.8	10550.3	677.5	12888.8	40.8	169.0	1477.0	4649.5	2284.5	8620.8	113.6	476.5	2757.8	15199.8	2962.0	21509.6
Sesame	4.23	3.0	64.2	34.5	134.5	240.4	0	0	7.0	110.6	821.0	938.6	4.2	3.0	71.2	145.1	955.5	1178.9
Green gram	54.8	338.5	13748.0	13973.0	1624.5	29738.8	0	100.0	780.0	23862.5	18935.0	43677.5	54.8	438.5	14528.0	37835.5	20559.5	73416.3
Ground nut	149.5	397.0	9569.7	12309.6	59508.0	81933.7	120.0	282.0	3486.5	27797.0	14447.8	46133.3	269.5	679.0	13056.2	40106.6	73955.8	128067.0
Finge r millet	3.5	5.5	146.0	2209.8	1389.0	3753.8	4.75	8.0	34.0	2241.0	492.3	2780.0	8.3	13.5	180.0	4450.8	1881.3	6533.8
Maize (OPV)	21.3	384.8	126.5	1467.0	0	1999.5	249.0	326.5	208.0	8884.0	9667.5	19335.0	270.3	711.3	334.5	10351.0	9667.5	21334.5
Soyabean	47.8	263.3	0	1914.5	108.0	4852.6	10.0	127.0	2756.0	4907.0	4125.0	11925.0	57.8	390.3	5275.0	6821.5	4233.0	16777.6
Sunhemp	0	0	2519.0	0	308.0	308.0	0	0	0	0	300.0	300.0	0	0	0	0	608.0	608.0
B. Onion	4.7	0	0	0	0	4.7	2.0	0	0	0	0	2.0	6.7	0	0	0	0	6.7
Total	451.9	2561.7	28233.1	49327.9	65914	146489	437.8	1095.7	9787.5	93988.3	55566.1	160875	879.8	3657.4	38020.6	143316	121480	307364

Br – Breeder seeds

Fd – Foundation seeds

Ba – Basic seeds

Rg – Registered seeds

Ct – Certified seeds

St – Standard seeds

F₁ – F₁ seeds

PRODUCTION AND SUPPLY OF VEGETABLE SEEDS

Basic seed production

There are 60 DOA recommended varieties in 18 vegetable crops grown in the country. Production of basic seed of some varieties was carried out in 11 government seed farms (Table 2.2.8). Total seed quantity produced in 2014 is less than that of year 2013 (4503.1 kg).

Crop	Quantity Produced (kg)		
	2013/14	2014	Total
	Maha	Yala	
Okra	57.8	–	57.8
Snake gourd	211.8	72.1	283.9
Winged bean	61.2	106.0	167.2
Luffa	33.9	18.4	52.3
Cucumber	15.6	10.0	25.6
Total	1334.6	1825.2	3159.8

Table 2.2.8: Basic Vegetable Seed Production in Government Farms -2014

Crop	Quantity Produced (kg)		
	2013/14	2014	Total
	Maha	Yala	
Bean	324.3	1192.0	1516.3
Bitter gourd	276.3	417.4	693.7
Brinjal	–	9.3	9.3
Bushitavo	225.5	–	225.5
Mea	128.2	–	128.2

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 2.2.9. The total production in Year 2014 is less than that of the previous year (64,395.5 kg).

Table 2.2.9: Standard Vegetable Seed Production (kg) by DOA-2014

Crop	Farm Programme			Contract Programme			Grand Total
	2013/14	2014	Total	2013/14	2014	Total	
	Maha	Yala		Maha	Yala		
Bean	1078.0	–	1078.0	12113.5	–	12113.5	13191.5
Bitter gourd	44.0	56.3	100.3	9119.1	–	9119.1	9219.4
Brinjal	185.25	97.8	283.1	61.2	–	61.2	344.3
Bushitavo	706.1	–	706.1	10119.1	–	10119.1	10825.2
Cucumber	153.7	8.9	162.6	502.4	–	502.4	665.0
Luffa	102.7	–	102.7	2310.6	–	2310.6	2413.3
Mae	522.0	444.7	966.7	–	–	–	966.7
Snake gourd	457.8	50.6	508.4	1739.5	–	1739.5	2247.9
Tomato	162.8	423.7	586.5	–	174.8	174.8	761.3
Winged bean	–	–	–	5875.1	–	5875.1	5875.1
Spinach	–	–	–	211.3	–	211.3	211.3
Total	3412.4	1082.0	4494.4	42051.8	174.8	42226.6	46721.0

Hybrid Vegetable Seed Production

F1 hybrid seeds of Brinjal, Okra, Tomato & Cucumber varieties were produced successfully in Aluttarama, Kundasale, Maha-Illuppallama & Ambepussa seed farms (Table 2.2.10).

Table 2.2.10: Hybrid Vegetable Seed Production in Govt. Farms (kg)-2014

Crop	2013/ 14	2014 Yala	Total
	Maha		
Tomato	5.8	16.8	22.6
Brinjal	48.7	72.35	121.1
Okra	55.6	–	55.6
Cucumber	–	23.7	23.7
Total	110.1	112.85	223.0

Vegetable Seed Distribution

Vegetable seeds were distributed through the DOA sales outlets and registered dealer network. These dealers include Agrarian Service Centres (ASCS), Cooperative societies, Farmer organizations, Provincial DOA and private registered seed merchants. Dealer network is strengthened in year 2014 through reactivating the members and appointing new dealers island wide. Supply of both basic and standard seeds is much higher when compared to the year 2013. The overall supply in the year 2014 is 54.6% higher than that of year 2013 (25,360 kg). Quantities of vegetable seeds supplied by SPMDC are given in Table 2.2.11.

Table 2.2.11: Vegetable seed supplied by DOA – 2014 (kg)

Crop	Basic			Standard			Grand Total
	2014 Yala	2014/15	Total	2014 Yala	2014/15	Total	
	Maha			Maha			
Bean	650.0	682.1	1332.1	7541.0	10123.25	17664.3	18996.4
Bittergourd	18.42	15.55	33.97	164.54	2664.17	2828.7	2862.7
Brinjal	3.13	1.41	4.54	98.28	131.23	229.5	234.1
Bushitavo	20.0	2.0	22.0	155.29	209.77	365.1	387.1
Capsicum	1.4	1.7	3.1	101.98	203.40	305.4	308.5
Cucumber	0.8	4.18	4.98	53.48	144.22	197.7	202.7
Luffa	53.59	2663.0	2716.58	–	–	–	2716.58
Mae	18.5	54.4	72.9	166.83	4985.48	5152.3	5225.2
Okra	121.0	124.28	245.28	319.83	2294.69	2614.5	2859.8
Thibbatu	–	–	–	5.57	7.64	13.2	13.2
Raddish	3.3	1.5	4.8	27.18	125.73	152.9	157.7
Snakegourd	55.95	55.05	111.0	127.74	568.30	696.0	807.0
Spinach	0.5	2.4	2.9	37.85	415.40	453.2	456.1
Sweet Melon	0.025	–	0.025	28.78	37.13	65.9	65.9
Tomato	2.43	2.74	5.17	51.68	112.46	164.1	169.3
Winged bean	14.55	34.0	48.55	86.21	3219.37	3305.6	3354.1
Amaranthus	0.5	1.0	1.5	34.65	369.97	404.6	406.1
Total	964.09	3645.30	4609.39	9000.89	25612.19	4613.08	9222.47

Supply of Home Gardening Vegetable seed packs for Divi Naguma Programme

Vegetable seed packs were supplied by SPMDC for stage vi of the Divi Naguma programme which is conducted by the Ministry of Economic Development with the Ministry of Agriculture. Quantities supplied are given in the Table 2.2.12.

Table 2.2.12: Quantities of seeds supplied for Divi neguma programme

Type of Seed Pack	Number Supplied
Home Gardening Packs	1,706,280
School Home Gardening packs	35,000
Seed Packs for Nursery Establishment	14,525
Total	1,755,805

2.2.13: Production of Pre-basic (Go), Basic (G1, G2 & G3) and Certified (C1 & C2) seed potato (mt) during year 2014

Variety Granola

Season	Pre Basic	Basic	Certified	Total (mt.)
2013/14 Maha	5.0	36.352	53.645	94.997
2014 Yala	—	227.708	264.06	491.768
Total	5.0	264.06	317.705	586.765

The quantity of seeds issued for seed producers in year 2014 was 586.465 mt. (Table 2.2.14)

Table 2.2.14: Seed Potato supplied by DOA (mt.) during year 2014

Variety	2014 Yala	2014/15 Maha	Total
Granola	95.30	491.165	586.465

PRODUCTION & SUPPLY OF PLANTING MATERIAL

Planting material production program was implemented in 20 DOA farms under the Farm Advance Account. Budded plants, rooted

PRODUCTION AND ISSUES OF SEED POTATO

The production of Pre-basic (G0), Basic (G1, G2, G3) and Certified seed of variety Granola were 5.0 mt, 36.352 mt and 53.645 mt respectively during the 2013/14 Maha season.

Pre-basic seeds were not produced in 2014 Yala season. The production of Basic and Certified seeds of variety Granola, during 2014 Yala were 227.708 mt and 264.06 mt respectively. The total quantity of seeds produced in year 2014 was 586.765 mt (Table 2.2.13)

cuttings, seedlings and suckers of fruit crops and few other crops were produced.

Total planting material production was 578,055, which is 25% lower than that of 2013 (768045). Under the budded fruit plant

category 362985 plants of 20 fruit crops were produced, which is 5.23 % higher than that of year 2013 (344941).

Total planting material supply was 581949, which is 3% lower than that of year 2013 (599999).

Table 2.2.15: Production and Supply of Planting Material in DOA Farm in 2014

Crop	Production	Issues
Budded Plants		
Avacado	5813	5999
Belifruit	2970	3528
Durian	14967	15047
Wood Apple	3877	4138
Jack	20295	19185
Guava	655	165
Ugurassa	1349	1652
Lime	6275	5885
Mango	151814	143178
Mandarine	15657	11894
Jambu	2666	3230
Orange	63079	60306
Rambutan	53993	60367
Sapadilla	1234	1809
Starfruit	3328	3178
Mangustin	983	977
Pears	3560	1856
Apple	107	107
Super Grade plants	3368	1711
Gaduguda	834	830
Other	6161	5737
Sub Total	362985	350779
Rooted Cuttings		
Grapes	641	628
Jambu	3242	3017
Pomagranate	458	457
Lemanine	3787	3360
Passion Fruit	799	714
Dragonfruit	4990	4644
Pepper	8330	8157
Sesbania	16958	14037
Super Grade plants	04	06
Other	3789	1648
Sub Total	43298	36786

Crop	Production	Issues
Seedlings		
Amberalla	11572	13535
Star fruit	1492	885
Papaya	3108	4063
Pormagranate	40115	54329
Beli	977	52
Guava	10561	10779
Sesbania	49761	47698
Drumstick	4915	4962
Curry leaves	1368	940
Lime	18523	23921
Nelli	2632	2638
Anoda	1314	2126
Passion Fruit	3890	8886
Orange	0	297
Super Grade plants	33	57
Other	13632	7442
Sub Total	163893	182610
Suckers		
Banana	349	3022
Pine apple	5350	6350
Other	2330	2461
Total	578055	581949
Vegetable pots	19283	18153

FARM ADVANCE ACCOUNT

Production of seed and planting material was carried out using the Farm Advance Account. Performance of the advance account during the year is given in Table 2.2.16.

Table 2.2.16: Farm Advance Account - 2014

Farm	Gross Profit/ (Loss) (Rs.)	Net Profit/ (Loss) (Rs.)
Aluttarama	7,077,879.32	1,311,615.98
Ambalantota	5,585,179.38	4,031,123.64
Ambepussa	6,410,035.18	3,975,050.89
Bandaragama	1,907,173.28	1,097,511.51
Bataata	(9,833,241.14)	(17,119,792.84)
Kandapola	17,029,468.86	13,746,220.15
Kantale	14,689,560.54	10,902,725.56
Kundasale	9,390,285.02	4,443,382.83
MahaIlluppallama	3,640,529.78	3,076,563.46
Malwatta	13,400,964.12	7,285,035.62
Meepilimana	8,290,499.36	4,728,030.61
Middeniya	401,998.28	(2,625,375.50)
Murunkan	4,389,498.28	2,667,945.68
Piduruthalagala	20,624,533.02	18,196,337.42
Polonnaruwa	32,187,359.19	23,026,057.82
Sita Eliya	4,567,721.45	(1,193,616.28)
Paranthan	1,994,834.26	(610,879.49)
Karadiyanaru	(297,019.50)	(1,699,049.97)
Udaredella	7,530,690.04	1,849,107.65
Rahangala	550,853.47	1,032,853.85
Others	102,609,170.56	92,842,818.46
Total	252,147,972.75	151,455,713.65

STAFF LIST

Designation	No.
Director	01
Agriculture Officer	36
Accountant	02
Agricultural Instructor	138
Farm Machinery Instructor	01
Technical Assistant	33
Agriculture Monitoring Officer	04
Programme Assistant (Agriculture)	04
Development Officer	30
Administrative officer	02
Management Assistant	76
Farm Clerk	36
Driver	68
Tractor Operator	37
Technician	05
Electrician	02
Machine Operator	09
Machine Attendant	02
Mason	01
Carpenter	02
Budder	39
Circuit Bungalow Keeper	05
KKS	06
Storeman	25
Watcher	158
Lorry Cleaner	08
Sanitary Labourer	03
Labourer (Grade iii)	1448
Total	2181

2.3 SOCIO ECONOMICS AND PLANNING CENTRE (SEPC) – PERADENIYA

The SEPC functions as the major advisory body, supporting the DOA and the Ministry of Agriculture, in formulating agricultural policies, research and development planning and conducting socio-economic research and agricultural policy analysis. The SEPC maintains a statistical unit to compile agricultural statistical information. The Centre also coordinates the activities of local and foreign funded projects of the DOA. In year 2014, socio-economic research and policy analysis concentrated on focusing economic

and financial viability of agriculture development programmes, investment in agriculture and input policies. The Centre contributed to solve problems concerning food shortage, especially in the context of recent changes in government policies and changes in global and domestic economic environment by identifying and guiding policy makers in developing strategies. The comprehensive programme to build a database on cost and returns of all major food crops on district and seasonal basis was continued.

BUDGET

Table 2.4.1: Annual budget - 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	2,322,591	2,135,231	92
Recurrent	4,333,662	4,246,611	98
NARP	434,942	353,204	81
Total	7,091,195	6,735,046	95

PROGRESS

Cost and returns of crop production

The costs and returns study of Maha 2012/13 Yala 2013 for paddy and subsidiary food crops, root and tuber crops and vegetables were published. The data include average yield, gross and net returns, total and unit cost of production and farm gate prices. 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.

Diversity and Comparative

Advantage of Rice Production in Sri Lanka

Dry Zone contributes two third of the total rice production and supply from Wet Zone mainly serves as a buffer stock. A study was conducted to measure diversity of popular rice varieties and comparative advantage of rice production systems in Sri Lanka. Secondary data on cost of cultivation surveys by Socio Economics and Planning Centre and rice

variety distribution data of Rice Research and Development Institute were used for the analysis. Simpson's Diversity Index (SDI) and Specialization quotients were calculated to estimate varietal diversity. Domestic Resource Cost (DRC) ratios were calculated to estimate comparative advantage. Hambantota, Puttlam and Ampara districts depicted a lower SDI values implying that very few varieties were distributed within them and the distribution of traditional varieties were low. Diversity of Bg varieties were high indicating Bg varieties were cultivated Island wide. According to specialization quotients, Bg 300 was specialized in Kurunegala, Anuradhapura and Puttlam districts Bg 352 in Matale, Anuradhapura and Polonnaruwa districts and Bg 357 in Colombo, Kegalle, Ampara, and Matara districts. DRC ratios revealed that, rice production under irrigated conditions possess and rain fed districts (Gampaha and Kalutara) do not possess comparative advantage during 2007-2011 period.

Adoption of rice technologies in Sri Lanka

A study was conducted in Kurunegala, Ampara, Mannar, Gampaha and Polonnaruwa districts to estimate the adoption rates of selected rice technologies and to identify the barriers in rice technology transfer to farmer level. Adoption rates were 54% of organic fertilizer use, 40% for integrated pest management, 33% for weedy rice management, 30% for seedling broadcasting (parachute) method, 21% for water seeding, 17% for weeder use, 10% for seeder use and 6% of leaf colour charts. Awareness of the rice technologies was always greater than the rates

of adoption and farmer preference for adopting new varieties and technologies. Farmer participatory demonstrations of technologies and in kind farmer contributions can accelerate the technology transfer process.

Economic impacts of climate change on rice based farming systems in Sri Lanka

Rice farming system is predicted to experience negative impact of climate change. Therefore, a study was conducted to *ex ante* assess impact of climate change on rice based farming systems in Sri Lanka using the approach of Trade of Analysis with Minimum Data (TOA-MD). Analysis was run for three scenarios. The results indicate negative impact on rice farmers through declined yield and net farm income under each scenario. Rice yield will decline by 7 to 18 % in Maha season and 25 to 41 % in Yala season and 66 to 74 % and 46 to 65% in off season. Mean net return will decrease by 27% to 38 % and 16 to 21% depending on climate model. Use of better varieties and N spilt application can offset the negative impacts of climate change to certain extent.

AgStat 2013

The booklet on agricultural statistics comprising of salient features of information on food crop sector was compiled and published AgStat 2014- Vol. XI 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 monitors the monthly cultivation progress of paddy, other field crops and vegetables. This report provides firsthand 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. This would guide various stakeholders towards major policy decisions at national level. Twelve crop forecast reports were prepared during the year

Policy Document Prepared

The SEPC prepared policy documents on changes of potato supply in Sri Lanka, comparative advantage and protection of potato, and comparative advantage of paddy farming.

Project Preparation and coordination

Twenty one project proposals towards food security and value chain economy designed for 2015-2019 period were collected, collated, compiled, and submitted to the treasury. The projects were designed to meet national goals of environmental friendliness and environmental safety of crop production, raising export incomes from agriculture, motivate younger generation for agriculture, productivity improvement of rice, other field crops, vegetables, root and tuber crops and floricultural crops, increasing domestic quality seed supply and assurance of seed security;

facing challenges from climate change and raising value addition in domestic agriculture. Project proposals on infrastructure development of the DOA, and development of bio-diversity gardens were prepared and submitted to treasury for consideration on 2015 annual budget. A proposal on laboratory and communication facilities upgrading was submitted to treasury for negotiating with KOIKA agency for obtaining funds.

Co-ordination of Programmes/ Projects

SEPC continued coordination of NARP projects, small scale foreign funded projects of the DOA, and memoranda of understanding on behalf of the DGA. SEPC initiated an evaluation study of the NARP projects.

Special studies

The following special studies were conducted during the year at the request of the DGA. Formation of database on Groundnut farmers, levels of production, and time of supply, formation of a database on maize farmers and their levels of and time of production, study on seed paddy availability, and study on cultivation of chilli in polythine bags.

Seminars/Workshops/Training programmes conducted by SEPC

Training workshop on cost of cultivation. In-Service Training Institute, Gannoruwa, Peradeniya, 2014.05.29- 30

Participation in various committees

- Mr. T.H.C.S. Perera, Director, SEPC continued to serve as a member of the

Board of Directors, Agricultural and Agrarian Insurance Board.

- Mr. Warnakulasooriya, Additional Director continued to serve as the Chairman of the price committee of the DOA.

PLAN FOR 2015

- Economic evaluation of women empowerment program in Ampara district
- Identification and economic evaluation of farmer performance for variety attributes in maize, chilli and green gram
- Evaluation of new fertilizer recommendation for paddy
- Evaluation of technology adoption, productive efficiency and profitability of rice farming
- Socio - economic factors affecting adoption of DOA's recommendations in Banana cultivation
- Study on cost of off season of big onion production in Hambantota and Monaragala districts
- Cost of cultivation study for major food crops - (2014 Yala, 2014/15 Maha, 2015 Yala)
- Comparative Study of paddy production under rotation and non rotation cultivation in Kalutara.
- Evaluation of secondary impact of third season mung bean production system in Hambantota
- An analysis of comparative advantage and impact of policy incentives for maize production
- A comparison of comparative advantage of mungbean production during third season cultivation and conventional upland rainfed cultivation
- Development of web based crop forecasting system
- Study on the productivity and profitability of Kundasale and Maha Illuppallama Seed farms
- Cost based price estimation of the seed supplied by the Department of Agriculture
- Cost of production study of Big onion seed
- Socio economic status of mushroom cultivation in Nuwara Eliya, Kandy and Matale
- Financial analysis of planting material production of pineapple using different methods
- A financial evaluation of sojan system of cultivation
- An evaluation of production and marketing of 'keera samba' rice variety
- Property right value estimation of varieties produced by DOA
- Impact of climate change on rice production in Sri Lanka and the determinants of farmers resilience towards climate change
- Crop forecasting – (2014/15 Maha, 2015 Yala, 2015/16 Maha)
- Publication of Agricultural statistics booklet - AgStat
- Coordinating NARP, Small scale projects and working groups
- Project/Proposals preparation, handling and directing
- Evaluation studies on Tissue Culture Project, Fruit village programme, and Yaya II programme of DOA

- JICA vegetable seeds project monitoring and evaluation, and seed quality marketing survey
- Monitoring projects on post-harvest management and value addition of fruits and vegetables and Island wide fruit and melon fly management.

Table 2.4.2: Total Number of Projects in Different Categories

Category	No.
Socio Economics Research	09
Agricultural Policy Analysis	02
Production and Marketing	08
Environmental and Resource Economics	03
Collection, Analysis and Publication of Agricultural Information	07
Project Handling and Evaluation	07
Human Resource Development	02
Total	38

STAFF LIST

Designation	No.
Director	01
Additional Director	01
Deputy Director	01
Agricultural Economist	12
Agricultural Monitoring Officer	01
Economist Assistant	11
Development Officer	03
Agricultural Instructor	02
Administration Officer	01
Public Management Assistant	07
Driver	05
Labourer	03
Total	48

3.1. EXTENSION AND TRAINING CENTRE (ETC) - PERADENIYA

The goal of the Extension & Training Centre is to achieve highest level of productivity in the food crops sector to ensure food security of the country as well as to improve living standards of the farming community. Achievements of the Centre are focused on four main areas: Extension, Training, Agricultural Education and Examination. Following activities are conducted to achieve the objectives of the Extension and Training Centre by the respective units.

- Direct extension programmes under major irrigation schemes conduct by 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 NVQ level 6 “Higher National Diploma on Agricultural Production Technology” course at Schools of Agriculture Kundasale, Pelwehera, Angunakolapelessa, 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 other general public, at Special Training Centers in Labuduwa, Anuradhapura and Wariyapola.

BUDGET

Table 3.1.1: Annual budget – 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	67,318,000	57,954,000	86
Recurrent	154,560,000	130,351,000	84
Projects			
<i>Funds under DOA Votes</i>			
• Agricultural Training Farm land development	19,504,000	19,504,000	100
• Construction of New Hostel for Pelwehera Agricultural School	160,000,000	13,170,000	30
• Agricultural School Development	250,000,000	74,471,000	30
• Increasing seed availability of popular traditional vegetables	3,000,000	2,850,000	95
<i>Funds under Ministry Votes</i>			
• Rice Export Zone	25,000,000	2,602,500	10
• Traditional pure seeds paddy production	3,737,700	2,407,703	64
• Enhancement of paddy cultivation in low country	3,500,000	2,288,007	65
• Radio quiz programme	1,000,000	510,000	51
• Construction of New Hela Bojun Alevi piyasa	14,700,000	3,627,378	25
• Increasing seed availability of popular traditional vegetables	3,000,000	2,850,000	95
• National Chilli Production	20,000,000	12,390,590	62
• Chilli, Maize, Popcorn Seed Production Programme with Defense Camps	8,223,000	3,560,808	43
• Other field crop seed production Project	98,000,000	2,528,833	03
• National Bee Honey Production Programme	1,000,000	999,845	100
<i>Foreign Funded Projects</i>			
• Development of locally appropriate GAP programme	1,287,475	499,445	39
• AFACI	2,000,000	1,540,000	77
• Improving income of rural farmers through establishing a food processing training center and encouraging private sectors on food processing	2,000,000	163,000	08
• Mainstreaming Biodiversity Conservation and Sustainable use for improved human nutrition and wellbeing (BFN project)	2,000,000	41,400	02
Total	839,830,175	257,236,009	31

PROGRESS

SPECIAL PROJECTS

1. 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 was carried out by this project.

2. Construction of New Hostel for Pelwehera Agricultural School

This special project was implemented in 2013 to improve hostel facilities for diploma students. 100 students can be accommodated in this hostel. Foundation of the building was completed during the year. Remaining work will be continued in 2015.

3. Agriculture School Development program

This project implemented in 2013 with the aim of improving library facilities, laboratory facilities, hostel facilities and other infrastructure facilities in five NVQ 6 level schools. Construction work of new buildings and renovation of old buildings in School of

Agriculture Kundasale, Angunakolapelessa, Pelwehera, Vavunia and Karapincha were carried out throughout the year. These activities will be continued in 2015.

4. Increasing Seed Availability of Popular Traditional Vegetables

Under this project 13 number of training centers of Department of Agriculture were funded for producing traditional vegetable seeds. Following amounts of seeds were produced during the year 2014. Farmer participatory production programs to enhance seed availability and production is also carried within the six Inter provincial areas.

Table 3.1.1: Amounts of traditional vegetable seeds produced

Type of Vegetable	Amount Produced (kg)
Tibbatu	32.0
Brinjall	28.0
Thalanabatu	63.64
Pumpkin	4.75
Okra	123.3
Kekiri	18.75
Long bean	362
Bitter gourd	43.9
Ash melon	9.5

To achieve the objective of traditional vegetable seeds availability, some amount of vegetable seeds were distributed among farmers to cultivate at home garden level.

5. Rice Export Zones Project

High quality seed paddy was produced during 2013/14 Maha season with the collaboration of Sri Lanka Mahaweli Authority. Bg 11/65

(Basmathi type) 45 mt and traditional varieties 'Suwandel' 28.4 mt & 'Pachcha Perumal'. 31.5 mt were produced to provide growers who cultivate paddy for export market. A paddy transplanter was purchased by the project and given to Mahaweli farm. Producing a Compact disk (CD) and video film regarding the export quality rice in Sri Lanka also funded by this project.

6. Traditional pure seed paddy production

To increase the availability of traditional seed paddy 20 demonstrations were established in 10 districts. Extent of one demonstration is 10ac. Farmers were provided traditional pure seed paddy to cultivate and packing materials to sell their seed paddy production. Training programs were conducted for farmer awareness.

7. Enhancement of paddy cultivation in low country

With the aim of increasing productivity of low country wet zone paddy fields, 240 demonstration plots were established in 7 districts. Parachute trays were supplied for seedling broadcasting and training programs were conducted to farmers.

8. National chilli production program

To increase the national chilli production chilli seeds were provided with 50% farmer contribution. To promote poly bag cultivation of chilli 1 million poly bags were supplied on 50% farmer contribution under this project.

Chilli Demonstration plots were established in regional units of Department of Agriculture.

9. Chilli, Maize, Popcorn Seed Production Programme with Defence Camps

To increase the availability of newly released chilli, maize and popcorn varieties seed production program was implemented in defence camps. MICH3 and Galkiriyagama selection were two chilli varieties selected to be grown in defence camps. In addition to that seeds of MI MZH and popcorn variety also given to defence camps to multiply them.

10. Other Field Crops seed production program (Cow pea, Soya bean, Green gram, ground nut, black gram and gingelly)

During this year actions were taken to improve infrastructure facilities needed for seed production program. Land development activities, soil conservation, improving irrigation facilities, renovation and construction of seed stores, establish cold storage facilities are some of the activities carried out in the seed production farms of the Department of Agriculture. In addition to seed farms some selected institutions of Department of Agriculture were supplied sprinkler irrigation systems, water harvesting ponds and agrowells to cater to the seed production program by cultivating their lands.

11. Establishing Other Field Crop products sales centres (Hela Bojun)

Construction work of five new Helabojun sales centres situated in Anuradhapura, Kegalle, Labuduwa, Kundasale and Bataatha were started with a view to popularize local food and other field crop products among people.

12. National Bee Honey Production program

Main objective of this program was increasing quality local bee honey and decreasing the imports. It was planned to establish bee honey villages in 10 districts and those villages were supervised by the staff of Bee development unit Bandarawela and other sub units. Under this project timber was purchased to produce bee boxes. Other than that packing materials for bee honey were also purchased.

EXTENSION ACTIVITIES OF INTER-PROVINCIAL AREAS

Six Inter-Provincial (IP) areas located in the commanding areas of major irrigation schemes are under the purview of the Extension and Training Centre of the central Department of Agriculture. Parts of the districts of Ampara, Anuradhapura, Hambanthota, Moneragala, Polonnaruwa and Kandy are demarcated as Inter-Provincial areas. Extension staff of the six inter provincial areas provide their services to farmers to enhance agricultural knowledge, improve skills and develop their attitudes towards the increase of National Food Production and uplift the living standards of farmer's by increasing their income.

Total Paddy extents cultivated in IP areas during 2013/2014 Maha and 2014 Yala were 164,211.49 ha and 75,682 ha respectively. The cultivated extents were decreased in both seasons due to scarcity of irrigation water in the tanks.

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, Chilly, Finger millet and Black gram were cultivated in six Inter-Provincial areas.

Specific information and performances of each Inter-Provincial area are given below.

INTER-PROVINCIAL AREA, HAMBANTOTA

Hambantota Inter Provincial Area covers the area for paddy about 15,000 ha under major irrigation 1,100 ha under minor irrigation and about 50 ha under rain fed conditions. Upland areas under Hambantota inter provincial area is about 39,546 ha where mainly cultivate low country vegetables and fruits such as banana and papaya. Lunugamwehera, Liyangastotota (Ridiyagama Reservoir) and Samanala wewa are the major irrigation schemes that provide irrigation facilities for cultivation activities. The two major cropping seasons, Yala, maha and a third season cultivation after Yala are practicing under above stated three irrigation schemes.

Hambanthota IP area comprises of two segments namely Walawa and Kirindoya. Agricultural extension activities are performed under the auspices of the extension staff of these two segments covering parts of the

Hambantota and Rathnapura districts. 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), Weerawila situated in Kirindioya agriculture segment which has residential facilities for 25 persons is also functioning under Hambantota Inter provincial area.

Main crop cultivating in this area is paddy and average yield is about 7.5mt/ ha. Vegetable and fruit cultivation contribute a lot to district production and there is an increasing trend for banana cultivation. In year 2014 special production programmes on Green gram, off season big onion cultivation, Red onion seed production, National chilli production and Traditional vegetable seed production were conducted. Apart from that with the cooperation of Ministry of Economic Development there is a project on Community Development and Livelihood development where only the technical assistance is provided by DDA s' Office. These activities are conducting other than Normal Extension and Production programme in the district.

Progress

Paddy

Extent under paddy Cultivation during Maha 2013/14 was 14,420.6 ha and it was 12,851.91 ha in Yala.

Green gram Production programme

Hambantota inter provincial area contributes a significant role for national Green gram Production. Since land is a limited resource, it is required to increase the land use efficiency. As a solution, after Yala season, necessary steps were taken to cultivate green gram as a third season crop apart from Yala and maha cultivation. In the year 2014, 3170.86 ha was cultivated and produce 3540 mt in Maha season and 3449.1 ha cultivated and 4138.92 mt produce in Yala season. 1250 kg Seeds were provided to selected farmers under 50 % farmer contribution as a subsidy. Technical advice was given to all the farmers by the extension staff to make this event a success.

Off- season Cultivation of Big onion

Big Onion is identified as an alternative cash crop in Hambantota district. Due to that, extent under big onion cultivation is increasing in Hambantota IP area. In the year 2014, cultivation extent was 200.63 ha and 292.15 mt of big onion were produced. Forty million rupees allocated to provide seeds and polythene to big onion growers.

Red Onion Seed Production Programme

Objective of this program is to promote red onion cultivation through true seeds other than bulbs. Because true seed cultivation is more advantage than bulb cultivation. 3,115 kg of bulbs were provided to farmers under 50% farmer contribution which cost Rs.1 Mn. Under this project 13.8 kg of true seeds were produced. From these seeds 1,481 kg and 2340 kg of bulbs produced in Maha and Yala season respectively.

National Chilli production Programme

This program initiated with the aim of reducing imports of dried chilli and the cultivated extent in the area was 185 ha. Out of that extent, 100 ha were cultivated in Maha season and other 85 ha were cultivated in Yala season. From this extent 222 mt of chilli was harvested. By this program Chilli seeds and 74,250 polythene bags were provided to farmers under 50% farmer contribution to promote bag cultivation of chilli.

OFC Seed Production Programme

Under this project 1701 kg of Ground nut seeds (certified) and 120 kg Sesam seeds provided under 50% farmer contribution from the allocation given by Ministry of Agriculture.

Fruit Village Programme

12,150 pomegranate plants were provided to farmers under 50% farmer contribution from ministry allocation from this project.

INTER-PROVINCIAL AREA, KANDY

Inter-Provincial area Kandy includes five Divisional Secretariat divisions namely Minipe, Wilgamuwa, Kandaketiya, Redeemaliyadda, Mahiyangana in Kandy, Matale and Badulla Districts. The Hasalaka Inter Province area consist of 11,737 ha major irrigation, 200 ha minor irrigation of low land and 7403 ha of uplands with 22,397 farm families.

These lands were irrigated by six 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 mostly preferred to cultivate white long paddy varieties rather than other type of varieties.

Maize, Ground nut, Green gram, and Chilli are the main Other Field crops grown higher extent in both seasons.

Maize crop is mainly cultivated in Thissapura and Kandaketiya AI ranges. Large extent of green gram is cultivated in Hadungamuwa and Hettipola AI ranges. Chilli, Black gram, Green gram, Cowpea, Kurakkan and Ground nut cultivated in all AI ranges. Off season big onion program is also going on this area.

Progress

2013/14 Maha

During 2013/14 Maha season targeted extent of paddy cultivation was 13,813.4 ha which includes 11,737.4 ha of major irrigation, 200 ha minor irrigation and 1,894 ha of rain fed lands. Out of this target, cultivated extent under major irrigation and minor irrigation were 11,112.4 ha and 45 ha respectively. Extent cultivated under rain fed was 1,322.8 ha. This shows cultivated extent was lower than the target under all three irrigation systems. The reason for this is due to drought condition during the season. Only 40% of rainfall received during 13/14 Maha when compared with the average rain fall during a Maha season.

During 2013/14 Maha season targeted extents of OFC cultivation were 35 ha of chilli, 257ha of maize, 23 ha of ground nut, 30 ha of Kurakkan, 05 ha of soya bean, 05 ha of cow pea, 14 ha of green gram and 02 ha of black gram. From this target 35.5 ha of Chilli, 766 ha of Maize, 23 ha of Ground nut, 39.1 ha of

Kurakkan, 07 ha of Soya bean, 06 ha of Cowpea, and 126.5 ha of Green gram were cultivated. Because of the low rain fall, the cultivation extent of paddy was decreased and the OFC extents like maize and, green gram cultivation was exceeded the targets since the OFC promotion programs were carried out by the extension staff.

Special programs

Special self seed production program for big onion true seeds was implemented during this season. But due to the drought and scarcity of mother bulbs the expected target could not be achieved.

Promotion of chilli bag cultivation, seed production of paddy and green gram, Promotion of organic fertilizer production and usage were other special programs carried out during this season.

Training programs conducted during Maha season were 18 bee keeping trainings, 19 Mushroom cultivation trainings, 08 Food technology trainings, 60 compost production trainings, 52 home garden cultivation trainings, 91 paddy cultivation trainings, 80 chilli cultivation trainings, 13 green gram cultivation trainings, 07 maize cultivation trainings, and 04 ground nut cultivation trainings were conducted.

In addition to that 14 chilli nursery trainings for 234 farmers and 04 chilli bag cultivation trainings for 196 farmers were carried out.

Established one OFC society.

2014 Yala

Since the scarcity of water in the irrigation schemes it was decided to decrease the

targeted extents of paddy during the season and those paddy fields which were fallowed due to water scarcity would be used for OFC cultivation to promote the OFC production. But due to heavy rains at the beginning of the season farmers cultivated paddy instead of OFC in those fields. Therefore cultivated extent of paddy exceeds the target. Paddy cultivation target was 5613.2 ha from major irrigation system and achievement was 8155.42 ha. 2542.25 ha were cultivated under minor irrigation schemes while the target was 10 ha. The paddy production was 40,827.1 mt with the average yield of 5mt/ha in the area. However 99.4 ha of paddy cultivation was affected by drought at the middle of the season. That extent was 1.2% from total cultivated extent of paddy.

With the aim of promoting OFC production in Yala season 66ha of chilli, 3786.2 ha of Maize, 225 ha of ground nut, 50 ha of kurakkan, 120 ha of soya bean, 99 ha of cowpea, 471 ha of big onion, 72 ha of red onion, 1171 ha of green gram, 48 ha of black gram, 155 ha of vegetable were targeted. These targets couldn't achieve due to heavy rains at the beginning of the season and cultivated extent was also affected by the drought at the middle of the season. Anyhow 12.8 ha of chilli, 901 ha of maize, 24 ha of ground nut, 13 ha of kurakkan, 07 ha of soya bean, 36 ha of cowpea, 21.3 ha of big onion, 10.5 ha of gingerly, 602.35 ha of green gram, 33.5 ha of black gram, and 86.2 ha were cultivated.

Targeted vegetable extent was 155ha and achievement was 86.2ha.

Progress under Special Projects

- To promote bag cultivation of chilli, 06 training classes, one mobile service and a field day were conducted.
- Seed production program of paddy and green gram also carried out during the season.
- Twenty eight training programs were conducted in this season to promote Organic fertilizer production and usage.

During this season 15 trainings about Bee keeping, 09 Mushroom cultivation trainings, 13 trainings about Food technology , 05 trainings about Farm Business schools(FBS) , 14 home garden trainings, 12 trainings about paddy cultivation, 42 farm women activities, 07 YFC activities, and 12 crop clinics were conducted.

Selected farmer group participated in 04 “liyasaraniya” broad casting programs. Another young farmer group participated in 02 radio programs named “Govibimai Rantabai Jayabimai”. In addition to that 13 new Farm women Organizations established.

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 to that 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 2014 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.

2013/14 Maha

Table 3.1.3: Summary of Progress 2014

Crop	2013/14 Maha (ha)	2014 Yala (ha)	Total (ha)
Paddy	68442.6	39102.6	107545.2
Chilli	594.9	198.05	792.95
Maize	3619.2	1639.75	5258.95
Ground nut	1366.15	176.35	1542.5
Tuber & Root crop	270.98	140.56	411.54
Vegetable	1756.21	887.56	2643.77
Leafy Vegetables	219.2	111.7	330.9
Banana	282.65	183.5	466.15
Mango	213.25	118.1	331.35
Pineapple	27.9	20.55	48.45
Orange	58.35	36.85	95.2
Papaya	126.25	84.75	211

Highlights

The grow bags cultivation practices under the National chilli production promotion programme has been implemented in Ampara District successfully. This is the only production programme implemented with the

subsidy scheme by which 185,000 grow bags have been distributed among farmers. The expected production was 185mt along with the average yield of 1kg from grow bag. Due to the higher price for the green chillies, almost all the produce had been sold as green.

Groundnut production especially in the Thambiluvil & Komari area is highly potential area in Ampara district. Total production of groundnut was 2305 mt from 1366 ha in Maha & 176 ha in Yala seasons.

Fruit production village is also considered as a promotion programme in the agricultural extension activities for long extent.

With the financial assistances of the Ministry of Agriculture, the following fruit plants were distributed among farmers.

Table 3.1.4: No. of fruit plants distributed

Fruit crops	No. of fruit plants issued	No. of beneficiaries	Extent cultivated (ha)
Mandarin	2500	134	04
Pineapple	24800	64	06
Pomegranate	3000	60	05

INTER PROVINCIAL AREA, MONARAGALA

Inter-Provincial area of Monaragala includes Siyambalanduwa, Okkampitiya, Ethimale & Thelulla Agrarian Service Centre divisions. Muthukandiya, Ethimale, Kotiyagala, Sadhathissa, Handapanagala tanks and Kumbukkan Oya Amuna are Major irrigation systems of Monaragala Inter-Provincial area. Paddy is the main crop grown and Maize is the second largest crop cultivated in the area. Total extent of the paddy cultivation is about

16,798 ha with major, minor and rain fed irrigation systems. Except the paddy cultivation Maize is the largely cultivated crop. Off season big onion cultivation program, Intermediate green gram cultivation program are special activities conducted by the extension staff of Moneragala Inter provincial office.

During 2013/14 Maha season targeted extent of paddy cultivation was 17,431.4 ha and cultivated extent. Out of this target, cultivated extent under major and minor irrigation was 2782.4 ha and 2560 ha achieved. Extent cultivated under rain fed was 11,814.2 ha. From the expected production of paddy which was 58,986Mt of paddy only 30,284 mt obtained due to the drought.

Quality Seed Paddy Production Programme

Under this programme Certified Seed production programme was implemented in 57 ha and total production was about 171mt.

In addition to that self seed production programme also implemented in 37 ha and seed paddy production from this extent was 111 mt.

Other Field Crop programme

Main other field crop cultivated in the area is Maize and Ground nut is the second largest OFC cultivated in the area. Other than these crops, Green gram, black gram, cowpea, chilli, gingelly, finger millet and red onion cultivated in this area.

Cultivated extents and production of other Field Crops during 2013/14 Maha season are as follows:

Table 3.1.5: Cultivated extents and production of other field crops

Crop	Cultivated extent (ha)	Production (mt)
Maize	16,117	78,570
Ground nut	805	1610
Green gram	246.5	372
Black gram	250	281
cowpea	212	336
Chilli	167	503
Gingelly	47	29
Finger millet	182	273
Red onion	30.5	320

Special projects

During 2013/14 Maha, off seasonal Big onion cultivation program was implemented in an extent of 54 ha covering all the agrarian centre divisions in the Inter- Provincial area. Seeds and polythene were provided to farmers. Rs.1million was allocated for this project.

In addition to that National Chilli production programme was implemented. This programme was funded by Ministry of Agriculture. To promote poly bag cultivation of chilli 73kg of seeds and 15,000 poly bags were distributed among selected farmers under 50% farmer contribution.

• Vegetables and fruit cultivation

Mainly cultivated fruit crops in the area are Banana, Papaya, Mango & Orange. During this season 1920 mt of banana, 1408 mt of mango, 1040 mt of orange & 1848 mt of papaya were produced by the farmers.

Seasonal targets and progress of the vegetables cultivated in the area during the season are as follows.

Table 3.1.6: Seasonal targets and progress of the vegetables cultivated

Crop	Seasonal target (ha)	Progress (ha)	Production (mt)
Brinjal	99	103	2060
Tomato	78	70	1390
Okra	105	91	1456
Cucumber	60	49	980
Bitter gourd	37	31	1067
Snake gourd	34	28	945
Pumpkin	502	242	3615
Mae	97	82	972
Ridge gourd	38	47	1645

2014 Yala

During 2014 Yala season, targeted extent of paddy cultivation was 4883 ha which includes 2785.4 ha under major irrigation and 2098 ha under minor irrigation. Out of this target,

cultivated extent under major and minor irrigation was 1091 ha and 240 ha respectively. From the expected production of paddy which was 23,995 mt only 3067 mt obtained due to the scarcity of water.

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.

2013/14 Maha

Paddy

Total extent of the paddy cultivation is about 30,694ha with major, minor and rainfed irrigation systems. During 2013/14 maha season targeted extent of paddy cultivation was 30,694ha. Out of this target, cultivated extent was 19,248.2 ha.

Mainly cultivated Other Field Crops are Maize, chilli and Soya bean. Off season big onion cultivation program, Intermediate green gram cultivation program are special activities conducted by the extension staff of Anuradhapura Inter provincial office.

Other Field Crop programme

Total cultivated extent of maize was 5623ha during the season and 33,738 mt of production harvested. It's contribution to the national production was 8%. From the cultivated extent of 677 ha of chilli, 812.4 mt of green chillie produced. Farmers cultivated 1785 ha of black gram and total yield was 2142 mt. During 2013/14 Maha season 3150 kg of Big onion true seeds were produced. Its value was Rs 47.25 million. Cultivated extent of Soya bean was 130 ha and 20,000kg of seeds produced.

Fruit cultivation

Under special mango cultivation programme 24,000 mango plants were cultivated in Padaviya area. Other than that 4200 "Tom EJC" mango plants were introduced to farmers in the area.

Permanent crop clinic program

Permanent crop clinic program was started in all AI divisions. 286 farmers were participated to these programs for gain solutions for pest and diseases problems.

2014 Yala

Paddy

During Yala season cultivated extents under major, minor & rainfed were 9653 ha 306.8 ha and 60 ha respectively.

Other Field Crop programme

Chilli

Cultivted extent was 416 ha during yala season. Total production from this extent was about 499.2 mt. That contributes 7.6% to the national contribution.

Under chilli bag cultivation program 30,000 chilli bags cultivated & 716 farmers were benefited.

Big Onion

Cultivation extent was increased from 661 ha to 1124 ha during this season. From the cultivated extent of 1124 ha total production obtained was 22,480 mt. It contributes 26% to the national production.

Green gram

50 mt of green gram was produced from 433 ha during this season. Value of this amount was Rs. 142 million.

Mid season green gram cultivation program was conducted successfully in between 2014 Yala and 2014/15 Maha seasons. Total extent cultivated under this programme was 850 hectares of paddy lands. Farmers were able to produce 1020 mt of green gram and total value of the production was Rs. 224 million

Other special achievements

32 chilli IPM demonstrations were conducted during this season. Under the Organic manure production program 5000 demonstrations were conducted and 10,000 mt Of organic manure produced.

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. IP area has 3 segments, 8 agriculture Service Centers and 35 AI ranges. The arable land extent in IP area is 34,840ha. 46 092 farm families are involved in agriculture. Paddy is the major crop in this locality and onion,

ground nut and maize extent have increased significantly in past five years.

Paddy is the main crop grown in this locality and Onion, Ground nut and Maize are the OFCs cultivated in larger extents.

Progress

The paddy production was 172,539 mt in 2013/14 Maha and 100,699.89 mt in 2014 Yala. That's contribution to the national production is 5.91% and compared to the previous year the paddy production has decreased in 0.09%. Due to the scarcity of irrigation water in 2014 yala season, paddy was cultivated as 'Bethma method'. To achieve the average yield of 5.9mt/ha, many agricultural extension activities have been conducted. ICM yaya, parachute yaya, mechanization yaya and demonstrations like IPNS, use of leaf colour charts were some of those activities. Other than that 843 training classes and 206 field days were conducted. Organic paddy production has become a promising trend among the farmers.

Other field crops

15 mt of bulbs were vernalized under Big onion true seed production program. Cultivation extent of ground nut has increased up to 296ha. In this Yala season 100 ha of 3rd season Green gram cultivation has been initiated. Red onion, big onion, and chilli cultivation extents have increased compared to the previous year while the rest of the OFC cultivation extents have declined. In both seasons 743 training classes, 293 of field days have been conducted.

There is a continuous increase in banana cultivation in the IP area. 485 ha of banana, 513 ha of mango, 120 ha of papaw and 161 ha of lime have cultivated either as commercial or as homestead cultivation. The low land vegetable crops are mostly cultivated in this region and out of that 67 ha of pumpkin, 79 ha of okra, 89 ha of long bean, 72ha of brinjal have cultivated throughout the year. 240 training classes on vegetable cultivation have been conducted in both seasons.

All AIs were trained for the Farmer Business school project in this year. 150 trainings have conducted on food and nutrition, local food promotion, kitchen management and entrepreneurship development. To promote local food among the community, 5 “Hela bojunal” have opened to promote indigenous food items.

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 297 training programmes were undertaken in 2014 (26,475 man days) of which 105 were for officers of Department of Agriculture (10,952 man days), 25 were conducted for officers of other Institutes (1756 man days) and 73 for farmers, students & others (5,521 man days). Also 86 numbers of workshops / seminars / meetings / discussions, (5547 man days) were conducted.

IN-SERVICE TRAINING INSTITUTE, ANGUNAKOLAPELLESA

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 129 training programmes were undertaken (7528 man days) and this included 76 programs for officers of the Department of Agriculture, (2600 man days), 10 for other institution staff (578) and 24 for farmers (661 man days), 10 field training programmes (550 man days), 01 outdoor training activities (47 man days) and 11 workshops/ seminars/ meetings/ discussions (845 man days), were conducted.

IN-SERVICE TRAINING INSTITUTE, HANSAYAPALAMA – ARALAGANWILA

The In-Service Training Institute, Aralaganwila has placed in Mahaweli block B conducts training programs for extension staff of Sri Lanka Mahaweli Authority, Department of Agriculture as well as other government and non-government officers. Other than that farmers and entrepreneurs of Mahaweli block B,C,D,G as well as Ampara and Polonnaruwa Inter-Provincial areas were trained by this institution. Model farm of the institution, department technical materials as well as cyber

technology are being used as tools for training programs.

In year 2014; 60 No. of training programmes (1956 man days) were conducted of which 1 program (60 man days) for officers, 15 programmes for farmers (385 man days), 07 field training programmes (420 man days) and 5 workshops (275 man days).

In addition traditional vegetable seeds were produced under the special project of 'Traditional Vegetable Seed Production' by this training Centre.

NVQ 3-4 level Field assistant program was started On 20th November 2014 for 15 participants.

FARM MECHANIZATION CENTRE

Farm Mechanization Training Center (FMTC) located in Puliyankulama, Anuradhapura is the sole national level training institute on farm mechanization.

Training mandate of the FMTC mainly focused on following aspects,

Operation and maintenance courses

- Vocational Training on Operation and maintenance of four wheel tractors- 10 days
- Operation and maintenance of Four wheel tractors-5 days
- Operation and maintenance of two wheel tractors-5 days
- Operation and maintenance of water pumps-3 days
- Operation and maintenance of sprayers-2 days
- Operation and maintenance of threshing machines and combine harvesters -2 days

- Operation and maintenance of Power transplanter -3 days

Repair courses

- Repair of two wheel tractor (K75) engine and transmission system - 10 days
- Repair of water pumps-5 days
- Repair of sprayers-5 days

Micro irrigation courses

- Micro irrigation introductory course-3 days
- Application and Designing of Micro irrigation for commercial Agriculture-5 days

Other courses

- Usage of hand tools of Agriculture
- Home gardening

During the year 2014, FMTC had conducted 64 training programs (6297 man days) and it included 14 programmes for officers (1020 man days), 21 programs for farmers (1279 man days), 2 programs for farm machinery operators of Department of Agriculture and 27 training programmes for students from universities, Schools, Technical colleges, and Agriculture schools (3938 man days).

In addition FMTC grants its support to 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.

Mechanization is one of the main elements in Yaya 2 program which was introduced to increase the productivity of paddy cultivation. Special program was carried out in Anuradhapura and Hambanthota districts to promote usage of power transplanter and power weeder by the training staff of FMTC.

SRI LANKA SCHOOL OF AGRICULTURE, ANURADHAPURA

Sri Lanka School of Agriculture, Anuradhapura was established on 2nd 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.

In the year 2014 five day training program on “Designing and establishment of Micro Irrigation System for Commercial Agriculture” was conducted for 43 Agriculture Instructors /SMO Farm machinery. In addition to that five day training program on “study of farm machineries” for 20 Sri Lanka Agriculture Service officers and two day training on Irrigation and water pumps for GCE A/L students.

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 since 2003 the Diploma course was not conducted due to lack of resources in the institute. After that one year training for Agriculture Research & Production Assistants (ARPA) was conducted from 2005 to 2012.

This training centre presently conduct 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 garden and other demonstrations were maintained with the view of transferring new agriculture technologies.

The Bee Development unit functioned at Mawathagama has been established on first of January 2014 to provide training and extension for the officers and the farmers especially in the North Western province and surrounding provinces.

During 2014, 19 training programs were conducted for 747 officers and 28 training programs were conducted for 509 farmers.

It is planned to start National Diploma Course in Agricultural Productivity Training (NVQ level 5) for 50 students with accommodation facilities from January 2015.

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.

School students farmers, non governmental organizations and many other people have visited the demonstration field of the Institute. In addition short term training programs were conducted for farmers, officers and general public. Final year exams for ARPA’ s held in February.

“Edible landscaping and urban agriculture course” (NVQ 3-4 level) was started in January 2014 and 27 participants followed

the course. 1st batch of students completed 6 months training within the institution and started on the job training. For the second batch 37 participants were selected and their 6 month training within the institution was commenced.

HORTICULTURAL CROP TRAINING & DEVELOPMENT INSTITUTE - BIBILE

Horticultural Crop Training and Development Institute was established in 1st April 2003 with joining the 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.
- Conducting training programs with new agricultural technology – for Government officers, NGO officers, farmers, and students of Schools/Universities.
- Establish and maintain training oriented demonstration fields.

Field experiment on new recommendation.

The Institute offers trainings on following subjects.

- Budded Fruit Pant 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

With the aim of promoting fresh fruit and fresh milk consumption, sales outlet was established within the institution. There was a high demand for these farm fresh fruit salad and fresh milk sold at cheapest prizes.

During the year the capacity of budded plants production of the farm was increased and small scale mushroom production unit was established for training purposes. Income earned from selling of fruit plants was about Rs. 5.8 million during the year.

Six training programs for SLAgS officers (218 man days), 8 training programs (621 man days) for other institutional staff, 11 training programs (3364 man days) for farmers, 27 field training programs (1851) and 03 Out door training activities (42 man days) were conducted by the institution. In addition to that NVQ level 3-4 level.

DISTRICT AGRICULTURE TRAINING CENTRE, WEERAVILA

District Agriculture Training Center (DATC) is located in the low country dry zone. (DL₅ – DL₁₆) This center was established in 1986 under the project of Lunugamvehera human settlement. Objective of this Institute is to educate and uplift the knowledge of Agriculture of farming community, school children as well as officers of DOA, PDOA,

other government institutes and non-governmental organizations.

In the year 2014, this training center conducted 10 farmer training programs (360 man days), 05 officer training programs for Department of Agriculture staff (115 man days) and 02 Officer training programs for other institutional staff (101 man days), 17 Field training programs (601 mandays), 09 workshops (293 man days) and 02 outdoor trainings (51 man days).

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 2014, total number of training programmes undertaken were 83 (2629 man days) by this Institute. This included 28 for officer trainings, (1318 man days), 14 for farmer trainings (412 man days), and 30 other trainings, (748 man days). Also 11 workshops (151 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 is about 4.5 ac. The model farm consists of Paddy, OFC, Vegetables, Fruits and Coconut. It provides technical

knowledge and methods of cultivating of each crops for farmers. Other than that Training Centre provides the knowledge about home gardening, bee keeping and mushroom production.

During the year 2014, a total of 95 training programmes were undertaken (1944 man days) and this included 29 programmes for officers (1204 man days) and 17 indoor programmes (388 man days), and 44 outdoor programs for farmers.

DISTRICT AGRICULTURE TRAINING CENTRE, PALAMUNAI

The District Agricultural Training Centre-Palamunai has been handed over to the Department of Agriculture on 23rd of September 2007 with office and teaching aids facilities by UNDP.

Objective of the training center is providing theoretical and practical training on Tamil medium on Agricultural Techniques to the farmers, agricultural officers, teachers, school children.

During the year 2014, a total of 31 training programmes were undertaken (1138 man days) and this included 17 officer trainings (595 man days), 11 farmer trainings (367 man days), and 3 trainings for school students (176 man days).

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 2014, one hundred and forty (140) number of district extension officers were trained on Women's Agricultural Extension and local food processing programs. About 564 number of farmer entrepreneurs were trained on food & nutrition and entrepreneurship development. In addition 131 number of women's organizations were established. 1646 number of households were developed through home gardening and kitchen improvement. Also other extension programmes conducted on women's agriculture extension were 05 number of articles, 02 television programmes, 39 Radio programmes, 25 field days, and 12 study tours. Furthermore exhibition stalls were conducted at 19 exhibitions.

Other special activities performed by this unit are,

- Under local food promotion programme, 16 sales outlets were organized with the participation of Women Agricultural Entrepreneurs in Matara district at Thelijjewila "Govi Sathiya" (seven days) and world Ayurvedic Exhibition (five days) at Kandy City Center
- A new group of entrepreneurs (28 members) were trained and provided opportunity to join "Hela Bojun Alewi

Piyasa" at Galaha junction Peradeniya to market their local foods.

In Addition following two special projects were implemented by this unit.

- i. Improving income of rural farmers through establishing a food processing training center to encouraging private sectors on food processing.
- ii. 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 fulfills 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.

Special Achievements

Twenty number of agro enterprise related training programs were conducted for 455 trainees. Published 200 project proposals based on commercially valued Agro enterprises for potential entrepreneurs at the launching ceremony of “ Commercial farming promotion program “ at PGRC Gannoruwa on 2014.11.05. Presently 55 Krushi Seva Piyasa (KSP) is being carried out and Five new KSP has been opened during the year. Nine market oriented community based organization (CBO) in three different locations under the Bio Diversity Adaptation For Climatic Change (BACC) project implemented collaboratively with ministry of environment were formed to enhance their entrepreneurial skills and 110 capacity building training programs were conducted for different stakeholders island wide to develop agribusiness sector.

BEE DEVELOPMENT UNIT , BINDUNUWEWA - BANDARAWELA

Bee keeping Development Unit is responsible for the development and extension of bee keeping among farmers. In order to dissemination of modern apiculture technology following facilities are provided by the unit.

- Training of farmers, officers, students and other interested people.
- Manufacture of bee keeping equipments.
- Training and registration of bee keeping equipments producers and certification.

- Technical support for government and non government institutions to implement bee keeping projects.
- Research work.
- Collecting of annual bee keeping & honey production data in Sri Lanka.
- During the year 15 number of training programmes were conducted on bee keeping for officers, farmers and university students and 3 training programmes on production of bee keeping equipments.
- The unit produced 302 number of bee boxes, 690 number of smokers, 180 number of brood frames, 180 number of honey frames and 1918 number of queen guards during the period. In addition maintained 250 number of bee colonies and produced 373 kg of bee honey. With the aim of promoting bee honey production, exhibition stalls were organized at Thelijjawila “Govi Sathiya” and Kuliapitiya “Deyata Kirula” exhibitions. Mobile training programs were conducted at Matara, Hambanthota, Ratnapura and Badulla.

National bee keeping Development programme was initiated with the Collaboration of Ministry of Agriculture in 2014.

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 level 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 and five hundred Young Farmers' Clubs formed and one third of them are registered at the Head Quarters.

During the year 2014, Island wide programs were conducted to create the participation of young farming generation for agricultural extension. A total of 13 training programs for officers and 175 training programs for YFC members were conducted. 172 number of cultural programs, 82 number of religious programs, 42 number of educational programs, 54 number of social programs were conducted by YFC. In addition facilities were provided for 31 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 technology & fertigation technology
- Controlled Environment Agriculture (Protected Agriculture, Poly-tunnel, Rainout shelters, Net houses)
- Agricultural Technology for Climate Change
- Commercial Farming (Advanced planning of commercial farms) for annual and perennial crops

• Advanced Nursery Management

In order to facilitate the above process relevant booklets, handouts and presentations were prepared. Provides the required technical know-how for the establishment of small to large scale commercial farms also a vital role in this unit. In addition technical support on Irrigation Management and Protected Agriculture Technology for the farm development programmes also provided by this unit.

Achievements

01. Dissemination of technical know-how on

- a) Water management for the farmers and officers
- b) Protected Agriculture Technology for the farmers and officers
- c) Climatic Change & future agricultural adaptation for officers and
- d) Workshops

Two workshops were conducted on Climate Change Adaptation for officers of Provincial, Inter-provincial and other Extension Officers of the Department of Agriculture

02. Preparation of estimates and designs for micro irrigation systems (specially, sprinkler irrigation systems for chilli promotion programme) and protected houses for government, semi - government and private sector institutes.

Highlights and Progress other activities

Initiation of Agricultural Technology for Climate Change Adaptation and rename the unit as Sustainable Agriculture & Irrigation

Management Unit to facilitate the farmer and officer awareness on continuous cultivation under extreme weather conditions (Severe drought and Rain).

- Technical support for mass media programmes specially, radio programmes
- Preparation of handouts, leaflets and presentations on Micro Irrigation, Protected Agriculture Technology & climatic change adaptation
- Attending technical meetings
- Assisting Commercial Farm Development activities.

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 2014 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 were also carried out by this unit. The unit also involved in providing information for Annual performance report of the Department of Agriculture, Central Bank report, & parliamentary Budget Speech and disseminating information to relevant agencies. Proposals received to submit for annual budget also compiled by the unit.

In addition to that Supervision of Development and extension activities implemented by the

DD, Moneragala (Inter provincial) also conducted by this unit.

AGRICULTURAL EDUCATION & EXAMINATION UNIT

The Education & Examination Unit consists of three subunits 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 of NVQ Level 6 which offered previously by the above schools were amended as "Higher National Diploma in Agricultural Production Technology" from the year 2013. Four Hundred and Eighty Five students are following Higher National Diploma in Agricultural Production Technology in the above schools by the end of the year 2014. In addition to the above course all the action were taken place to start NVQ level 5 course as National Diploma in Agricultural Production Technology for 250 students since March 2015 at Labuduwa, Wariyapola, Bibile & Palamune.

The Examination sub unit conducts various examinations for officers of the DOA while handling all semester end examinations of 5 Schools of Agriculture annually. Nineteen Departmental Examinations & Efficiency bar Examinations have been held by the Examination sub unit and the number of candidates sat for these examinations were 1257 by the end of 2014.

The limited and opened Examination for recruitment for the post of Seed Technicians-2014, Technical Assistance -2014 & post of Warden were held and the number of

candidates sat for aforesaid examinations were 383, 108 and 138 respectively during the period 2014.

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 significant activities. The technical support for the curriculum development for competency Based Training

(CBT) was entirely provided to the Vocational Education Commission by this unit. Revision course of CBT curriculum which was introduced in 2013 was done with lecturers of School of Agriculture. In addition to this lesson plans, scheme of training were developed according to CBT curriculum. Action has been taken to employ 250 students who passed out from Schools of Agriculture in various institutes related to agricultural sector for 6 month on the job Training (OJT).

The number of students in the different SOA in year 2014 is given in the table.

Table 3.1.7: number of students in Schools of Agriculture in 2014

School of Agriculture	Year	Medium						Total	Grand total
		Sinhala		Tamil		English			
		Boys	Girls	Boys	Girls	Boys	Girls		
Kundasale	1 st	42	16	17	12	16	8	111	220
	2nd	43	15	20	06	18	7	109	
Angunakollpellessa	1 st	41	6					47	83
	2nd	26	10					36	
Pelwhera	1 st	30	13					43	93
	2nd	37	13					50	
Vavuniya	1 st			24	13			37	65
	2nd			15	13			28	
Karapincha	1 st	24						24	24
	2nd							0	
Total		243	73	76	44	34	15	485	485

ORGANIC AGRICULTURE AND PLANT NUTRIENT MANAGEMENT UNIT

The major activities conducted by this unit in the year 2014 were implementation of programmes on producing rice for export, popularizing of traditional rice varieties for export purpose, and popularizing

environmental friendly agriculture in the country.

Achievements

- Providing technical and financial assistance for Cultivation of 80 ha for seed paddy.

- Organization and implementation of four workshops for new agriculture technology dissemination.
- Organization of three workshops to improve the VAT programme.
- Supervision of extension activities implemented by the Extension & Training Centre.

PLAN FOR 2015

Following programmes will be implemented by Extension and Training Centre in the year 2015.

- Agricultural extension programmes in 6 Inter-Provincial areas
- The focus for 2015 will be to enhance the productivity of the major crop paddy grown in IP areas to ensure food security of the country. The Yaya 2 program will be implemented to achieve this task under major irrigation, minor irrigation and rain-fed conditions in the cropping seasons. It also envisaged to produce quality seed paddy by community itself.
- Cultivation of Other Field Crops in off seasons and during 3rd 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 during off season will also be strengthened appropriately by each IP area to reduce the vegetable during the off season.

- Agriculture education programme at Schools of Agriculture (SOA)
- Conduct National Diploma in Agricultural Production Technology course at all 5 Schools of Agriculture Around 485 NVQ 6 level diplomats 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 NVQ 5 level agriculture course at Schools of Agriculture Wariyapola &, Labuduwa, DATC, Palamuna and Horticultural Crop Training & Development Institute Bibile.
- Conduct following exams according to the exam calendar of year 2015.
 - Examinations of National Diploma in Agricultural Production Technology
 - 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 4 new sales outlets ‘Hela Bojun Alevi Piyasa’ which markets local food in selected 4 districts.
- 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.
- 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
 - Training programmes on Protected Agriculture Technology (including rainout shelters), irrigation management & Climatic Change Adaptation

- Continuation of activities related to protected agriculture for continuous crop production even under unfavorable weather conditions. This includes training programmes, introduction of artificial lighting (LED bulbs) for crop production under cloudy conditions and promotion of trough culture in protected agriculture.
- Farmer participatory research using
 - 35% shade nets for papaya and grape cultivation
 - LED bulbs as alternative light source under cloudy conditions in protected agriculture
 - troughs in protected agriculture as an alternative for grow bags
- Continuation of preparation of estimates for protected houses (including rain-shelters and net houses) and micro irrigation systems
- Media Presentations, Radio programmes to promote the use of rain shelters for continuous crop production before starting the rainy season and climate smart agriculture
- Exhibition
- Agricultural Technology for Climate Change Adaptation and Low cost structures for Protected Agriculture will be carried – out as site demonstrations.

Special Projects

- 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.

- Training & Capacity Building of staff of the Extension & Training Centre.
- Continuation of Rice export project
- Continuation of Increasing seed availability of popular traditional vegetables
- Yaya 2 programe to increase the production and productivity of paddy.

STAFF LIST

Designation	No.
Director	02
Additional Director	06
Deputy Director	17
Assistant Director	30
Agriculture Officer	21
Lecturer	45
Lecturer (Contract)	01
Subject Matter Specialist	08
Engineering Assistant	01
Agriculture Monitoring Officer	11
Programme Assistant (Agriculture)	13
Development officer	40
Agricultural Instructor	260
Economist Assistant	02
Technical Officer	06
Bee Keeper	08
Mechanic	05
Budder	04
Carpenter	04
Waiter	01
Librarian	01

Designation	No.
Management Assistant service	86
Reserch Assistants	01
Translator (English)	01
KKS	02
Technical Assistant	25
Machinery Attendant	02
Store Keeper	14
Farm Clerk	07
Plant Yard Helpers	04
Office Assistant	01
Cinema operator	02
Cook	33
Watcher	107
Driver	59
Matron	10
Technician	05
Electrician	01
Earth Mover Operator	10
Water Pump Operator	01
Labourer	401
KKS	01
Steward	02
Labourer (Contract)	133
Circuit Bungalow Keeper	01
Total	1395

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 productive, to improve access to DOA information and services and to create more citizen centric governance.

Information and Communication Centre (ICC) was established on 01st 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

maintain Agriculture Technology Parks. Units under the ICC are Farm Broadcasting Service, Audio Visual Centre, Agriculture Publication Unit and Agro Technology Parks at Gannoruwa and Bata atha.

Construction of six storied building has been started in Gannoruwa for establishing a new Centre, National Agriculture Information and Communication Centre and this will be the Information Hub of the National Agriculture Information Network.

BUDGET

Allocations received and expenditure incurred under different votes are given in Table 3.2.1.

Table 3.2.1: Annual budget - 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	27,803,715	23,811,881	86
Recurrent	53,443,425	47,984,684	90
Projects			
• Media Programme	23,240,000	23,347,596	100
• Agro Park	4,500,000	4,129,559	92
• Deyata Kirula - 2014	5,000,000	4,999,371	100
• Crop Forecasting	2,100,000	2,095,748	99
• AFACI-ATIN project	2,598,463	1,383,818	53
• Govi sathiya 2014	11,016,391	11,822,382	107
• Seed Act	1,000,000	158,838	16
• Stationary (Ministry of Agriculture)	64,500	59,500	92
Total	130,766,494	119,793,377	92

PROGRESS

HEAD QUARTERS (ICC)

Main responsibility of this centre is to manage ICT activities of the DOA. It also involves in designing and production of leaflets, books, and DOA diary. In addition, DOA media activities are being performed by this centre.

During the year 2014 ten volume of Agriculture Technology Information Newsletters were produced and distributed. DOA diary for 2015 which includes contact details of the DOA officers was prepared. Twenty two Crop Calendars and two books on Plant tissue culture and Underutilized fruit crops were designed and published under the AFACI - ATIN project.

For special media activities seventeen paper articles were published and twenty one mass media programs were broadcast.

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 (ICC). Mandate of the center is to cater DOA for 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 Agriculture publications, leaflets, posters, large format prints for hoardings, banners.
- Management of Agro Technology Parks at Gannoruwa.
- Organizing agricultural exhibitions at regional and national level; *Deyata Kirula, Govi Sathiya*.
- Operating Agriculture Advisory Service “*Govi Sahana Sarana Sevaya*” (Telephone Short Code 1920)
- Developing and Updating websites;
 - DOA website (www.agridept.gov.lk),
 - *Wikigoviya* website (www.goviya.lk),
 - Rice Knowledge Bank in Sri Lanka
 - *Krushika Lanka Dwaraya*, AFACI website
- 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 - 04

Graphic Communication

Technical publications - 26

Leaflets/ Broachers - 55

Hoardings/Display boards - 06

Exhibition/ Research posters - 317

Paper supplements/Poster for offset printing- 19

Desktop presentation - 06

Invitation Cards/Greeting Cards - 388

Labels /Stickers/ Name Boards - 4058

Banners - 90

Video/Photography

Mihikatha Dinuwo - 52
Govibimata Arunalu - 50
Other Documentaries - 11
TV spots - 13
Video Duplication - 55
Digital Photography - 41,173

Information Technology

IMM CDROMs - 04
Updating of websites - 435 updated items
LAN related jobs - 10 jobs
Database & software development - 900 hrs
Hardware software maintenance - 830 Jobs

Govi Sahana Sarana Advisory Service

No. of queries handled - 33,638
Through Skype (Video calls) - 59

Exhibitions

Deyata Kirula, Govi Sathiya and Fruit Crop
Exhibition - 03

A Park – Gannoruwa

Number of visitors (School Children) - 70,404
Number of visitors (Adults) - 30,712
No of foreign visitors - 284
Income (entrance ticket) - Rs. 1,043,670
Sales Centre income (rent) - Rs. 680,254.5

AGRICULTURE

PUBLICATION UNIT

The broad objective of this unit is to disseminate appropriate agriculture technologies and other related information through print media among the end users. To achieve this broad objective, Agriculture publication unit is responsible for the publishing and distribution of printed materials of the Department of Agriculture to support field extension activities. Agriculture Press and Information centre are under the purview of

this unit. Agriculture press of this unit caters the entire printing requirement of the DOA and it includes technical and non-technical publications. In addition to this, it undertakes the printing requirements of the Ministry of Agriculture. The Information Centre is responsible for distribution of printed materials for sales and free issues.

Progress

During the year 2014 a total of nine (09) new publications were published by this unit. Old publications on mushroom and big onion were revised. Thirty nine publications were reprinted. One hundred and fifty thousand (150,000) copies of crop calendars were produced for various crops in sinhala and tamil languages under AFACI project.

Rs 2.54 million rupees earned during year 2014 from various activities. Nearly 2.3 million rupees earned by selling of publications and IMMCDs through two sales centers of this unit.

Table 3.2.2: Revised publications in 2014

Name of the Publications	No. of Copies
Mushroom (Sinhala)	5,000
B. Onion (S)	5,000
B. Onion (T)	2,500

Table 3.2.3: Reprinted Publications in 2014

Name of the Publication	No. of copies
Organic Manure	5,000
Passion	2,500
High yield in paddy	800
Leafy Vegetables	990
Mushroom (Sinhala)	500
Pulses (Sinhala)	500
Leafy Vegetables (Sinhala)	5,000
Annual Planting Banana	500
Pineapple	1,500
Home Garden (Sinhala)	5,000
Bite book	500
Preparation of Jam	500
Bath gasin Nava Rasayak	500
Instant food	500
Home Garden (Sinhala)	1,000
Bojun path	1,000
Jack cultivation	500
Khomba	500
Water melon	1,000
Mango (Sinhala)	6,000
Mushroom (Sinhala)	1,000
Mango (Tamil)	2,250
Avocado (Sinhala)	500
Budding and Layering	1,000
Banana Suckers Production (Sinhala)	250
Rambutan (Sinhala)	250
Banana Cultivation (Sinhala)	250
Vegetable Cultivation	4,000
Pomegranate	6,000
Pulses (Tamil)	500
Papaw (Sinhala)	1,750

In addition to the above DOA publications, Agriculture press printed different types of printed materials including leaflets, posters and invitation cards etc. Entire seed certification

labels and forms of the Seed Certification Service are printed at the press.

Table 3.2.4: New Books Published in 2014

Name of the Book	No. of Copies
Extension Methods	5,000
Govikam Sangarawa 44-3	5,000
Tropical Agriculturist	750
Disease control in OFC (Sinhala)	1,000
Disease control in OFC (Tamil)	500
Kamatholil Vilakkam 51 -3	750
New Crop Varieties	800
Govikam Sangarawa 44-3	5,000
Kamatholil Vilakkam 51 -3	1,000
Underutilized fruits of Sri Lanka	1,000
Tissue Culture (Sinhala)	2,500
Tissue Culture (Tamil)	1,000
Vegetative propagation of Mangosteen	1,000
Technical Diary	6,000

Table 3.2.5: Printed materials in 2014

Type of Publication	No. of copies
Posters	165,000
Crop Calendars (AAFACI)	150,000
Books and booklets	45,000
Invitation card	1,000
Certificates	2,500
Newsletters	4,450
Forms, Letters etc.	143,075
File covers	7,000
Others	25,000
SCS Labels	760,700
Forms for Crop Forecasting Program	172,102
Books for Crop Forecasting Program	25,000
Leaflets	200,000

Free issues of publications

Publications issued among technical staff of DOA and Provincial DOA during this year.

1. Govikam Sangarawa - 7130
2. Kamatholil Vilakkam - 1120
3. Recommended Crop Varieties - 500

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 introduce 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 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 introduced "Listeners club" concept. These listeners are awarded with training programs, workshops and field visits to popularize the radio programs and to get their feedback.

Krushi FM web radio (www.krushifm.lk) has been implemented towards establishing a live Radio Channel in future.

Progress

Table 3.2.6: Listeners club training programs & workshops in 2014

Unit	No. of Training & Workshop	
	Target	Progress
Colombo	06	06
Kandy	03	03
Matara	12	08

Other activities performed in 2014

- Media coverage and announcing in Field days, Trainings and Ceremonies: - 08
- Conducting exhibition Stalls - 05
- Public Addressing System Handling in Exhibitions - 05
- Free Advisory Service over the phone - 667

Table 3.2.7: Radio Programs Broadcast in year 2014

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 practices	Matara	FM 91.7/91.9*
	7.00-7.30 p.m.	<i>Kurinchi Malahar</i>	Magazine Program	Kandy	FM 107.3/107.5
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 102.1/102.3
Friday	8.00-9.00 a.m.	<i>Aswanna</i>	Live Discussion	Kandy	FM 107.3/107.5
	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>Muhaduhul</i>	Feature	Kandy	FM 107.3/107.5
	Saturday	6.45-7.00 a.m.	<i>Krusha Charika</i>	Magazine Program	Kandy
8.00-8.15 a.m.		<i>Govibima</i>	Magazine Program	Kandy	FM 107.3/107.5
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 102.1/102.3
9.15-9.30 p.m.		<i>Ulavar Illum</i>	Magazine Program	Colombo	FM 104.7/104.9
Sunday	9.45-10.00 a.m.	<i>Boradiya Mankada</i>	Magazine Program	Kandy	FM 107.3/107.5

* Broadcast in Sandya Sevaya

Table 3.2.8: Radio programs broadcast in 2014

Unit	Radio Program	Target	Progress
Colombo	<i>Govithanata payak</i>	50	48
	<i>Govi Gedara</i>	50	47
	<i>Govisara</i>	50	47
	<i>Sara Boomi</i>	53	49
	<i>Koratuwa</i>	50	47
	<i>Seilama</i>	50	47
	<i>Govijana Madala</i>	50	45
	<i>Liyasaraniya</i>	50	47
	<i>Veettu Thottam</i>	50	51
	<i>Ulavar Illum</i>	52	49
	<i>Wanna Maruadam</i>	52	45
Kandy	<i>Aswenna</i>	50	50
	<i>Kalavita</i>	120	120
	<i>Krusha Charika</i>	50	50
	<i>Aththama</i>	120	120
	<i>Kurinchi Malahar</i>	52	52
	<i>Muhaduhal</i>	52	52
	<i>Boradiya Mankada</i>	48	48
	<i>Wayamba Gewatta (1hr)</i>	10	10
	<i>Wayamba Gewatta (½hr)</i>	36	36
	Short Messages	1000	1000
Anuradhapura	<i>Rajaratay Govibimay</i>	26	26
	<i>Saruketha</i>	45	45
	<i>Ranketha Addara</i>	46	46
	<i>Thunaththa</i>	50	50
Matara	<i>Ruhunu Gewatta</i>	46	46
	<i>Asvadduma</i>	157	157
	<i>Thirasara</i>	50	46
	<i>Kadamalla</i>	50	44
	<i>Sannasa</i>	50	44
	<i>Govidathata Ape Saviya</i>	506	506
	<i>Lady Bird</i>	51	48

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.

Bata atha park 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.

One other important aspect of this garden is the facilitation provided for agricultural education. There are 13 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 in this park is the self-explanatory instructional technical board in all three languages; Sinhala; Tamil and English.

During 2014 a summer hut and fish therapy unit was constructed.

Progress

Table 3.2. 9: Financial Progress during 2014

Description	Income (Rs)
School Students	79,915.00
Other Students	30,270.00
Adults	375,320.00
Tourists' Children	500.00
Adult Tourists	29,400.00
Vehicle Parking Charges	35,250.00
Auditorium	1,000.00
Farm Products	161,716.00

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	06
Lecturer	03
Programme Assistant (Agriculture)	03
IT Officer	01
Development Officer	16
Media Assistant	04
Audio Visual Assistant	03
Artist	01
Agricultural Instructor	49
Public Management Assistant	13
AV Technician	01
Photographer	01
Press Book Binder	02
Machine Minders	03
Composer	03
Farm Clerk	03

Designation	No.
Video/Camera Photographer Assistant	04
Driver	14
Tractor Operator	02
Cinema operator	01
Video Editor	04
Video Editing Assistant	02
Video Lighting Assistant	04
Video Assistant	02
Sound Reorder	04
Exhibition Assistant	02
Storeman	05
Watcher	30
Lorry Cleaner	01
Carpenter	01
Welder	01
Electrician	01
Agri. Extension Service Assistants	14
Technician	02
Mechanic	03
Painter	01
K.K.S	01
Labourers (Permanent)	161
Labourers (Contract)	52
Total	432

4.1 ADMINISTRATION DIVISION - PERADENIYA

The Department of Agriculture has an approved cadre of 12,932 belonging to various all island services of which 8355 positions are filled and only 4577 positions are remained vacant.

The role of the Administration Division is to execute various tasks related to matters of the establishment concerning all categories of officers and other employees. The important functions vested with the division are,

- Obtaining approval to fill vacancies
- Calling applications in terms of specified criteria
- Conduction of relevant written tests and interviews
- Selection of most suitable applicants
- Recruitment and promotions

- Facilitation and coordinating to conduct efficiency bar exams

- Dealing with disciplinary matters etc.

The Division also communicates with organizations such as Public Service Commission, Human Rights Commission, Attorney General's Department, Department of Management Services, Salaries and Cadre Commission, Parliamentary Advisory Committees 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 – 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	22,476,020	17,706,947	79
Recurrent	18,861,630	17,965,656	95
Total	41,337,650	35,672,603	86

PROGRESS

Appointments

The highest number of staff recruitment in a year is witnessed in 2014 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 2014

Designation	No. of appointments
Research Sub Assistant	08
Agriculture Extension Officer	15
Technician	23

Designation	No. of appointments
Technical Assistant	11
Technical Assistant (Engineering –Civil)	14
Technical Assistant (Engineering – Lighting)	02
Composer	02
Video Editor	02
Audio Recorder	02
Video Assistant	01
Video/Photographer Assistant	02
Video Lightning/Electrical Assistant	02
Demonstrative Assistant	01
Video Editing Assistant	01
Seed Technician	14
Bee Keeper	02
Machinist	07
Mechanic	18
Machine Minder	01
Plant Yard Attendant	11
Male/Female Warden	14
Cook	11
Waiter	01
Storeman	09
Tractor Operator	06
Lorry Cleaner	13
Watcher	71
Appointments made by the Director General of combined Services	
Driver	15
Permanent Appointments	
Labourer	2600
Total	2879

**Table 4.1.3: Cadre increase in 2014 by
Department of Management Services**

Designation	No.
Additional Director of Agriculture	10
Principle Agriculture Scientist	37
Principle Agriculturist	13
Deputy Director of Agriculture	42
Deputy Registrar of pesticides	01
Economic Assistant	06
Technical Officer (information & Communication)	12
Technical Assistant (information & Communication)	40
Assistant Director of Agriculture	203
Agriculture instructor	260
Research Assistant	173
Technical Assistant (Ag. Extension)	1696
Total	2493

Promotions

Table 4.1.4: Promotions made during 2014

Designation	No.
Sri Lanka Agricultural Service (Super numeric Class)	02
Sri Lanka Agricultural Service II/I	04
Agricultural Instructor (Special)	15
Agricultural Instructor(Special) I	90
Agricultural Instructor(Special) II	16
Research Assistant (Special)	03
Cinema Operator (Special)	02
Promotions made by Director General of Combined Service`s	
PMA (I)	40
PMA (II)	31
PMA to (SLAS)	01
Office Employee Service (II)	01
Office Employee Service to PMA	02
Driver II ආ	02
Driver I	02
Total	211

Retirement from the service

Table 4.1.5: Retirements during 2014

Designation	No.
Research Officer	09
Agricultural Officer	05
Lecturers	05
Subject Matter Specialist	01
Administrative Officer	02
Agricultural Instructor (Special)	07
Agricultural Instructor	18
Research Assistant (Special)	01
Research Assistant	01
Research Sub Assistant	02
Public Management Assistant	14
Farm Clerk	01
Driver	11
Electrician	01
Storeman	07
Composer	01
Artist	01
Lorry Cleaner	01
Engineer Assistant	03
Seed Technician	01
Machine minder	01
Mechanic	01
Technician	03
Tractor Operator	02
Office Employee Service	03
Circuit Bungalow Keeper	01
Budder	02
Bee Keeper	01
Steward	01
Carpenter	03
Watcher	11
Labourer	02
Sanitary Labourer	02
Total	125

Release of officers to other posts

Research Assistant	13
Technical Assistant (Agricultural Extension)	04
Public Management Assistant	04
Development Officer	14
Farm Clerk	01
Watcher	06
Waiter	02
Labourer	02

Vacation of Service

Agriculture Instructor	05
Technical Assistant (Agricultural Extension)	08
Technical Assistant (Agricultural Research)	02
Driver	01
Mechanic	02
Watcher	01

Resignation from Posts

Agriculture Instructor	01
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Officers released to Provincial Council

Agricultural Instructors	10
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Deceased while in service

Table 4.1.6: Deceased While in service during 2014

Designation	No.
Agriculture Instructor	01
Carpenter	01
Driver	01
Farm Clerk	01
Watcher	01
Total	05

Disciplinary Inquiries

Table 4.1.7: Disciplinary Inquiries during 2014

Category	Number of inquiries pending at the beginning of the year 2014	Number of inquiries initiated during the year -2014	Number of inquiries completed during the year - 2014	Number of inquiries pending as at 2014.12.31
Formal Disciplinary Inquiries Preliminary investigations	41	26	23	44
Government/ Internal Audit	24	09	12	21
Inquiries of petitions	79	33	29	83
Total	144	68	64	148

Table 4.1.8: F.R.104 Inquiries

Number of inquiries pending at the beginning of the year 2014	Number of inquiries initiated during the year 2014	Number of inquiries completed during the year 2014	Number of inquiries pending as at 2014.12.31
536	163	137	562

Amount of loans granted and types of salary advances

Table 4.1.9: Details of loans and salary advances

Type of loan	No. of vouchers Approved	Amount paid (Rs.)
Distress	640	86,826,913.00
Bicycle	07	42,000.00
Property	64	86,627,559.84
Total	711	173,496,472.84

Agrahara Insurance Scheme

- Number of Applications submitted for reimbursement of hospital charges and Spectacles - 1100
- Value of bills- Rs. 1,14,51,268.52
- Number of Accident claims submitted – 06
- Value of accident claims –Rs. 600,000.00 (Applications were recommended and submitted to the National Insurance Trust Fund)
- Number of natural death claims submitted -13
- Value of natural death claims- Rs. 1,300,000.00

Security Deposits

- Number of persons whose security deposits were released after retirement - 57
- Amount released - Rs: 900,674.23
- Credited to the Government Account - Rs. 5,566,285.00

Pensions

- The Files received by the pension branch are as follows.
- For payment of pensions - 256
- For death gratuity - 07
- For reversion of pensions - 132
- For the refund of W&OP Contributions - 87
- Obtaining of W&OP Contribution (Pension Circular 3/2014) - 08
- For the payment of Service Gratuity to contract labourers - 06
- For release of minority receipts - 11

No. of officers gone abroad for Post Graduate Degree

M.Sc.

Deputy Directors	02
Agricultural Economist	01
Agriculture Officer	01

No. of Officers returned after completing post-graduate Degree

M.Sc.

Asst. Director	01
Research Officers	01

Release of officers to study within the island

Ph.D. Degree

Research Officer	05
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M.Phil. Degree

Research Officer	06
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M.Sc. Degree

Asst. Director of Agriculture	01
Agriculture Officer	02
Lecturer	01

B.Sc. Degree

Agriculture Instructors	07
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Completing Degree within the island

B.Sc. Degree

Agriculture Instructor	09
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Overseas visits abroad for training, workshops and other conferences

Table 4.1.10: Overseas visits during 2014

Designation	No.
Director General of Agriculture	03
Additional Director General	05
Director	24
Chief Engineer	03
Chief Accountant	01
District Director of Agriculture	04
Provincial Director of Agriculture	01
Registrar of Pesticides	01
Additional Director	10
Deputy Director	25
Asst. Provincial Director of Agriculture	01
Asst. Director of Agriculture	10
Engineer	02
Research Officer (In Charge)	04
Research Officer	72
Agricultural Economist	03
Lecturer	07
Agriculture Officer	17
Administrative Officer	01
Agricultural Instructor	66
Agricultural Monitoring Officer	02
Programme Assistant	08
Development officer	02
Research Assistant	05
Engineering Assistant	01
Soil Surveyor	01
Development Officer	02
Public Management Assistant	09
Office Employee service	01
Total	289

Local Training

Table 4.1.11: Local trainings conducted during 2014

Training	No. of Officers Attended
Training for others on F.R. 104 inquiries (for Directors, Accountants, Engineers, Administrative officers and public Management Assistant)	58
Training on Store keeping (Officers who have engaged in the duties of stores)	57
Workshop on Pension file updating (Step - 01) for PMA	110
Workshop on Pension file updating (Step - 02) for PMA	63
Training on Government Procurement process (Step - 01) for Accountants, Development Officers, PMA,, Agriculture Instructor)	97
Training on Government Procurement process (Step - 02) for Accountants, Development officers, PMA, Agriculture Instructor)	90
Training for Farm Clerk (Step – 01)	61
Training for Farm Clerk (Step – 02)	43
12 days free Tamil Language Training For all Department Officers	80
Three days Training for Contract labourers	592
Training on maintenance of personal files for PMA	98
Training on Management Concept	74
Total	1423

Officers Participated in local conferences

Training Conducted By Sri Lanka Institute of Development Administration

- Officers Attended for trainings - 121

Recoveries

- Total amount recovered by the government during the year 2014 from the officers who are already in the service and have breached the agreements is Rs: 191,880.25
- 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: 1,235,181.66

PLAN FOR 2015

- Performance of establishment matters relevant to all posts of the Department of Agriculture
- Fill all the vacancies in all posts of the Department of Agriculture.
- Implementation of retirement process of the Department of Agriculture practically in accordance with new Programme of payment of pension introduced by the Department of pension

- Further expansion of productivity concept within the administration division
Implementation of Productivity concept in all other Director Divisions and application of Productivity concept to upgrade performance of the Department of Agriculture,
- Completion of central computer net work and development of computer data base
- Modification of all branches of the Administration Division and rearrangement of outdoor environment

STAFF LIST

Designation	No.
Director General	01
Additional Director General	01
Director (Administration)	01
Deputy Director (Administration)	02
Assistant Director (Administration)	01
Administrative Officer	05
Translator	03
Legal Assistant	01
Development Officer	17
Public Management Assistant	83
K.K.S.	20
Driver	08
Watcher	06
Sanitary Labourer	02
Labourer	23
Total	174

4.2 ENGINEERING DIVISION - PERADENIYA

The main objective of the Engineering Division is to provide quality infrastructure facilities to achieve the objectives of Department of Agriculture.

The main functions of the Engineering Division can be categorized as follows:

- A. Procurement of Capital Assets :
 - a. Civil engineering constructions
 - b. Procurement of Machinery, vehicles and Office Equipment
- B. Maintenance of infrastructure facilities:
 - a. Buildings and structures
 - b. Vehicles and Machinery
 - c. Office Equipment
- C. Other Services:
 - a. Operation and Maintenance of the drinking water supply scheme in Kundasale

- b. Providing engineering advisory services to all Divisions of DOA
- c. Installation and maintenance of Cold rooms, Pack houses, Processing Units etc.

In order to improve and expand the service of the Division, regional mechanical workshops were established in four locations (Kundasala, Seetha Eliya, Polonnaruwa and Angunakolapelessa). The main activity carrying out in these workshops is repairing and servicing of vehicles. In addition, Engineering Assistants & Technical Assistants were stationed in the regions in order to attend civil engineering requirements efficiently.

BUDGET

The budgetary allocations and expenditure under different votes for the year 2014 are given in Table 4.2.1.

Table 4.2.1: Annual budget – 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	4,817,765	4,699,413	96
Recurrent	8,718,125	8,365,857	96
Total	18,353,655	17,764,683	97

PROGRESS

Progress of Civil Engineering Works

The activities carried out are 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 for payments

- Preparation of Estimates for other Divisions– Because of the limitations of human resource, especially shortage of technical staff, only the estimates were prepared by the Engineering Division on requests of the respective Directors.

The summary of the Civil Engineering works carried out by the Division in 2014 is as follow.

Requests Received

- New Constructions: 47
- Repairs: 525

Total work carried out:

- Total Estimates Prepared : 537
- Estimates sent for other Divisions : 390
- Tender awarded : 147
- Minor Repairs : 537

Table 4.2.2: The value of the civil Engineering works (Division wise summary) carried out during the year

Division/ Description	Awarded Value (Rs.)
Administration	6,910,314
Finance	3,162,604
RRDI	4,820,550
SCPPC	10,221,989
Extension & Training	65,557,523
HORDI	20,121,061
SPMDC	39,384,271
NRMC	2,698,822
FCRDI	4,964,004
Engineering	6,411,394
ICC	4,028,631
Ministry of Agriculture	4,541,924
Total	172,823,088

Progress of Mechanical & Electrical Engineering works

The activities carried out in the year 2014 are as follows:

a. Procurement of Works

- Registering of garages & service stations
- Registration of suppliers

b. Vehicle repairs and maintenance

Table 4.2.3: Vehicle repairs and recommendations given

Location of workshop	Major Repairs	Minor Repairs	Recommendations	Work in Progress	Total
Kundasale	6	91	-	18	115
Head Office	25	45	150	-	220
Polonnaruwa	29	15	-	01	45
Angunakolapelessa	12	95	122	06	253
Seetha Eliya	14	91	167	11	283
Total	86	337	439	36	916

c. Procurement of Machinery and Equipment

Table 4.2.4: Value of Goods Procured in 2014

Division	Total (Rs.)
Engineering Division	771,987
Administration Division	2,281,030
Finance Division	5,917,535
Office of the Additional Director General (Research)	152,269
Extension & Training Division	4,061,029
Socio Economics & Planning Centre	582,253
Seed & Planting Material Development Centre	6,639,971
Natural Resource Management Centre	548,580
Horticulture Research & Development Institute	1,352,364
Seed Certification & Plant Protection Centre	1,010,700
Field Crop Research & Development Institute	4,528,012
Rice Research & Development Institute	704,605
Progress Monitoring & Evaluation Unit	126,190
Information & Communication Centre	3,047,993
Extension & Training Division 118-2-3-20-2502 (3)	16,046,104
National Plant Quarantine Service	2,866,450
Ministry of Agriculture (Organic Fertilizer Division)	5,983,913
Farm Machinery Research Centre, Mahailuppallama 118-2-3-30-2502	6,319,286
Fruit Crop research & Development Centre	14,260,370
Total	77,200,640

Table 4.2.5: Value of total capital works handled by the Engineering Division

Work	Value (Rs.)
Civil Engineering	
Constructions	172,823,088
Procurement of Equipment	77,200,640
Total	250,023,728

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. There exist a number of vacancies in the cadres of technical staff. Owing to this constraint, numerous difficulties have been encountered in carrying out new civil engineering work as well as routing work such as operation of water supply scheme, Kundasala etc. At present, the division does not have a sufficient number of Inspectors of Work, Building Overseers and Draughtsman to handle the work load in the Civil Engineering section.

STAFF LIST

Designation	No.
Chief Engineer	01
Mechanical Engineer	04
Civil Engineer	03
Electrical Engineer	01
Engineering Assistant	07
Administrative Officer	01
Public Management Assistant	13
Development Officer	05
Technical Officer	01
Technical Assistant	15
Drivers	06
Mechanic	21
Electrician	05
Carpenter	02
Mason	02
Technician	05
Machinist	06
Store man	03
Plant Yard Attendant	03
KKS	01
Watcher	07
Labourer	14
Total	126

4.2.1 FARM MACHANIZATION RESEARCH CENTER (FMRC) - MAHAILLUPPALLAMA

Farm Mechanization Research Center (FMRC) 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 prevailing in different parts of the Sri Lanka. The activities carried out by FMRC are as follows.

- Identifying mechanization needs according to priorities & constraints in different farming systems.
- Selection & testing of promising machinery & implements with regard to their constructions, their functions, safety, economic & sociological factors.

- Development, modification & adaptation of agricultural machinery & implements to suit local conditions.
- 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. Administration Section

BUDGET

The allocation and expenditure under different votes for 2014 given in table as follows.

Table 4.2.1.1: Annual budget - 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	1,582,375	1,573,846	99
Recurrent	5,065,686	4,456,706	88
Projects			
• AFACI	873,256	864,369	99
• NARP	2,428,691	2,233,521	92
• Identify suitable mechanization methods to enhance quality and productivity of rice production targeting export market	10,800,000	7,458,829	69
• (RPTERM)			
Total	20,750,008	16,587,270	80

PROGRESS

RESEARCH & DEVELOPMENT

During 2014, following machinery has been developed.

Tine Tiller Seeder for 4W Tractor

Objective:- To introduce a 4W tractor attached multi crop high land seeder.

Final Product:- Tine tiller coupled seeder which can be used for high land crops and high land paddy.

Contribution:- As imported seeders are not suitable for local conditions, Tine tiller coupled seeder mechanism was developed to suits local farming conditions.

High Capacity Seed Paddy Cleaner

Objective:- To increase capacity of the existing paddy cleaner

Capacity and durability of existing seed paddy cleaner is not enough to cater the present demand. Farmers need a machine with high capacity, easy operation and low maintains. Separate cleaning mechanism is introduced to achieve the user friendliness.

Final Product:- Seed paddy cleaner with steel structure and durable oscillating unit, capable of cleaning 400 kg/hour.

High Capacity Maize Thresher

Objective:- To increase the capacity of the existing maize thresher.

Final Product:- Maize thresher, driven by 4 wheel tractor with a capacity of 5 tons/hour and threshing recovery of 95% and higher cleaning efficiency.

High Capacity Finger Millet Thresher

Objective:- To increase the capacity of existing thresher.

Final Product:- High capacity finger millet thresher which can be operated by both electric motor and 2w tractor engine with the capacity of 320kg/hr.

Cassava Ridger

Objective: - To mechanize ridger forming of cassava cultivation.

Present practice of ridge forming is done by manually after secondary land preparation which is required higher labor cost. Also it is difficult to achieve evenness through the field, causing problems to use machinery for future activities.

Final Product: - 4 Wheel tractor attached ridger to form ridges according to the recommended spacing.

Cassava Slicer

Objective:- To introduce slicer for cassava.

Manual slicing done by knives and more time consuming. Motor driven slicer can perform faster.

Final Product:- Motor driven machine to perform slicing operation automatically.

AGRICULTURAL & INDUSTRIAL EXTENSION

Actively participated Deyata Kirula, Govi Sathiya, Fruit Week, Post Harvest Technology exhibition held in 2014. Radio programs were

broadcasted about “Paddy Mechanization Package under Yaya 2” and “Mechanization in agricultural sector” in leading radio channels. Special project to improve the extension of farm machinery was introduced and paddy mechanization packages were distributed to extension offices. Demonstrations of machinery were carried out all over the island. Demonstration on Maize Mechanization Package, Finger Millet Thresher, Ground Nut Pod Remover, Axial Flow Water Pump were also carried out parallel to the demonstrations of paddy mechanization package. Special trainings for farmers, officers of Department of Agriculture were conducted to enhance the knowledge and experience on mechanization.

Table 4.2.1.2: Extension programs during the year 2014

Type	Number of programmes
Field demonstrations	33
TV programs	01
Radio programs	06
Exhibitions	04
Internal training	12
Visitors	260

TESTING & EVALUATION SECTION

Farm Mechanization Research Center is the sole government institute which established to test and evaluate locally manufactured or imported agricultural machinery in Sri Lanka.

Following machines were tested during 2014.

Table 4.2.1.3: Machineries tested during 2014

Machine Type	No. of Machines Received	No. of Test Reports Issued
Four Wheel Tractor	02	02
Two Wheel Tractor	03	-
Power Spray	05	-
Hand Spray	03	01
Cultivator	-	-
Thresher	-	-
Combine Harvester	01	-
Mamoty	05	03
Tine Tiller	-	-
Rotavator	01	02
Roto slasher	-	-
Transplanter	01	01
Power Weeder	01	-
Water pump	16	02
High pole saw	01	-
Total	39	11

FARM MACHINERY

MAINTENANCE & REPAIRING

This section was established to give recommendations and technical assistance, to evaluate, estimate and repair Farm Machinery, Vehicle and other machinery and equipments.

Following recommendations, repairs and services were done during year 2014.

No. of repairs

Engine – 03

Gear box – 04

Other – 05

No. of recommendations – 191

No. of services - 13

STAFF LIST

Designation	No.
Deputy Director	01
Mechanical Engineer	03
Engineering Assistant	02
Management Assistant	02
Agricultural Instructor	02
Technical Assistant	01
Driver	04
Store man	01
Earth Mover Operator	02
Plant Helper	02
Mechanic	06
Machinist	06
Technician	05
Welder	01
Tinker	01
Carpenters	01
Watcher	03
Unskilled Labourer	24
Contract Labourer	06
Total	73

4.3 FINANCE DIVISION – PERADENIYA

The main objective of the finance division is establishment and operation of a sound financial management system to achieve the objectives of the Department of Agriculture.

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 and financial management

PROGRESS

Capital Expenditure

Table 4.3.1: Capital expenditure – 2014

Project	Project Description	Revised Estimate (Rs Mn.)	Expenditure (Rs Mn.)	Progress %
285 – 1 – 1	Administration & Establishment Services	48.300	45.536	94.28
285 – 2 – 2	Agriculture Research & Development	504.979	474.123	93.89
285 – 2 – 3	Agriculture Extension & Training	343.371	324.464	94.49
285 – 2 – 4	Seed Certification & Plant Protection	620.300	584.127	94.17
Total		1,516.950	1,428.071	94.14

Recurrent Expenditure

Table 4.3.2: Recurrent expenditure during 2014

Project	Project Description	Revised Estimate (Rs Mn.)	Expenditure (Rs Mn.)	Progress %
285 – 1 – 1	Administration & Establishment Services	295.295	292.058	98.90
285 – 2 – 2	Agriculture Research & Development	960.127	957.768	99.75
285 – 2 – 3	Agriculture Extension & Training	743.578	743.405	99.98
285 – 2 – 4	Seed Certification & Plant Protection	758.710	758.955	100.03
Total		2,757.710	2,751.826	99.79

Operation of Advance Account Activities

Table 4.3.3: Operation of advance account – 2014

Description	Approved limit (Revised) (Rs Mn.)	Actual Amount (Rs Mn.)
1. Maintenance of Agricultural Farms		
Maximum limit of Expenditure	440.0	384.154
Minimum limit of receipts	440.0	487.636
2. Public Officers Advance Account		
Maximum limit of Expenditure	180.0	173.753
Minimum limit of receipts	120.0	121.421

All accounts of the Department in 2014 were produced to the Auditor General before the date specified. It is noteworthy that the Finance Division was able to receive a good audit opinion in 2012 and 2013 for its Farm Advance accounts for the first time in the history of the Department. The Farm Advance account was able to acquire working profits and net profits in 2012, 2013 and 2014.

In addition, the accounts were certified by the Auditor General as produced correctly, subject

to a few observations mentioned, after auditing the appropriation accounts in 2012 and 2013.

Apart from this we were able to send the monthly account summaries of the Department to the Treasury before the date specified in 2014. This resulted the Department to be included in the list of first 10 of the web page published by the Treasury each month in 2014. It was another success achieved by us.

Collection of Revenue

Table 4.3.4: Collection of revenue during 2014

Revenue Heads	Category	Actual Receipts (Rs Mn.)
20 - 02 - 02 - 99	Loan Interest	13.268
20 - 03 - 99 - 00	Other receipts	58.873
20 - 02 - 01 - 01	Rent and others	20.959
20 - 03 - 02 - 18	Department Sale & Other charges	225.233
20 - 04 - 01 - 00	W & O.P	73.395
20-06-02-00	Sale of capital Assets	63
20-03-04-00	Bicycle basic payment	15.160
Total		469.888

STAFF LIST

Designation	No.
Chief Accountant	01
Chief Internal Auditor	01
Deputy Director (Finance)	03
Assistant Director (Finance)	06
Budget Assistant	02
Translator	01
Development Officer	19
Public Management Assistant	78
K.K.S	09
Driver	05
Unskilled Labourer	11
Total	136

4.4 PROGRESS MONITORING AND EVALUATION

UNIT (PMEU) – PERADENIYA

The PMEU is responsible for monitoring and evaluation of activities and development programmes conducted by all institutes and centers of DOA. In addition it holds the responsibility of preparing Annual Action Plans, Procurement Plan, Annual Performance Report, monthly progress reports and other relevant reports of the DOA 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.

PMEU which had been located spaciouly from its establishment in 1992, had to relocate in a confined building in head office premises temporarily.

BUDGET

Table 4.4.1: Annual budget - 2014

Vote	Allocation (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital	706,744	590,244	84
Recurrent	21,311,766	21,008,509	99
Total	22,018,510	21,598,753	98

PROGRESS

Compilation of Action Plans

Action plans for the year 2014 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 2014. Monthly progress reports on each for Capital and Recurrent expenditure were prepared and submitted to the Ministry of Agriculture.

Table 4.4.2: Summary of progress of DOA during 2014

Vote	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure (%)
Capital	1,517	1,428	94
Recurrent	2,758	2,752	100
Projects under DOA votes	1,012	981	93
Projects under Ministry of Agriculture votes	78	42	54
Projects under Ministry of Economic Development votes	91	91	100
Total	5,456	5,294	97

Progress Monitoring of Special Projects

Special Projects under DOA votes

Progress of 23 special projects under DOA votes were monitored and monthly reports including physical and financial progress was submitted to the Ministry of Agriculture. Financial progress of special projects under DOA votes is given in Table 4.4.3.

Table 4.4.3: Progress of special projects under DOA votes during 2014

Vote No.	Project	Institute	Allocation (Rs Mn.)	Revised Allocation (Rs Mn.)	Revised Allocation after FR 66 & 69 transactions (1)	Expenditure according to Chief Accountant's Report (Rs. Mn.) (2)	% (2)/(1) *100
285-2-4-1-2502(2)	Seed production and purchasing programme	SPMDC	200	250	250		
285-4-1-2502(5)	Increasing seed availability of popular traditional vegetable seeds	HORDI	05	05	05	254.99	100
285-2-4-5-2502(5)	Accelerated seed farm development programme	SPMDC	150	150	150	149.11	100
285-2-4-9-2502	Promotion of local seed potato production	SPMDC	60	10	10.26	10.26	100
285-2-2-8-2502	Development of new hybrids and open pollinated varieties of other field crops	FCRDI	100	80	85.29	85.29	100
285-02-02-2104(3)	Building construction of Regional Agricultural Research and Development Centre, Kilinochchi	FCRDI	33.7	20			
285-2-2-0-2104(4)	Construction of research office and laboratory at Bandarawela	HORDI	10	05	20.50	20.50	100
285-2-2-0-2104	Construction of testing lab	FMRC	05	4.1			
285-2-2-9-2502	Establishment of 100 fruit villages	FRDI	40	30	33.39	33.39	100
285-2-2-10-2502	Establishment of Biodiversity Garden of tropical fruits	FRDI	38	28	28	26.99	96
285-2-2-7-2502	Implementation of Soil Conservation Act	NRMC	14	14	13.52	11.80	84
285-2-3-0-2104(1)	Construction of new building for Audio Visual Centre	ICC	175	90.17	76.76	76.76	100

Vote No.	Project	Institute	Allocation (Rs Mn.)	Revised Allocation (Rs Mn.)	Revised Allocation after FR 66 & 69 transactions (1)	Expenditure according to Chief Accountant's Report (Rs. Mn.) (2)	% (2)/(1) *100
285-2-3-0-2104(2)	Construction of new hostel at School of Agriculture, Pelwehera	ETC	160	10	38	38	100
285-2-3-4-2502	Media programme	ICC	24	24	24	24	100
285-2-3-4-2502	Media programme	ETC	01	01	01	0.41	41
285-2-3-7-2502	Agro Technology Parks	ICC	4.5	4.5	4.5	4.49	100
285-2-3-8-2502	Agriculture School development	ETC	250	100	81.54	73.08	89
285-2-4-4-2502	Establishment of quality seed and planting material production through implementation of Seed Act	SCPPC	20	20	20	13.98	69
285-2-4-7-2104	Strengthening of seed certification activities	SCPPC	50	40	40	30.17	75
285-2-4-8-2502	Minimize potential adverse effects of agrochemicals on human health and environment	SCPPC	50	50	50	47.55	95
285-2-2-5-2502	NARP projects	DOA	50	50	42.5	42.46	100
285-2-3-6-2401	Annual Symposium	DOA	3.2	3.2	3.2	3.02	94
285-2-2-4-2502	Small scale projects	DOA	35	35	35	34.98	100
	Total		1,478.4	1,023	1,012	981.33	93

Special Projects under Ministry votes

DOA received allocations from Ministry of Agriculture and Ministry of Economic Development for different projects. The financial progress of those projects are given in tables 4.4.4 and 4.4.5 respectively.

Table 4.4.4: Progress of special projects under Ministry votes during 2014

Vote	Project	Institute	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure (%)
118-2-3-20-2502 (3)	Increasing potato consumption	SPMDC	0.31	0.31	100
118-2-3-20-2502 (5)	National programme on rehabilitation of fruit trees	FRDI	0.46	0.018	04
118-2-3-20-2502 (5)	Supplying mango plants to Sri Lanka Air Force Camp, Palali	SPMDC	0.09	-	-
118-2-3-20-2502 (3)	Development of popcorn varieties and cultivation techniques	FCRDI	1.61	0.31	19
118-2-3-20-2502 (3)	Chilli cultivation	ETC	19.86	13.05	66
		SEPC	0.132	0.04	30
118-2-3-20-2502 (3)	“Govi sathiya’ and agricultural exhibition	ICC	4.52	4.51	100
118-2-3-20-2502 (3)	Supplying interculturators	ENG	0.30	-	-
118-2-3-20-2502 (3)	Establishment of ‘Hela bojun alevi piyasa’	ETC	14.70	14.4	98
118-2-3-20-2502 (3)	Production of popcorn and maize seeds in collaboration with Army Camps	ETC	8.220	3.32	40
118-2-3-20-2502 (3)	Subsidiary food crop production programme	ETC	22.24	4.8	22
		FCRDI	7.58	4.0	52
		SCPPC	1.80	1.79	99
		SPMDC	23.70	5.8	24
		ENG	40.54	16.9	42

Vote	Project	Institute	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure (%)
118-2-3-20-2502 (3)	Construction of a seed store at Field Crop Research & Development Institute, Mahailuppallama and mechanization of seed processing	SPMDC	34.3	4.03	12
118-2-3-20-2502 (4)	National bee development programme	ETC	1.0	0.8	79
118-2-3-21-2502	Trial on liquid fertilizer for paddy cultivation	RRDI	0.42	0.3	62
		FCRDI	0.21	0.04	18
118-2-3-21-2502	Promotion of production and consumption of organic fertilizer	HORDI	11.0	8.3	75
118-2-3-21-2502	Quality testing of commercial organic fertilizer and recommendation of fertilizer through soil testing	HORDI	2.8	2.05	73
		FRDI	0.9	0.45	50
		FCRDI	2.4	1.84	77
		RRDI	1.4	1.07	77
118-2-3-21-2502	Purchasing of items for the new Training Centre at Regional Agricultural Research & Development Centre, Makandura	HORDI	6.0	6.0	100
118-2-3-21-2502	“Govi sathiya’ – Compost production programme at Agricultural Research Station, Telijjawila	HORDI	0.5	0.5	100
118-2-3-21-2502	Media programmes	ICC	5.26	6.3	121
118-2-3-21-2502	Sun hemp seed production programme	FCRDI	0.5	0.4	77
118-2-3-21-2502	‘Govi sathiya’ and agricultural exhibition	ICC	1.5	1.5	100
118-2-3-21-2502	Radio programmes	ICC	1.21	1.2	99

Vote	Project	Institute	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure (%)
118-2-3-28-2502	'Deyata kirula' - 2014	ICC	12.0	11.96	100
118-2-3-28-2502	'Deyata kirula' - 2015	ICC	5.0	4.97	99
118-2-3-28-2502	Supply of parachute trays for farmers	RRDI	0.5	0.5	100
118-2-3-28-2502	Special Mango programme	ETC	0.7	-	-
118-2-3-28-2502	Production of planting materials of Pineapple	HORDI	0.88	0.84	96
118-2-3-30-2502	Rice export programme	ETC	35.5	10.7	30
		RRDI	28.7	19.8	69
		ENG	10.8	8.6	79
118-2-3-3-2502	Printing of data collection formats and summary documents	ICC	2.1	2.1	100
118-1-2-0-1201	Purchasing of file covers for the Ministry of Agriculture	ICC	0.06	0.03	41
118-2-3-27-2502	Red onion seed production programme	FCRDI	0.50	0.5	92
Total			77.7	41.6	54

Table 4.4.5: Progress of special projects under Ministry of Economic Development votes during 2014

Vote	Project	Institute	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure (%)
105-02-01-01-2105	'Divi neguma' national programme – payments for vouchers in hand	SCPPC	1.3	1.020	78.4
105-02-01-01-2105	'Divi neguma' national programme – Phase iv	SPMDC	90.0	89.961	99.96
Total			91.3	90.981	99.65

Achievements of DOA

Achievements of DOA in the year 2014 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 2013 was prepared and submitted to the Ministry of Agriculture. It is also distributed to 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. M. M. Yahyakhan, Translator (English-Tamil) assumed duty after completing two year no pay leave for foreign job. One Management Assistant transferred out and two Management Assistants transferred in. One Office Assistant transferred in and two Watchers were attached to SPMDC. One Labourer was joined the permanent cadre of PMEU.

STAFF LIST

Designation	No.
Deputy Director	01
Translator (English-Sinhala)	03
Translator (English-Tamil)	01
Programme Assistant (Agriculture)	01
Agricultural Instructor	01
Public Management Assistant	03
Development Officer	03
Driver	02
KKS	02
Labourer	03
Laborer (Contract)	02
Total	22

5. WEATHER REPORT

Meteorological data collected from 12 agro-meteorological stations representing different agro-ecological regions in Sri Lanka during 2013/2014 Maha (September – February) and 2014 Yala (March – August) seasons have been summarized in this report. This report was 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 5.1. The monthly total rainfall and corresponding 10-year averages of 12 stations are given in Tables 5.2 and 5.3 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 5.4, 5.5, 5.6, 5.7 and 5.8, respectively.

In general, rainfall of 2013/2014 Maha season was below the expectations in almost all regions of the country. It was mainly attributed to the weak inter-monsoonal weather conditions and northeast monsoonal circulation prevailed in and around the island. Meanwhile, rainfall in 2014 Yala season also showed an erratic spatial pattern with both below and above normal rains in different regions.

Low Country Wet Zone

Bombuwela (WL_{1b})

The cumulative seasonal rainfall of this region during 2013/2014 Maha season was about 38

percent low compared to its long term average of 1,539 mm. The negative anomaly of rainfall received in every month of season attributed to this reduction. Monthly cumulative potential evapotranspiration values of the latter half of the season remained beyond the cumulative rainfall of respective months.

The recorded negative anomaly of cumulative seasonal rainfall of 2014 Yala season was only about 6 percent and it is mainly due to the reduction of rainfall during each month of the season except June and August compared to its long term average. In addition, the monthly cumulative potential evapotranspiration value of July was above the cumulative rainfall. However, cumulative potential evapotranspiration of all other months of the season was well below the cumulative rainfall of respective months.

Mid Country Wet Zone

Peradeniya (WM_{2b})

In this region, the cumulative seasonal rainfall of 2013/2014 Maha season was about 827 mm, that of 25 percent decrease compared to the long-term average. This negative anomaly in the Maha season rainfall is a result of below normal rainfall in each month of the season except in September. Rainfall in December was a 68 percent low compared to the long-term average. Meanwhile, conventional dry months of the region, namely January and February were exceptionally dry with 44 and 99 per cent reduction in rainfall, respectively. However, it may have been a conducting

environment for flower setting of tree-fruit crops in the region.

The recorded rainfall during 2014 Yala season was only about 4 percent low compared to its long term average due to the receipt of below normal rains during the months of March, April and July. Even though rainfall during first inter-monsoon season (March – April) was below the long term average, the potential evapotranspiration value of April was well below the cumulative rainfall. Moreover, the received rainfall during each month of the season was well in excess of potential evapotranspiration throughout the season except March.

Up Country Wet Zone

Sita Eliya (WU₃)

Cumulative seasonal rainfall of 2013/2014 Maha season in this region was about 721 mm, which is about 38 per cent decrease compared to its long-term average. This decrease was mainly attributed to below normal rains experienced during the period of October through February in the Central Hills.

The Yala season in this region experienced a near normal rainfall with a cumulative rainfall of about 743 mm of rainfall, which is a 2 percent decrease over the long-term average. This negative anomaly was a result of below normal rainfall received in March and July. The maximum temperature during the season ranged from 17 °C to 25 °C while the minimum temperature was in the range of 9 °C to 19 °C.

Low Country Intermediate Zone

Batalagoda (IL_{1a})

The recorded cumulative seasonal rainfall was 908 mm during 2013/2014 Maha season in this region and so there was about 17 percent decrease compared to its long-term average. It was mainly attributed to below normal rains received in November to February period in the northeast monsoon season. This negative anomaly may have lowered the water levels in most of the minor tanks in the region and possibly rainfed agriculture has been badly affected.

This region experienced about 5 percent higher rainfall during Yala season compared to its long-term average. Fairly good rains received during the months April, May and August. However potential evapotranspiration values were in excess of cumulative rainfall in March, June and July. and thus soil moisture stress conditions in upland crops may have developed during latter part of the season.

Monaragala (IL_{1c})

Compared to its long term average, this region experienced about 57 percent decrease in cumulative seasonal rainfall during 2013/2014 Maha season. None of the month in the season was able to record expected amount of rains and thus, soil moisture stress conditions may have prevailed in upland crops grown without supplementary irrigation.

The cumulative seasonal rainfall of the 2014 Yala season in this region was 384 mm, which was about 38 percent reduction compared to its long-term average. This decrease was mainly attributed to the below normal rains

experienced during the period from March to June. The cumulative seasonal rainfall of the season was much below the evapotranspiration demand of the atmosphere resulting soil moisture stress conditions.

Mid Country Intermediate Zone

Kundasale (IM_{3a})

The cumulative seasonal rainfall of 2013/2014 Maha season was about 23 percent lower compared to its long-term average of 935 mm. The recorded negative anomaly of the season was mainly attributed to the below normal rainfall received during November to February. However, potential evapotranspiration values remained well below the monthly rainfall during each month of the season except February. Therefore, soil moisture stress would not have been a problem for crops grown this region.

The seasonal cumulative rainfall of Yala season was 525 mm and it was just a 3 percent decrease compared to its long-term average with below normal rains during the months of March, April and July. Furthermore, the potential evapotranspiration in March, July and August was in excess of cumulative rainfall.

Up Country Intermediate Zone

Bandarawela (IU_{3c})

In line with other parts of the Central Highlands, this region also experienced a 33 percent decrease in cumulative rainfall during 2013/2014 Maha season compared to its long-term average with below normal rains in most months of the season. However, the potential evapotranspiration remained well below the

rainfall of each month of the season except in September and February. The maximum temperature during the season ranged from 20 °C to 30 °C while the minimum temperature was in the range of 6 °C to 19 °C.

In contrast to the other parts of the Central Highlands, this region experienced a near normal rainfall during 2014 Yala season with a minor positive anomaly. This positive anomaly was mainly attributed to the above normal rainfall experienced during the months of April, May and August. However, monthly cumulative potential evapotranspiration values were above the cumulative rainfall of respective months except in April and May. The maximum temperature during the season ranged from 21 °C to 30 °C while the minimum temperature was in the range of 11 °C to 21.5 °C.

Dry Zone

Maha-Illuppallama (DL_{1b})

The cumulative Maha season rainfall in the north-central part of the DL_{1b} agro-ecological region was 655 mm; a 35 percent decrease below the expected amount. This decrease in cumulative rainfall was mainly attributed to the negative anomaly of rains experienced in each month of the season except January. Nevertheless, potential evapotranspiration values remained well below the monthly rainfall during each month, except September and February.

Contrary to the other areas of the country, this region recorded a 40 percent increase of the cumulative seasonal rainfall during 2014 Yala season compared to its long term average of 389 mm. This positive anomaly was mainly

attributed to the above normal rains experienced in April and May. Furthermore, the cumulative potential evapotranspiration values also did not exceed the cumulative rainfall of these two months. The rainfed upland crops grown without supplementary irrigation may have suffered from soil moisture stress conditions at latter part of the season.

Angunakolapelessa (DL_{1b})

As in the case of other parts of the country, the decrease of cumulative seasonal rainfall of 2013/2014 Maha season in the southern part of the DL1b agro-ecological region was about 33 percent compared to its long term average of 557 mm. This negative anomaly was due to the receipt below normal rains in each month of the season except December. Meanwhile, cumulative monthly potential evapotranspiration values of the season remained below the monthly rainfall in November and December resulting possible soil moisture stress conditions in rainfed crops.

The 2014 Yala season was fairly dry in this region with about 29 percent reduction in cumulative seasonal rainfall compared to its long term average with below normal rains in each month of the season except May. Meanwhile, cumulative rainfall in April and May was in excess of the potential evapotranspiration of respective months. Hence, rain fed upland crops may have suffered soil moisture stress conditions during latter part of the season if supplementary irrigation was not provided.

Aralaganwila (DL_{2b})

Cumulative rainfall, in the Eastern part of the Dry zone was about 893 mm with a negative anomaly of 44 percent compared to its long term average. This was mainly attributed to the below normal rainfall received during each month of the season except January. The decrease of cumulative monthly rainfall in October and November was about 71% and 70 % compared to its long-term average of 300 mm and 408 mm, respectively. Evaporative demand of the atmosphere remained below the cumulative rainfall of the months of November, December and January. Hence, there was hardly any chance of developing soil moisture stress conditions for crops grown on highlands.

The cumulative Yala season rainfall of this region was almost equal to its long term average of 421 mm. However, both June and July did not record any rainfall. Potential evapotranspiration values remained below the monthly rainfall during each month of the season except in April and May. Usually, a conducive Yala season does not exist in this region.

Weerawila (DL₅)

As in the other regions of the country, this agro-ecological region had no exception and it also recorded a negative anomaly. The recorded 452 mm of rainfall was a 48 percent decrease compared to its long-term average. Except September, recorded rainfall in each month of the season was below the expected levels. Despite Maha season being the major rainy season of the region, 2013/14 Maha season was unusually dry in this region too.

The recorded cumulative seasonal rainfall in this region was only about 122 mm, a 62 percent decrease compared to its long term average. It was the highest negative anomaly recorded among the stations in the country under review. Since none of the month in the season recorded a rainfall of 100 mm or more; the threshold value to designate any month as a Wet month each month of the season can be considered as a Dry month. Meanwhile, the cumulative potential evapotranspiration of each month of the season was much in excess of the cumulative rainfall of the respective months. Being the driest region of the country it is not an unusual weather condition for the region. However, dryness of 2014 Yala season in this region goes on records in the recent climatological history of the DL5 region.

Table 5.1: Total rainfall (mm) of 2013/2014 Maha & 2014 Yala seasons

Agro-met Station	Agro Ecological Zone	Maha 2013/14 Sep-Feb	Maha Ten Year Average (2003-12)	Yala 2014 Mar-Aug	Yala Ten Year Average (2003-12)
Bombuwela	WL _{1b}	961.9	1539.4	1523.2	1622.9
Peradeniya	WM _{2 b}	827.4	1109.6	873.8	908.0
Sita-Eliya	WU ₃	721.1	1166.8	743.2	754.4
Bathalagoda	IL _{1a}	908.2	1089.1	764.1	726.7
Makandura	IL _{1a}	891.0	1118.2	820.8	932.7
Moneragala	IL _{1c}	592.1	1364.4	384.0	619.2
Girandurukotte	IL ₂		*		*
Kundasale	IM _{3a}	719.0	935.1	525.1	541.3
Bandarawela	IU _{3c}	764.1	1134.3	655.3	644.4
Maha-Illuppallama	DL _{1b}	654.7	1002.8	545.9	388.9
Angunakolapellessa	DL _{1b}	556.9	833.6	351.7	493.3
Aralaganwila	DL _{2b}	893.0	1605.1	415.1	421.0
Weerawila	DL ₅	451.7	868.9	122.5	319.4

Table 5.2: Monthly total rainfall 2013/14 (mm)

Agro-met station	2013				2014							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwela	245.2	360.9	249.2	66.5	25.4	14.7	109.9	218.4	249.7	446.8	70.9	427.5
Peradeniya	241.3	294.2	173.3	63.5	54.3	0.8	12.1	221.3	166.2	238.2	88.1	147.9
Sita-Eliya	221.5	136.5	130.2	171.5	51.0	10.4	47.6	169.2	234.6	127.2	73.1	91.5
Bathalagoda	148.8	375.5	245.2	63.7	75.0	0.0	1.2	347.3	166.2	60.2	47.9	141.3
Makandura	307.6	270.7	211.8	12.1	10.0	78.8	24.4	113.1	102.0	288.7	60.6	232.0
Moneragala	6.1	89.4	181.9	173.4	75.0	66.3	26.8	60.0	73.3	0.0	83.9	140.0
Girandurukotte	71.9	174.8	215.4	280.0	339.4	74.5	34.2	256.1	193.9	0.0	0.0	51.3
Kundasale	129.7	292.5	158.3	77.3	60.8	0.4	12.9	159.5	94.5	158.2	28.1	71.9
Bandarawela	42.8	273.1	197.1	137.5	83.8	29.8	24.3	301.1	232.0	22.2	3.3	72.4
Maha-Illuppallama	21.7	228.8	189.7	70.0	134.1	10.4	0.0	322.9	195.2	2.0	0.0	25.8
Angunakolapellessa	86.4	55.8	206.2	161.1	43.0	4.4	47.3	114.7	120.9	37.5	14.8	16.5
Aralaganwila	39.0	85.9	120.9	231.7	356.3	59.2	15.8	158.1	115.5	0.0	0.0	125.7
Weerawila	47.7	86.9	252.0	51.9	3.4	9.8	27.7	36.1	50.6	3.6	0.2	4.3

Table 5.3: Monthly average Rainfall in mm (2003-2012)

Agro-met station	Month											
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwela	295.8	449.1	391.9	202.2	98.4	97.5	182.3	327.0	406.2	285.8	194.1	227.6
Peradeniya	122.5	311.4	294.6	197.4	96.2	66.2	168.1	250.5	106.0	131.6	142.7	109.1
Sita-Eliya	127.9	261.2	286.5	228.3	174.7	72.1	127.8	168.3	144.5	116.1	109.2	88.6
Bathalagoda	99.8	309.8	289.5	222.9	88.5	64.6	142.3	221.5	108.2	98.0	82.8	73.9
Makandura	158.3	403.1	292.0	133.1	65.3	60.5	148.8	211.8	200.1	172.3	97.1	102.7
Moneragala	121.5	313.1	395.4	262.0	171.2	83.0	116.1	266.6	102.9	21.2	45.2	67.3
Kundasale	74.8	220.2	239.6	199.7	108.7	74.9	116.3	169.0	71.1	68.6	59.6	56.7
Bandarawela	111.0	296.1	291.8	213.3	121.3	75.8	144.4	214.3	131.3	45.2	51.7	57.4
Maha-Illuppallama	77.1	263.7	282.3	198.4	102.7	77.8	105.7	168.1	52.7	10.2	24.9	27.3
Angunakolapellessa	96.5	170.6	252.3	159.1	86.6	47.7	108.6	128.5	92.9	48.5	41.8	73.0
Aralaganwila	46.8	299.2	407.7	432.6	273.2	155.9	98.5	135.1	65.3	20.3	40.9	60.9
Weerawila	45.4	184.9	293.3	187.5	97.0	51.0	79.5	134.1	42.5	15.0	14.4	33.8

Table 5.4: Monthly Potential Evapotranspiration (mm) - 2013/14

Agro-met station	2013				2014							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwela	67.2	84.3	72.0	69.4	74.4	80.6	96.7	76.8	81.8	76.8	74.4	57.0
Peradeniya	60.0	74.4	67.2	67.0	84.3	98.6	124.0	67.2	74.4	55.2	64.5	64.5
Sita-Eliya	36.0	*	*	*	*	*	*	*	*	55.2	59.5	64.5
Bathalagoda	69.6	81.8	64.8	76.9	86.8	94.1	111.6	91.2	89.3	84.0	96.7	81.8
Makandura	88.8	94.2	84.0	81.8	76.9	85.1	119.0	103.2	96.7	93.6	101.7	101.7
Moneragala	93.6	91.8	69.6	*	*	*	*	86.4	94.2	127.2	106.6	109.1
Kundasale	72.0	74.4	62.4	54.6	59.5	73.9	101.7	84.0	84.3	62.4	76.9	81.8
Bandarawela	74.4	79.4	69.6	39.7	59.5	80.6	81.8	72.0	57.0	84.0	109.1	76.9
Maha-Illuppallama	91.2	99.2	57.6	42.2	54.6	69.4	111.6	91.2	86.8	105.6	121.5	106.6
Angunakolapellessa	100.8	101.7	96.0	79.4	104.2	114.2	146.3	110.4	101.7	115.2	143.8	119.0
Aralaganwila	129.6	124.0	67.2	49.6	47.1	65.0	91.8	103.2	99.2	158.4	188.5	146.3
Weerawila	100.8	*	69.6	67.0	91.8	100.8	126.5	96.0	111.6	156.0	188.5	143.8

* - Data Not Available

Table 5.5: Maximum and Minimum air temperature (°C) – 2013/14

Agro-met station	2013								2014															
	Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		June		July		Aug	
	Max	Min																						
Bombuwela	30.1	23.7	30.7	23.7	31.4	23.1	31.4	22.2	31.2	22.2	31.5	22.2	32.5	22.3	32.3	23.3	31.5	23.8	31.0	24.7	30.7	25.4	30.0	23.9
Peradeniya	27.8	21.1	29.1	20.9	29.7	20.9	27.4	20.6	28.3	20.8	30.6	18.2	32.0	21.1	31.7	21.7	30.5	22.4	28.8	23.1	28.3	23.2	28.4	21.9
Sita-Eliya	19.7	12.3	*	*	*	*	19.7	9.6	19.1	11.5	20.8	10.9	20.7	11.4	22.1	12.6	22.2	14.1	19.5	14.3	18.3	13.6	19.5	13.5
Batalagoda	30.0	23.6	31.2	23.5	31.3	23.0	29.2	22.5	29.5	22.0	31.9	20.0	34.3	22.2	33.7	23.8	32.1	24.8	31.1	25.4	30.5	24.9	30.3	24.1
Makandura	30.6	24.6	31.4	24.5	30.7	24.1	30.7	24.5	32.1	23.4	32.8	23.1	33.7	24.3	33.4	24.1	32.1	25.0	31.2	24.9	30.5	25.2	30.2	24.6
Moneragala	34.8	22.6	34.7	22.1	31.6	22.0	28.6	22.1	30.0	21.5	31.5	20.6	32.8	21.1	33.9	21.4	34.2	22.8	36.0	22.2	36.4	21.8	35.3	21.6
Girandurukotte	33.9	23.9	35.1	23.8	32.0	*	29.3	*	30.1	21.5	31.3	20.2	33.2	21.4	36.3	22.8	35.2	23.5	35.2	23.4	35.7	23.4	35.6	22.5
Kundasale	28.9	21.0	30.1	20.5	30.0	20.3	27.8	20.0	28.3	19.1	30.6	17.7	32.0	19.9	33.1	21.1	31.5	22.0	29.5	23.0	29.3	23.0	29.5	21.7
Bandarawela	26.3	16.5	26.5	15.3	25.5	15.9	22.7	15.2	23.5	15.3	25.7	12.9	26.1	14.6	27.3	16.6	27.6	17.2	27.3	17.5	27.9	17.3	26.9	16.6
Maha-Illuppallama	31.9	24.0	32.9	23.6	31.2	22.4	29.0	21.4	29.2	21.3	31.6	20.2	34.6	22.2	34.8	23.5	32.7	24.8	32.5	25.6	32.7	25.3	32.7	24.4
Angunakolapellessa	31.8	24.3	32.6	23.9	31.9	23.5	30.5	22.8	31.8	22.3	32.7	21.7	34.0	22.9	33.5	24.1	32.9	25.2	33.5	25.3	33.9	25.4	33.2	24.5
Aralaganwila	34.1	22.3	35.1	21.5	31.7	21.9	28.8	21.0	29.1	20.3	30.9	19.0	33.1	19.7	36.1	21.1	35.1	21.9	34.9	22.8	34.6	22.9	34.7	20.8
Weeravila	32.4	24.1	33.2	23.9	32.1	23.4	31.0	23.4	29.8	23.4	32.3	22.7	33.8	23.9	33.7	24.8	33.6	25.6	34.3	26.2	35.0	25.8	32.8	25.6

* - Data Not Available

Table 5.6: Relative Humidity (%) – 2013/14

Agro-met Station	2013								2014															
	Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		June		July		Aug	
	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E
Bombuwela	87	81	87	77	84	78	85	77	87	86	87	75	82	68	82	74	85	75	87	80	83	77	90	81
Peradeniya	81	76	77	71	80	70	83	71	77	66	75	56	72	52	82	72	80	77	83	77	83	77	83	77
Sita-Eliya	93	92	*	*	*	*	88	92	89	90	87	87	75	84	77	85	85	89	93	89	95	92	92	90
Batalagoda	81	73	80	71	87	67	87	71	84	70	84	55	78	46	83	60	78	71	79	68	79	69	80	70
Makandura	84	80	85	79	87	81	85	78	86	78	82	71	84	78	86	76	86	78	86	81	86	81	89	85
Moneragala	70	60	70	66	77	70	83	80	81	82	82	63	73	60	79	67	84	77	73	53	75	53	79	64
Girandurukotte	74	58	74	54	87	72	88	79	93	77	91	69	87	64	83	52	82	61	70	52	62	52	72	57
Kundasale	79	74	78	67	83	67	86	71	83	69	79	54	72	48	81	62	76	69	76	74	76	74	78	71
Bandarawela	70	65	70	71	77	77	88	80	86	76	72	61	76	69	76	69	74	72	65	60	60	56	63	68
Maha-Illuppallama	80	62	77	58	89	72	90	75	91	72	87	51	79	46	83	54	81	67	79	63	78	59	79	59
Angunakolapelessa	80	71	78	68	80	74	87	77	81	70	81	69	77	67	83	80	83	76	79	69	73	62	77	69
Aralaganwila	66	52	65	51	82	66	84	72	85	72	84	61	79	54	73	56	75	60	63	56	65	57	67	54
Weeravila	74	65	75	68	81	73	81	76	79	65	78	60	79	58	79	65	78	69	77	62	75	64	79	68

M - Reading at 8.30 hours

E - Reading at 15.30 hours

* - Data Not Available

Table 5.7: Bright Sunshine Hours – 2013/14

Agro-met station	2013				2014							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwela	5.9	6.8	6.9	6.2	7.9	9.0	8.5	7.3	6.2	6.0	7.3	5.3
Peradeniya	5.8	7.7	6.6	4.9	6.5	9.1	9.4	6.8	7.3	5.7	6.0	5.0
Sita-Eliya	3.9	*	*	4.2	4.8	7.8	8.0	8.1	6.3	5.6	6.1	4.7
Batalagoda	6.0	8.0	6.7	4.9	7.1	9.3	9.2	7.9	7.4	6.5	6.3	5.7
Makandura	*	*	*	*	*	*	*	*	*	*	*	*
Moneragala	*	*	*	*	*	*	*	*	*	*	*	*
Girandurukotte	5.5	7.2	5.0	2.0	2.5	7.2	7.1	6.9	6.1	6.2	7.7	6.7
Kundasale	6.2	5.3	4.5	4.4	6.0	6.5	7.3	6.4	7.4	6.9	5.9	6.2
Bandarawela	5.9	5.9	5.2	2.3	4.0	7.4	7.4	6.5	6.1	6.8	7.7	5.7
Maha-Illuppallama	7.1	8.4	5.9	4.1	5.5	8.4	9.1	9.1	8.5	8.3	8.1	7.5
Angunakolapellessa	5.7	7.1	6.9	4.0	7.1	8.4	7.9	7.1	7.2	6.6	7.7	6.9
Aralaganwila	8.0	8.5	6.9	3.8	4.3	8.4	9.1	8.7	8.4	9.5	9.1	7.9
Weeravila	7.3	8.2	7.4	4.4	7.6	8.9	8.4	7.3	7.4	7.2	8.1	6.5

* - Data Not Available

Table 5.8: Wind Velocity (Km.p.h) – 2013/14

Agro-met station	2013				2014							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Bombuwela	3.0	2.9	1.8	1.8	2.3	2.8	2.5	2.5	3.4	4.4	4.7	3.2
Peradeniya	3.4	2.8	3.0	5.4	6.3	4.9	5.9	1.9	3.0	4.1	4.3	3.2
Sita Eliya	*	*	*	4.3	3.9	4.4	5.7	3.2	4.1	14.1	19.7	12.6
Batalagoda	7.1	5.0	2.7	4.6	5.1	3.7	3.9	2.9	5.1	9.4	9.7	7.3
Makandura	4.1	4.1	4.2	3.6	4.1	4.1	4.3	4.1	4.2	4.2	4.1	4.2
Moneragala	2.6	1.8	1.3	2.3	2.4	2.0	2.1	1.2	1.4	2.2	1.9	1.9
Girandurukotte	*	*	*	*	1.3	1.1	*	1.6	1.3	2.2	2.6	0.6
Kundasale	3.4	2.7	1.7	2.0	2.3	2.9	3.9	2.2	2.2	3.5	4.4	2.4
Bandarawela	5.1	3.4	2.9	2.9	3.2	3.7	3.8	3.2	3.9	5.5	6.4	4.6
Maha-Illuppallama	8.0	6.2	3.5	4.6	5.4	4.9	6.1	3.1	5.6	9.3	9.8	8.1
Angunakolapellessa	6.0	5.2	5.1	4.5	6.0	6.8	7.9	4.7	5.1	7.0	7.4	5.9
Aralaganwila	4.6	3.5	1.5	2.2	2.1	1.8	2.2	2.1	2.2	6.5	8.4	4.6
Weeravila	6.2	4.5	1.8	2.4	4.0	3.6	4.2	1.7	4.3	9.2	10.0	7.2

* - Data Not Available

6. PUBLICATIONS AND PRESENTATIONS

Publications

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Extension
W.J. Samarawickrama M.Sc., ADA,
Landscape Architecture &
Floriculture
K.A.N. Wijesinghe B.Sc., ADA, Crop Science
B.H.T.K. Kumari B.Sc., ADA, Food Science
& Technology
W.M.K.D. Wijeratnayake M.Sc., ADA, Crop
Science
W.M.S.K. Weerasekara Dip. In Agric., ADA,
Crop Science
M.S. Thilakasiri Dip. in Agric., ADA, Ag.
Extension

**PROVINCIAL DIRECTOR OF
AGRICULTURE, SOUTHERN
PROVINCE**

Mahesh Subasinha Dip. in Agric., PD,
Ag. Extension
M.W.S.A. de Silva Dip. in Agric., DPD, Ag.
Extension

S.K.N. Rubasinghe	B.Sc., DPD, Animal Science
I.D. Gunawardhana	B.Sc., DPD, Ag. Extension
D.A. Palihawadana	M.Sc., ADA, Ag. Extension
C. Dahanayake	Dip. in Agric., ADA, Ag. Extension
H.K.D.K. de S. Siriwardhana	B.Sc., ADA, Ag. Extension
W.G.M. Wickramasinghe	B.Sc., ADA, Ag. Extension
K.S. Pushpakanthi	B.Sc., ADA, Ag. Extension
S.D.W. Gunasekera	B.Sc., ADA, Soil & Water Management
Dharmapriya Nanayakkara	B.Sc., ADA, Ag. Extension
D.N. Gunawardhana	M.Sc., ADA, Animal Science

INFORMATION & COMMUNICATION CENTER

W.A.G. Sisira Kumara	M.A., Director, Communication
I.S.M. Haleemdeen	M.Sc., ADA, Ag. Economics

AUDIO VISUAL TRAINING CENTRE, GANNORUWA

R.D. Siripala	M.A., Addl. Director, Media
J.K.A. Hettiarachchi	M.Sc., SMS, Natural Resource Management
I.G.K. Janaka	B.Sc., AO, Agriculture
W.M.K.R. Wickramasinghe	M.Sc., AO, Crop Science
H.G.H.J.K. Keerthiratne	B.Sc., AO, Agriculture

PUBLICATION CENTER, GANNORUWA

S. Periyasamy	M.Sc., DD (Communication), Agriculture
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FARM BROADCASTING SERVICE

W.L. Hiran Peiris*	B.Sc., DD, Agriculture
G.G.D. Lalani	M.Sc., DD, Agriculture
I.P. Liyanage	B.Sc., ADA, Agriculture
A. Valesivanadan	B.Sc., Lecturer, Food & Nutrition
M.A. Chandanie	M.Sc., Lecturer, Horticulture
R.A.T.M. Ramanayake	B.Sc., Lecturer, Agriculture
G.A. Gunasekara	B.Sc., AO, Agriculture
J.A. Joseph	Dip. in Agric., AO, Agriculture

AGRO TECHNOLOGY PARK, BATA ATHA

R.H.A. Chandrasiri	B.Sc., ADA, Agriculture
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ADMINISTRATION DIVISION

Janaka Dharmakeerthi	B.B.A., Director (Administration)
P.V.M.S.B. Udovita	B.A., L.L.B., DD (Administration)
R.A.D.T.N. Tennakoon	B.Sc., M.A., DD (Administration)
G.K.G.T.D. Gedarakumbura	B.Sc., M.Sc., DD (Administration)

ENGINEERING DIVISION

M.H.M.A. Bandara C. Eng., M.I.E.S.L., Pg.
Dip., B.Sc., Chief Engineer
C.L. Rajapakse C.Eng., M.Phil., M.I.E.S.L.,
B.Sc., Mechanical Engineer
M.A. Shantha Kumara C. Eng., B.Sc.,
Mechanical Engineer
P. Rajapakse C. Eng, M.I.E.S.L., B.Sc.,
Civil Engineer
A.K.S.P.S. Wijayasoma A.M.I.E.S.L.,B.Sc.,
Electrical Engineer
K.M.P. Sameera A.M.I.E.S.L., B.Sc.,
Civil Engineer
A.P.A.P.S. Jayanthirathna A.M.I.E.S.L.,
B.Sc., Civil Engineer
L.L.R.R. Lokuliyana A.M.I.E.S.L., B.Sc.,
Mechanical Engineer

FARM MECHANIZATION

RESEARCH CENTRE

B.M.C.P. Balasooriya B.Sc., Pg. Dip., Eng.
Mgt., DD, Mechanical
Engineering
H.M.A.P. Herath B.Sc., Mechanical
Engineer
G.A.M.A. Wijethunge B.Sc., Mechanical
Engineer
M.H.J.J. Hemachandra B.Sc., Mechanical
Engineer

FINANCE DIVISION

R.P. Premarathna B.Com(Special), PGDAF,
IPFDA, HNDC, Chief Accountant
C.K. Rajapathirane M.A, PDA, B.Com,
HNDA, Deputy Director
(Finance)
M.F.M. Faiz B.Com., PDAF, Chief Internal

Auditor

W.A.G. Weerasingha ICASL Inter., PGDA,
Deputy Director
(Finance)
M.A. Kumara B.Sc. (Mgt.), Deputy
Director (Finance)
A. Jeyakumar M.P.A., B. Com., Assistant
Director (Finance)
C.P. Ruwanpitiya B.Com., Assistant
Director (Finance)
H.G.I. Madusanka B.Com., Assistant
Director (Finance)
H.M.U.S. Digashani M.A., B.Com., Assistant
Director (Finance)
H. Welagedara M.A., B.Sc., Assistant
Director (Finance)

PROGRESS MONITORING & EVALUATION UNIT, PERADENIYA

P.C. Peiris M.Sc., DD, Agricultural
Systems

* On study leave

** On no pay leave

*** On contract basis

8. TECHNICAL STAFF QUALIFICATIONS

(As at 2014.12.31)

Institute/ Centre/ Division/ Unit		Diploma	B.A./L.L.B.	B.Com./ B.B.A./ 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	17			07		01		20	04	05	54
	GLORDC	16	01		15			01	07		01	41
	RARDC/ Aralaganwila	08			01				03		01	13
	RARDC/ Kilinochchi	05	01		07				01		03	17
HORDI	HORDI	24			15				13	02	05	59
	FRU	04							02		01	07
	RARDC/Bandarawela	14	01		16				09	01		41
	RARDC/Makandura	21			09				04			34
	ARS/Sita Eliya	09			05						01	15
	ARS/Telijjawila	05	02		07				03			17
	ARS/Girandurukotte	05			01				02			08
FRDI	FRDI	13	03	01	09				10	04	01	41
	FCRDS	04			03				02		02	11
	PVIC	12			07				03		01	23
RRDI	RRDI	56	10		28			01	26	08	03	132
	RRRDC/Bombuwala	18		01	13				07	01		40
NRMC		16			08				08	01	04	37
SCPPC	SCPPC				01				03		01	05
	SCS	98	13	01	25				03	01	02	143
	PPS	07			03				05	01		16
	ROP	04			12				09		02	27
	PGRC	06			03		01		05	01	03	19
	NPQS	53			28				11		02	94
SPMDC		156	20		28		06		18			228
SEPC			12		03			01	09	01	03	29
ETC		261	06	01	42	01			27			338
ICC			06	01	21			04	06			38
Administration Division			20		10				02			32
ENG	Engineering Division	08			04	05						17
	FMRC	02			05							07
Finance Division			02	05	01		04	02				14
PMEU			01	01	02				02			06
TOTAL		842	98	11	339	06	12	09	220	25	41	1603

9. Staff Position

(As at 2014.12.31)

No.	Designation	Service	Cadre		
			Approved	Filled	Vacant
1	Director General of Agriculture	SLAgS	01	01	0
2	Additional Director General of Agriculture (Research)	SLAgS	01	0	01
3	Additional Director General of Agriculture (Development)	SLAgS	01	0	01
4	Additional Director General (Administration)	SLAS	01	01	0
5	Director of Agriculture	SLAgS	10	02	08
6	Registrar of Pesticides	SLAgS	01	01	0
7	Additional Director of Agriculture	SLAgS	28	03	25
8	Deputy Director of Agriculture	SLAgS	106	14	92
9	Assistant Director of Agriculture (Agri. Development)	SLAgS	342	228	114
10	Assistant Director of Agriculture (Agri. Research)	SLAgS	382	214	168
11	Assistant Director of Agriculture (Agri. Economics)	SLAgS	23	15	08
12	Principle Agriculture Scientist	SLAgS	37	0	37
13	Principle Agriculturist	SLAgS	13	0	13
14	Deputy Registrar of Pesticides	SLAgS	01	0	01
15	Director (Administration)	SLAS	01	01	0
16	Deputy Director / Assistant Director (Administration)	SLAS	03	03	0
17	Chief Accountant	SLAcS	01	01	0
18	Chief Internal Auditor	SLAcS	01	01	0
19	Accountant (Class I)	SLAcS	01	03	-02
20	Accountant (Class II/III)	SLAcS	13	07	06
21	Chief Engineer	SLEgS	01	01	0

No.	Designation	Service	Cadre		
			Approved	Filled	Vacant
22	Engineer (Civil)	SLEgS	04	03	01
23	Engineer (Mechanical)	SLEgS	09	08	01
24	Engineer (Electrical)	SLEgS	01	01	0
25	Legal Officer	LOS	01	0	01
26	Assistant Director (Information & Communication)	SLICS	01	0	01
27	Administrative Officer	PMAS	37	18	19
28	Agriculture Instructor (Special Grade)	SLTS	98	22	76
29	Research Assistant (Special Grade)	SLTS	25	17	08
30	Assistant Director (Agriculture)	SLTS	100	10	90
32	Librarian (Supra Grade)	LS	01	0	01
32	Translator (English)	TS	06	06	0
33	Translator (Tamil)	TS	01	01	0
34	Economist Assistant	DOA	21	11	10
35	Information & Communication Technical Officer	SLICS	19	0	19
36	Statistical Assistant	DOA	02	02	0
37	Librarian	LS	05	03	02
38	Agriculture Monitoring Officer	DOA	110	90	20
39	Programme Assistant (Agriculture)	DOA	177	94	83
40	Legal Assistant	DOA	02	01	01
41	Media Assistant	DOA	05	03	02
42	Audio Visual Assistant	DOA	05	03	02
43	Budget Assistant	DOA	02	02	0
44	Development Officer	DOS	370	229	141
45	Agriculture Instructor	SLTS	1244	832	412
46	Research Assistant	SLTS	388	153	235

No.	Designation	Service	Cadre		
			Approved	Filled	Vacant
47	Engineering Assistant	SLTS	40	09	31
48	Technical Officer	SLTS	03	02	01
49	Soil Surveyor	SLTS	05	04	01
50	Public Management Assistant	PMAS	641	532	109
51	Farm Clerk	DOA	80	74	06
52	Artist	DOA	03	01	02
53	Photographer	DOA	03	01	02
54	Audio Visual Technician	DOA	01	01	0
55	Seed Technician	DOA	24	22	02
56	Bee Demonstrator	DOA	02	01	01
57	Warden (Male)	DOA	11	0	11
58	Warden (Female)	DOA	04	0	04
59	Agriculture Extension Officer	DOA	15	15	0
60	Technical Assistant (Engineering)	DOA	34	15	19
61	Technical Assistant (Extension)	DOA	1781	76	1705
62	Technical Assistant (Research)	DOA	15	14	01
63	Information & Communication Technical Assistant	DOA	50	0	50
64	Foreman (Press)	DOA	01	0	01
65	Driver	DS	333	309	24
66	Cinema Machine Operator	DOA	06	03	03
67	Composer	DOA	04	03	01
68	Book Binder (Press)	DOA	02	02	0
69	Earth Mover Operator	DOA	100	99	01
70	Plant Yard Attendant/ Machine Minder	DOA	04	03	01
71	Storeman	DOA	74	73	01

No.	Designation	Service	Cadre		
			Approved	Filled	Vacant
72	Machinist	DOA	18	17	01
73	Mechanic	DOA	45	38	07
74	Carpenter	DOA	30	15	15
75	Mason	DOA	30	04	26
76	Electrician	DOA	25	15	10
77	Plant Yard Attendant	DOA	18	10	08
78	Bee Keeper	DOA	13	13	0
79	Budder	DOA	71	65	06
80	Circuit Bungalow Keeper	DOA	22	17	05
81	Steward	DOA	01	0	01
82	Cook	DOA	40	40	0
83	Seed man	DOA	30	29	01
84	Technician	DOA	68	60	08
85	Research Sub Assistant	DOA	80	77	03
86	Video Editor	DOA	04	04	0
87	Audio Recorder	DOA	04	04	0
88	Video Cameraman / Cameraman Assistant	DOA	04	04	0
89	KKS	OES	100	70	30
90	Lorry Cleaner	DOA	28	16	12
91	Watcher	DOA	656	656	0
92	Sanitary Labourer	DOA	14	14	0
93	Video Lighting / Video Assistant	DOA	04	04	0
94	Video Assistant	DOA	02	02	0
95	Video Edit Assistant	DOA	02	02	0
96	Demonstration Assistant	DOA	02	02	0

No.	Designation	Service	Cadre		
			Approved	Filled	Vacant
97	Waiter	DOA	04	04	0
98	Labourer	DOA	1903	1406	497
99	Contract Labourers received permanent appointments	DOA	2876	2600	276
	Total		12932	8452	4480

DOA – Department of Agriculture

DOS – Development Officer Service

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 Technological Service

TS – Translators’ Service

OES – Office Employees’ Service

DS – Drivers Service