Annual Performance Report 2012

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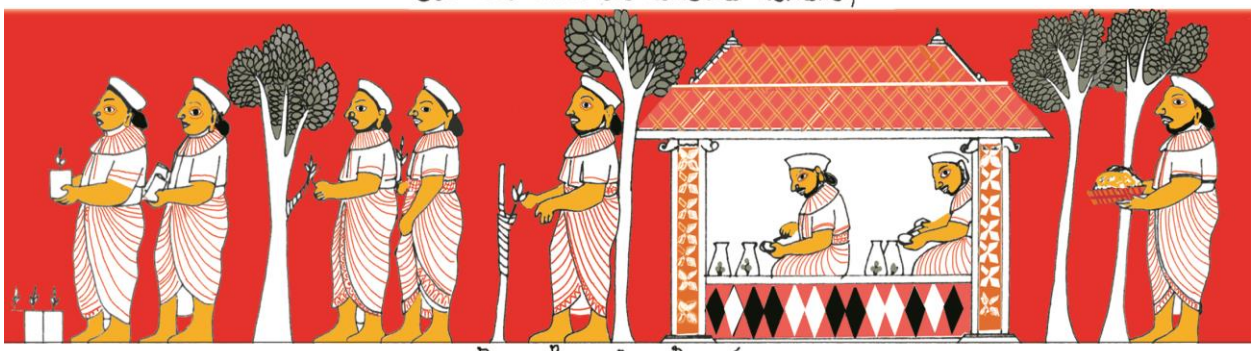

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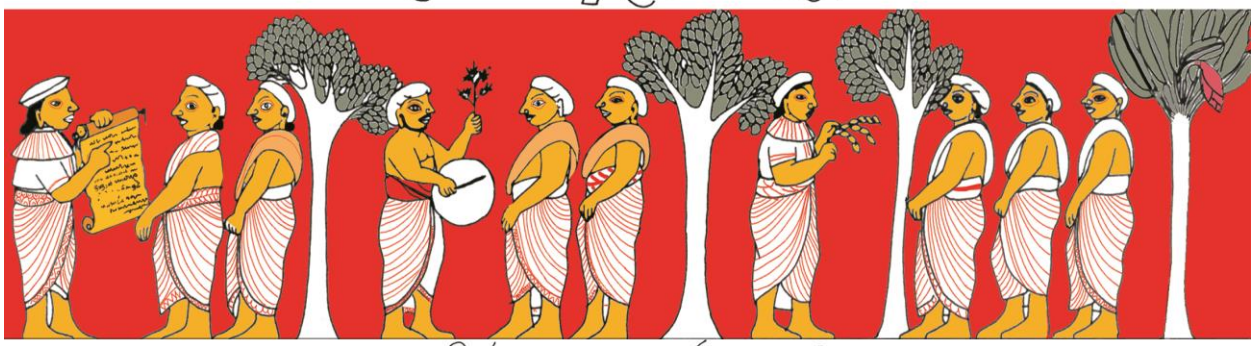

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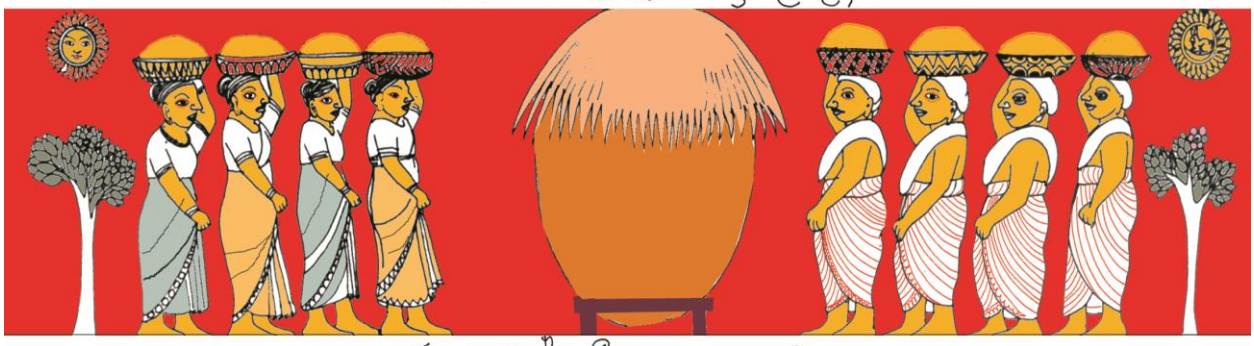

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Department of Agriculture, Peradeniya, Sri Lanka

ANNUAL PERFORMANCE REPORT 2012

DEPARTMENT OF AGRICULTURE
PERADENIYA
SRI LANKA

Published
by

Department of Agriculture
Peradeniya
Sri Lanka
2013

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

Vision

Achieve excellence in agriculture for national prosperity.

Mission

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

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FOREWORD

It is an absolute pleasure to provide a foreword, in my capacity as the Director General of Agriculture, to the Annual Performance Report - 2012 of the Department of Agriculture, vested with the mandate of developing agricultural sector in Sri Lanka-a predominantly agricultural country. DOA, with a proud history spanning over 100 years has a staff of over 10,000 attached to 192 institutes, centres and units spread throughout the island.

This Annual Performance Report presents all the activities carried out by 10 technical divisions and 3 support service divisions of the DOA in 2012. The information contained in this report on the current state of the resource of the DOA will be immensely beneficial for the policy makers, legislators and researchers in planning their future activities.

Especially in 2012, number of remarkable achievements were made in the agricultural sector of Sri Lanka. Most importantly, DOA – the pilot in the agricultural development of Sri Lanka, which was awaiting its centenary in 2012 was able celebrate it in grandeur, with the participation of His Excellency the President.

In 2012, DOA received Rs. 3,507 million as the total allocation of which financial progress exceeded 92%. A sum of Rs. 700 million was spent on the development of infrastructure in the seed farms in the last few years. As a result, 16 farms were able to make profits in this year, marking another significant achievement.

The year 2012 marked another milestone for the DOA as the country reached self – sufficiency in maize, as a result of regular extension programs implemented by the DOA to meet the entire national requirement through domestic production, and thereby prevent imports over 150,000 MT annually.

Overcoming the dearth of the human resource that posed a huge obstacle for the DOA in executing its activities efficiently, a solution was given to a decade-old drastic problem by filling vacancies existed in minor and skilled grades and in Technical service, Agricultural Service etc.

I wish to express my sincere gratitude to the entire staff of the DOA for their commitment and support towards making such a progress and number of achievements. I also wish to thank specially the staff of the Progress Monitoring and Evaluation Unit for their great effort in compiling and publishing this report amidst various difficulties, and those officers who carried out the Tamil translation of this report.

K. G. Sriyapala

Director General of Agriculture

ABBREVIATIONS & ACRONYMS

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

IU - Up Country Intermediate Zone
IW/ CPE – Irrigation Water/ Cumulative Pan Evaporation
JICA – Japan International Cooperation Agency
KKS – Karyala Karya Sahayaka
KOPIA – Korea Photovoltaic Association
KVSN – Krushikarma Vyapthi Seva Niladhari
LCWZ – Low Country Wet Zone
LSVAT – Large Scale Varietal Adaptability Trial
M.Ec. – Master of Economics
M.Sc. – Master of Science
MAI – Moisture Availability Index
mg – Milli gram
ml – Milli litre
mm – Milli meter
MPET – Medium density Poly Ethylene Terephthalate
mt – Metric ton
MYMV – Mung bean Yellow Mosaic Virus
MYT – Major Yield Trial
NBPGR – National Bureau of Plant Genetic Resources
NCB – Non Calcic Brown
NCRVT – National Coordinated Rice Varietal Trial
NCVT – National Coordinated Varietal Trial
NEAP – National Environmental Action Plan
NIAS – National Institute of Agrobiological Sciences
NPK – Nitrogen, Potassium and Phosphorus
OFC – Other Field Crops
PCCC – Permanent Crop Clinic Committee
PD - Provincial Director
PECRODEP – Perennial Crop Development Project
PET – Potential Evapotranspiration
PGR – Plant Genetic Resources
Ph.D. – Doctor of Philosophy
ppm – Parts per million
PTWG – Provincial Technical Working Group
PYT – Preliminary Yield Trial
RA – Research Assistant
RAPD – Random Amplified Polymorphism Detection
REAP – Regional Economic Advancement Project
RGM – Rice Gall Midge
RO - Research Officer
ROIC - Research Officer In Charge
RSC – Rooted Stem Cuttings
RTWG – Regional Technical WorkingGroup
RYP – Red Yellow Podzolic
SLANRMP – Sri Lanka Australia Natural Resources Management Project
SLUSDA – Sri Lanka – United States Development Agency
SMS - Subject Matter Specialist
SOA – School of AgricultureSriLanKoRDAA – Sri Lanka – Korea RuralDevelopment Administration Allium
t – Metric ton = 10^3 kg
TOT – Training of Trainers
TSP – Triple Super Phosphate
VAT - Variety Adaptability Trial
WL – Low Country Wet Zone
WM – Mid Country Wet Zone
WU – Up Country Wet Zone

1.1 FIELD CROPS RESEARCH AND DEVELOPMENT INSTITUTE - MAHAILLUPPALLAMA

The mandatory tasks of the Field Crop Research and Development Institute, Mahailluppallama and its satellite stations are to develop varieties and other related technologies with regard to Other Field Crop (OFC) such as condiments (chili and onions), grains, 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) and to disseminate research findings and the technology primarily to its stakeholders. In addition, it has the responsibility in producing adequate quantities of nuclear seeds of all crops under its purview. Further, FCRDI also caters to the enhancement of the productivity of regionally important rice and Dry Zone fruits and vegetables. In-situ conservation of indigenous germplasm of all Dry Zone fruit crops from local and international source and utilizing them in improving the cultivars and also introducing and testing germplasm are being done at FCRDI. To achieve all these objectives, FCRDI collaborates with national and international research and development institutes, universities and private sector organizations.

National policy for OFC envisages self satisfactory in legumes, cereals, millets and ground nut by 2015. To achieve this task, both productivity and the area under cultivation must be improved. However, increasing the area under cultivation is limited as the scarcity of natural resources such as water prevails and competition for agricultural lands for other needs other than OFC cultivation is high. Therefore, increasing farm productivity while optimizing natural resources, is the option to be chosen.

FCRDI system comprises the main research station at Mahailluppallama and its satellite stations such as 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, Vavuniya and Thelijjewila. 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 – 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	10,296,988	8,713,508	85
Recurrent	28,346,293	25,203,363	89
Projects			
NARP			
I. Onion	2,200,000	2,058,341	94
II. Chilli	2,590,000	2,433,379	94
III. Water Management	2,190,000	2,029,301	93
IV. Vegetable	250,000	185,810	74
Community based seed production (Chilli)	1,000,000	939,026	94
Farm development	8,050,000	7,673,410	95
Fruit production (Grapes)	1,600,000	1,541,741	96
KOPIA	426,461	426,461	100
Development of hybrid maize	835,000	822,457	98
Total	**57,784,742**	**52,026,798**	**92**

PROGRESS

CROP IMPROVEMENT

Condiments

Chilli

Chilli is one of the most important condiments grown in Sri Lanka. The current extent of cultivation occupies 13 313 ha with an average green chilli yield of 3.33 t/ha. Production of green chilli in the year 2011 was 44 398 t. As the production level was below the national requirement, 42 782 t of chilli was imported in 2011.

The potential production of green chilli under well managed irrigated condition is around 15 t/ ha. The main causes for the low productivity in farmers' fields are the high incidences of pest and diseases which resulted in poor quality as well as the quantity of the harvest. Therefore, the crop improvement programme on chilli crop was conducted with the objective of development of high yielding varieties with good quality pods and resistant/ tolerant to pests and diseases.

Achievements

- **Two new chilli varieties released**

  Two new chilli varieties were recommended and released for extensive cultivation.

  The variety MICH 3 is highly suitable for green chilli production. Moderate sizes of the pods of this variety have attractive shinny appearance with dark green colour. The variety is moderately tolerant to leaf curl complex and recommended for island wide

cultivation. The breeder seed production of this variety has been initiated and 2.5 kg of breeder seeds were supplied to SPMDC/DOA to include the variety for seed production process. The variety has yield potential of more than 15 t/ha of green chilli.

Waraniya is one of the popular chilli land races among wet zone farmers. The second new variety MI *Waraniya* 1 was the purified and selected version of existing *Waraniya* land race. This variety has long pod of more than 18 cm and yellowish colour pods with moderate pungency. MI *Waraniya* 1 also can be used as a supplementary vegetable for capsicum. It has more than 25 t/ha of fresh fruit chilli yield and the variety is mostly suitable for homesteads and grown in pots.

- **Promising chilli lines**

  Two promising chilli breeding lines were selected and identified after conducting NCVT for green chilli. The selected promising lines namely PC 1 selection and ICPN selection were out yielded than the rest of the entries. The NCVT was conducted in several locations; Aralaganvila, FCRDI/ Mahailluppallama, Kalpitiya GLORDC/ Angunakolapellessa, ARS/ Thirunelveli and RARDC/ Makandura. The promising line PC 1 selection has short conical shape pods with light green colour and high pungency. It is suitable for both green and dry chilli production having the yield potential of more than 15 t/ha of green chilli. The line will be tested in varietal adaptability test in coming seasons. Seeds of the promising line were submitted for DUS test at seed certification service (SCS) of DOA.

  The second promising line ICPN selection was selected and purified from the germplasm obtained from AVRDC. It also has high yielding ability of more than 18 t/ha of fresh chilli. The line has shinny, yellowish colour appearance with long pungent pods. The pericarp thickness of the ICPN selection is quite higher than our green chilli varieties. The line is mostly suitable for vegetable purpose but it has very high pungency. The seeds of the line were given to PGRC for conservation and the line will be needed to compare with capsicum lines for further studies.

- **Hybrid breeding in chilli**

  More than hundred and fifty F1 crosses were tested under field condition as preliminary evaluation of locally developed F1 hybrids with their parental lines. According to the performance, six F1 crosses were identified for the evaluation in large scale trials in different locations. The prevailed extreme dry weather condition during 2012 yala season badly affected on the success of the crossing.

Onion

Onion is an essential condiment crop cultivated in Sri Lanka. In the year 2011, extents of cultivation for big onion and red onion were 3451 and 6145 respectively, with average yields of 13.24 and 11.77 mt/ha. Production level of big onion in the year was 45682 mt, while it was 72339 mt for red onion. As these production levels were below the national requirements, 170731 mt of big onion and 6807 mt of red onion were imported to fulfill the national requirement.

Development of high yielding seed setting varieties, resistant to pests and with good keeping quality will contribute to increase the production and reduce the importation of onion. Thus research programme on onion crop improvement was conducted to develop such varieties, and several studies were conducted in different phases of the continuing process of varietal development, in the year 2012.

Achievements

- Newly developed 19 lines of big onion were evaluated with the variety *Dambulla* selection as control, for storability. Losses due to rotting, sprouting and drying were calculated in 2 weeks interval and the experiment in progress.

- The experiment of evaluation and selection of 13 lines of improved big onion for yield and other beneficial agronomic traits against to the variety *Dambulla* selection as the control was showed that 2 lines reached their physiological maturity 10 - 12 days less than the control and 3 lines gave higher bulb yield.

- In the hybridization programme, 10 no of families of F2 generation were selected from 4 no of different crosses which were made in maha 2010/11. These families should be evaluated for other beneficial traits than the uniformity and superiors should be selected as parents for hybridization programme in future.

- Onion seeds are imported to Sri Lanka by the private sector and are becoming popular among the farmers. These varieties are marketed in the country without screening for their adaptability to local agronomic conditions or susceptibility to local pests and diseases. Thus, the possibility for an outbreak of a pest or disease cannot be excluded. Onion cultivation is under risk if an exotic variety, which is highly susceptible to a particular pest or disease, is grown extensively in the country. Therefore, studies were conducted to observe field performance, pest incidences and disease incidences of the imported onion varieties.
- Two varieties performed better in yield comparatively with the variety Dambulla selection, out of 6 exotic big onion varieties evaluated for recommendation for general cultivation. The exotic variety "Kohinoor 9" was evaluated with checks variety *Dambulla* Selection, *Galewela* Light Red and Agri Found Light Red for off-season cultivation.

- The trial of investigating effect of planting space on final seed yield of the variety *Dambulla* Selection was conducted in yala 2012 and it should be extended for next three seasons.
- Genetic variability in onion is very less related to important traits such as tolerant/ resistant to biotic and abiotic stresses. Therefore one trial was initiated to create genetic variability by induce mutation in yala 2012. Seeds of variety *Dambulla* Selection were treated with different concentrations of chemical mutagen Ethyl Methene Sulponate (EMS) and treated seeds were planted in fields according to DOA recommendation. Important growth parameters were measured. According to results the experiment

treatments should be re-arranged by changing concentrations and treated time duration for next season.

- Less or no seed setting is very common in cluster onion and in general farmers should use bulbils as planting material. An experiment was conducted to evaluate improved seed setting cluster onion lines for bulb yield and other agronomic traits. It was found that the cluster onion line MICLO-09-01 performed better than local cluster onion variety *Vethalan*.
- Six uniform cluster onion families were selected for generation advancement.

Coarse Grains

Maize

Maize cultivation in Sri Lanka has expanded over the last several years and has become a highly commercialized venture and the cultivated extent of maize in 2011 was 50 545 ha (Department of Census and Statistics, 2012). It is mainly cultivated in highlands during Maha under rainfed conditions while in Yala it is cultivated both highlands as well as lowland paddy lands with supplementary irrigation. Productivity of maize also has been increased from 1.65 to 2.88 t/ha during past 4 years. One of the contributing factors for expansion of maize cultivation and subsequently the yield is adoption of hybrid varieties and associate technologies. At present country is almost self sufficient in maize production. However, 95 % of the total hybrid seed demand is met by imported hybrid seeds which is 707 t in 2009 (Custom reports, 2009). Foreign exchange spent for importing seeds was Rs. Million 164.48. Hence, the maize improvement programme was continued to develop maize hybrid and open pollinated varieties with high yield (5 - 7 t/ha) and resistance to biotic and abiotic stresses.

Achievements

- Seven normal corn hybrids were selected from over 700 single crosses made using locally developed inbred lines and CIMMYT inbred lines and evaluated in NCVT during last two seasons. These hybrids showed average yield about 4.5 - 5.5 t/ha.

- Three Open pollinated varieties of maize from Indonesia were evaluated in advanced yield trials and NCVT. One variety Srikandikuning "MIOPV1" was selected for VAT at farmer fields. Selected Indonesian OPV showed average yield about 4 -5 t/ha.

- Fourteen maize hybrids received from CIMMYT (International Maize and Wheat Improvement Center) were evaluated and 4 hybrids were selected for further evaluation and selected hybrids showed comparable yields (6 - 7 t/ha) commercial check hybrid variety.

- Five exotic maize hybrids and sweet corn hybrids (imported by private companies) were evaluated to test the adaptability and susceptibility for common pest and diseases. Evaluation reports for sweet corn Hybrids Sugar 75, Sunsweet, Golden 95 and Super Big were submitted to relevant companies and evaluation will be continued for maize varieties.

Finger millet

Finger millet cultivation in Sri Lanka has stagnated over the last several years.Cultivated extent of finger millet was 5 251 ha in 2011 (Department of Census and Statistics, 2012). It is mainly cultivated in highlands during Maha under rain fed conditions while limited extent in Yala it is cultivated both highlands as well as lowland paddy lands with supplementary irrigation. Productivity of finger millet also has not been changed 1.0 - 1.1 mt/ha during past 5 years. At present, total domestic production were 5411 t, total imports were 3 622 t (Department of Census and Statistics, 2012). Foreign exchange spent for importing finger millet was Rs. Million 105.3 Hence, finger millet improvement programme was continued to develop with high yield (2 - 2.5 mt/ha) and resistance to biotic and abiotic stresses.

Achievements

- Four promising finger millet accessions were under NCVT in Maha 2011/12 and 3 promising accessions were selected for VAT at farmer fields. Those accessions gave average yield about 3.0 - 3.5 t/ha in Yala 2012. They will be further evaluated in VAT and LS (large scale) VAT.
- Eight promising finger millet accessions were in Preliminary Yield Trial. Those accessions showed average yield about 3.0 -3.5 mt/ha.
- Fourty three finger millet accessions received from PGRC were evaluated and multiplied for future breeding purposes.

Grain Legumes

Mungbean

Mungbean is one of most important pulse crop grown in Sri Lanka. The current extent of cultivation occupies about 15 772 ha (including 3rd season) with an average yield of 1.16 t/ha. Production level of mungbean in the year of 2011 was approximately 10 838 mt, which was well below the national requirement. As a result 10 447 t of mungbean was imported to fulfill the national requirement. The main causes for the low productivity in farmer field are the high incidences of diseases especially mungbean yellow mosaic virus & pests as well as unavailability of quality planting materials. The whole sale price and retail price receptively Rs. 202 /kg and Rs. 170 /kg. The main reasons for high market price are damage of storage pest and high harvesting cost.

Therefore, development of high yielding pest & disease resistance verities with desirable agronomic characters is very important to achieve the production target and there by reaching the self sufficiency in mungbean in Sri Lanka.

Achievements

- Twenty two mungbean F1 populations which were crossed in Maha 2011/12 with the objectives of High yielding (> 2.5 t/ha), Resistance to storage pest, pod bore & leaf eating caterpillars, Resistance to mungbean yellow mosaic virus, powdery mildew andcercosphora leave sopt, Short or long age-less than 60 days or more than75days good, grain quality (hard seed percentage less than 1, large seeds (1000 seed weight more than 70

g) and Synchronized matured were established in the field.

- Twelve F_2 populations which were selected from F1 generations in Maha 2011/12 were established in the fields as bulk for generation advancement
- Five promising lines which have potential yield of 2 t/ha and moderate resistance to mung bean yellow mosaic virus were tested in NCVT with check variety MI 6.
- Four high yielding lines (MICP 11, MICP 113, MICP 114 and MICP 539-17) were tested in VAT to test the adoptability in the farmer's fields in Monaragala, Hambantota, Vauniya, Agunakolapalassa, Aralaganwila, Anuradhapura, Polonnaruwa, Kurunegala & Puttlam.

Cowpea

Cowpea is one of the most important food legumes, which is mainly grown under rain-fed condition in dry and intermediate zone of Sri Lanka. Cultivation extent of cowpea is gradually decreased due to the commercial crop cultivation such as maize, mung bean, black gram and soybean. Although, at present there is no commercial value for cowpea, it is very important in the sustainable cropping system and rain- fed farming. Therefore

Development of high yielding varieties is the one of the main strategy to increase the local production.

The current extent of cultivation occupies about 9 267 ha, with an average yield of 1.13 t/ha. Production level of cowpea in the year 2011 was approximately 10 453 t. About 905 mt of cowpea was imported in 2011 to fulfill the national requirement.

Developing technologies to address the issues of insect pest attacks is one of the approaches to reduce the gap between national requirement and national production, because cowpea is susceptible to a wide range of insect pests that attack at all stages of growth. Among these pests, those that damage the developing seeds are likely to be of economic importance as cowpea is mainly grown for grains.

Achievements

- Thirty four breeding lines were produced for yield evaluation through Hybridization and selection Programme.

Black Gram

Blackgram is the one of cash crop grown in dry zone of Sri Lank since it has become an important row material for food processing industry. The current extent of cultivation occupies about 8 669 ha with an average yield of 0.67 t/ha. Production of blackgram in the year 2011 was 5 782 t and about 7 084 t Was imported to fulfill the national requirement.

Development of high yielding and both early and late maturing blackgram varieties with resistance to major pest and diseases, and improvement of nutritive and processing qualities are some of the alternatives to increase the productivity.

Achievements

- Nine F1 populations which were crossed in Maha 2011/12 with the objectives of High yielding (>2.5 t/ha), pest and disease resistance (storage pest & yellow mosaic

virus), short and long duration (less than 90 days or more than 100 days) were established in the field to produce F_2 generations.

Oil Seeded Crops

Soy Bean

In Sri Lanka, soy bean is mainly used for poultry feed and human food manufacturing as cheap source of protein, Poultry feed industry is mainly depend on the imported soybean cake. At present the demand for local soybean production is very high due to some restriction on importations. However, local production is inadequate to fulfill this requirement. In 2011, extent of cultivation is about 2 451 ha with the average yield of 1.57 t/ha. Whereas, the production is about 3 847 t one of the reasons for low production in lack of high yielding varieties. Variety Pb 1 is the mostly cultivated variety among the Sri Lankan farmers. Therefore, development of high yielding soybean variety is one of the main solutions for increase the production.

Achievements

- MISB 1 a high yielding (>5 t/ha) large cream seeded (12 - 13 g/100 seeds) variety which matured about 90 days was conditionally released. This variety is tolerance to bacterial pustule disease and tolerance to shattering.
- Nine AVRDC grain soybean germplasm were evaluated for identifying better parents for hybridization and selection of a high yielding (>4 t/ha) large cream seeded promising line for future recommendation for farmer's cultivation.

Dry Zone Vegetables

Okra

Okra has become a popular vegetable crop among farmers in the dry zone, since it can be cultivated in both seasons and generate an early income. It is important to produce a high yielding pest and disease tolerant hybrid okra variety to increase the okra productivity in the island. Okra is one of the important vegetable crops among the agro-well farmers in Anuradhapura district, who cultivate okra as an early income source and also to get at harvest at every other day.

Achievements

- Two okra lines, OKS 1 and OKS 3 selected as best lines based on low virus attack at initial stage and good pod characters in research level and these were sent to Varietal Adaptability Trials for farmer field evaluation.
- Three okra lines were selected based on good pod characters, branching ability and low water requirement as a parental lines out of 25 accessions and lines, which are used for future breeding programme.

Fruits

Grapes

- Four varieties of grapes (Isreal Blue, Muscat MI, French MI and Khandara were trained on live wild plants (Gleridiceria, Ipil-Iplil, Gansooriya, and kilavei) to identify suitable wild plants used for grape vine training. Growth rate is high in Ipil-Ipil and lowers in kilavei.

Wood Apple

- Eight wood apple accessions collected from dry zone of Sri Lanka were evaluated to identify high yielding accessions with good quality fruits. Accession collected form FMRC performed better than the others tested. Average number of fruits per tree was 474 and fruit ranging from 200 - 380 g/fruit.

AGRONOMY

- Integrated effect of mulching, deep ploughing and organic matter application was tested for chilli. All above soil amendments showed significant positive impact on growth and yield of chilli during *maha*. The trial will be continued for three more seasons to verify and confirm the results.
- Four NCRVTs were conducted for rice varieties belongs to three different age classes viz. 3, 3 ½ and 4 - 4 ½ months to explore their regional adaptability. Collected data were sent to RRDI, Bathalagoda for final analysis.
- An alternative nursery technique was tested for chilli and finger millet using parachute trays, medium size nursery trays (128 holes/ tray) and large nursery trays (72 holes/ tray). These were compared with the normal ground nursery. There was no significant difference between the medium size tray plants and large tray plants at the time of transplanting of their total biomasses. By using the nursery trays transplanting shock was minimized in chilli and finger millet compared to the normal nursery. To develop more economical alternative nursery technique this trail will be carried out further to minimize the nursery raising time and find the most suitable tray type for the above two crops.
- Changing of average weather conditions or average distribution of weather is severe in today context. Changing of mean atmospheric temperature, variability and unpredictability in rainfall pattern will create biotic and abiotic stresses. Detrimental effect of biotic and abiotic stresses cause lowering of food productivity. With the changes in the climate temperature increases and availability of water becomes lesser. That could influence the plant photosynthesis. Therefore ten inbred maize lines were screened under water stressed conditions and normal irrigated conditions based on their leaf photosynthesis, chlorophyll content, transpiration rate, leaf area index, shoot to root dry weight, gap between 50 % tasselling and 50 % silking harvesting index and grain yield. Even under stressed conditions P 31-7-1, NO 20x, No 11 Yellow and P 36-4 performed well and these inbred lines can be used for future breeding purposes. This study will be repeated in Yala 2012 as well.
- Flowering synchronization of maize studied for parental lines of Sampath. Male line of Sampath hybrid is CML 348 and Female line is CML 20. Purpose of studying the flowering synchronization is to overlap taselling of male line with the silking of female line. This overlapping can be calculated by calculating the growing degree days. It was found that for Maha season female line should be planted seven days after planting the male line for overlap the tasselling and silking. This should be further studied to understand the seed set

percentage by changing the gap between two inbred lines

CROP PROTECTION

Pathology

- It is important to identify disease resistance and new diseases of imported onion seeds before going for commercial level. This study was carried out during Yala 2012 with the objective of finding resistant exotic big onion varieties for major diseases. Seventeen exotic big onion varieties were tested with local Dambulla Selection. Prevailing weather condition was not suitable for disease development during the season. However, some varieties were affected with fungal bulb rot and anthracnose. None of the varieties were affected with purple blotch. Variety MI BO 10-1 was highly susceptible for anthracnose and two varieties namely, W 241 Galutan and DR 1 were susceptible for anthracnose. None of the varieties were susceptible for fungal bulb rot. This experiment will be repeated in Maha 2012-13 to confirm the results.
- Most chilli growers use high amounts of Nitrogen fertilizer to reduce yield loss due to diseases. But adequate crop nutrition makes plants more tolerant or resistant to disease. Therefore, this study was conducted to identify the effect of different N levels on major diseases of chilli. Five different urea levels were applied with recommended dose of Triple Super Phosphate and Murate of Potash. Different N levels, 100 kg of N/ha, 150 kg of N/ha, 200 kg of N/ha, 250 kg of N/ha & 300 kg of N/ha were used. According to the experiment, with the increment of N level, disease incidences become high. This experiment will be carried out in Maha 2012-13 to confirm the result.
- Use of chemicals is often impractical and crop resistance is the most economical way of controlling the diseases of Mung Bean (MB) and Black Gram (BG) cultivation. Therefore, the research was conducted to find out the resistant/susceptible lines for major diseases of MB and BG. Most of the varieties (including spreader variety) were severely infected by leaf crinkle virus disease at one month after planting and the plants which may be infected by other diseases at the later stage of the crop could not be identified. From MB lines, 6 were highly susceptible and 14 were susceptible and from BG lines, 2 were highly susceptible and 11 were susceptible for Leaf crinkle virus. Experiment will be repeated.

Entomology

- Farmers use high amount of nitrogen fertilizer to chilli crop to increase the yield. However, with the use of high nitrogen fertilizer to increase the yield, it could increase the pest population and aggravate the leaf curl problem in chilli. Therefore, an experiment was conducted to study the relationship between different levels/ sources of nitrogen fertilizer and leaf curl damage. The severity of leaf curl damage was low in calcium nitrate applied plots compared to other treatments. The experiment will be repeated.
- Pilot scale testing of insecticides against chilli leaf curl complex was conducted. Two

insecticides (Imidacloprid 70 % WG and Abamectin 3.6EW) can be recommended for effective management of leaf curl complex in chilli.

- Thrips are the most important pest of onion and several other crops. An experiment was conducted to find out the alternate insecticides having different mode of action to control thrips. Seven insecticides were tested and there was no significant difference among treatments. Experiment will be repeated during Yala 2013.
- Twenty onion lines were evaluated for pest damages. All the lines were damaged by thrips.

  Onion caterpillar damage was very low in all the tested lines.
- Use of seed treatment is one of the most efficient ways to protect crops from pest and diseases. Therefore, an experiment was conducted to find out the effectiveness of two insecticide seed treatments to reduce the damages of soil pests, aphids and first generation of stem borer in maize. Both seed treatments (Thiamethoxam 70 % WS and Imidacloprid 70 % WS) were effective in controlling pest damages at early stage of the crop.
- Insect pests cause tremendous losses in quality and yield of grain legumes. Significant control in pest damages has not found with the use of currently available insecticides. Therefore, thirty six mung bean germplasm/ lines and twenty eight black gram varieties were evaluated for pest resistance. Eighteen mung bean lines and 10 black gram lines were moderately resistant to pest damages. The experiments will be repeated to confirm results.

Weed Management

Since the recommended herbicides on field crops is very less and also due to the very high labour cost, weeding is becoming a foremost problem in field crops sector. To overcome this difficulty, new herbicides are evaluating continuously under the research programme of the institute. In 2012,under mentioned research were completed and the results were included as well.

- Weed control efficacy of Quizalop-p-ethyl 50 g/l EC on chilli and groundnut was investigated. Three rates were tested as 1.0, 1.5 and 2.0 l/ha on chilli and groundnut. The new herbicide was successful in controlling grasses only. The test report was submitted to the Plant Protection Unit for pilot scale testing.
- An experiment was conducted to test weed control efficacy of Halosulfuron-methyl 75 WG on maize. Three rates of the new herbicide were tested as 60, 80 and 100 g/ha on maize. It was found that the herbicide was able to control only sedges. The test report was submitted to the Plant Protection Unit for pilot scale testing.
- Weed control efficacy of Imazethapyr on legumes was investigated. Three rats were tested as 600, 700, 800 ml/ha on mung bean as pre emergence and post emergence applications. Promising results were given in pre emergence application and further evaluation will be conducted. The test report was submitted to the Plant Protection Unit for pilot scale testing.

- A trial was conducted to identify the suitable application rates and formulations of Nicosulfuron for the control of weeds on maize. Three formulations (Nicosulfuron 25% SL 150 ml/ha, Nicosulfuron 4 % SC 1000 ml/ha and Nicosulfuron 75 % WDG 40 g/ha) and three rates from each formulation were tested. It was observed that all the three formulations were successful in controlling weeds on maize. Further evaluations will be conducted.
- Weed control efficacy of Oxyfluorfen 480 g/l SC on onion was studied. It was observed that new formulation showed much better control of weeds on onion than existing recommended formulation of oxyfluorfen 240 g/l EC. Further evaluations will be conducted.

SOIL FERTILITY

- Gliricidia leaves are good source of nitrogen. Integrated use of gliricidia leaves with chemical fertilizer was tested to reduce chemical nitrogen fertilizer requirement of chilli crop. Results show that the incorporation of six tones of gliricidia leaves in to one hectare of land could be cut down 25 % of chemical nitrogen fertilizer requirement of the chilli crop. Half of this amount could be applied one week before planting and rest of the amount 4 weeks after planting.
- A series of repeated field experiments were planned to be conducted at the same site to confirm the previously found promising results of pot experiments on suitability of locally produced Eppawala Single Super Phosphate (ESSP) as a substitute for Triple Super Phosphate (TSP) for maize. The experiments conducted in Maha 2011-12 and in Yala 2012 did not show any significant treatment effect on the growth and yield performance of maize. The experiment will be repeated in forthcoming seasons to verify and confirm the results and to give a recommendation.

WATER MANAGEMENT

- Micro irrigation system packages have been identified as important components to increase water use efficiency/ water productivity in present agricultural practices. Fertigation is an advanced technique, which is used to supply the required plant nutrients in soluble form to the plant root zone through micro irrigation systems, especially through drip or trickle irrigation systems.

  However, Department of Agriculture does not have a proven fertigation recommendation for chilli based on properly conducted research findings. Hence, a study was initiated to give a fertigation recommendation for chilli in RBE soil. The study conducted in Yala 2012 revealed that the application of DOA recommended fertilizer in fertigation and manual basis give equal growth and green chilli yield performances. The study will be repeated in Yala 2013 with some modifications in the splitting days of fertigation.
- An experiment was conducted to study the effect of irrigation interval on growth and yield of chilli in well drained drainage class in RBE soil using the climatological method to determine the irrigation water requirement. Six (6) days irrigation interval found to be the

best irrigation interval among the tested 3 days, 6 days, 9 days and 12 days irrigation intervals for growth and yield performances, and irrigation water use efficiency of green chilli in well drained drainage class of RBE soil. Further, the results emphasized the applicability of previously given 7 days irrigation interval general recommendation for chilli.

FOOD TECHNOLOGY

- Three soybean varieties/ lines (Pb 1, 10 966 and PM 13) were tested for crude protein contents and crude fat contents. There was no significant difference in both crude fat and crude protein contents. Results revealed that, Pb 1 showed higher protein content (38.33%) than PM 13 and 10 966. Line 10 966 showed higher crude fat content (18 %) than PM 13 and Pb 1 varieties.
- Twenty six Mango varieties were evaluated for both physical qualities (Length, Weight, Circumference, and Thickness etc) and chemical qualities (Brix, PH, Titratable Acidity and Colour of Flesh etc). Result revealed that variety "Zill" showed higher Titratable Acidity than other varieties (fruit processing) and variety "Anwar Ratul" showed higher Brix value (freshly consumed) than other varieties.

BIO TECHNOLOGY

Increasing food production of the country necessarily demands regular improvement on the strategies that encompass optimal use of inputs. Innovative pest control measures and latest techniques adopted in genetic crop improvement. Most of these achievements have been made through conventional techniques. However, conventional breeding techniques are time consuming and production of new OFC can be expedited by employing latest biotechnological techniques. Further, disease diagnosis and related plant protection research could be accelerated through molecular biological techniques and incorporated tissue culture techniques.

Achievements

- Towards development of a QPM incorporated maize lines/variety using molecular markers;
- Incorporation of the Opeque -2- gene into non QPM lines desired to be converted
- Selfing of F1 population to segregate the lines
- Optimization of DNA extraction protocols were initiated.
- Studies were initiated to identify and confirm the resistance/ tolerance sources (lines/ varieties) for chill leaf curl virus using molecular techniques
- Mass production of the through seed/shoot tip cultures, under in-vitro conditions was just initiated after completion of the incubation room and physical and chemical requirements and optimization of culture initiation condition is in progress.

SEED PRODUCTION

Breeder and Certified/ Commercial Seed Production

Following quantities of breeder and certified/ commercial seeds were produced and supplied to SPMDC and other relevant organizations by FCRDI (Table 4.1.2).

Table 4.1.2: Quantities of breeder and certified/ commercial seeds produced during 2012

Crop	Variety	Breeder seed production (kg)		Certified/ commercial seed production (kg)
Maize	Parental lines of hybrid maize variety Sampath	Male	262.0	-
		Female	760.0	
	Ruwan		20.0	-
	Bhadra		16.0	-
Finger millet	Rawana		14.5	-
	Oshada		20.0	-
Chilli	MI Green		2.65	50.0
	Galkiriyagama Selection		2.4	23.5
	MI 2		2.6	34.5
	MI Waraniya		10.0	1.85
	MI Green		-	150.0
	MICH 3		3.15	10.7
Mung bean	Ari		43.5	80.0
	MI 5		51.0	39.0
	MI 6		58.0	87.0
Big onion	Dambulla Selection	Mother bulbs	280.0	790.0
		True seeds	3.34	8.5
Black gram	MI 1		50.5	-
	Anuradha		68.5	791.0
Soy bean	Pb 01		75.0	-
Cowpea	Dhawala		75.0	-
	MI 35		15.0	-
	Waruni		30.5	-
	Bombay		10.0	-
Okra	Haritha		-	-
	MI 7		9.75	-
Bitter gourd	MC 43		-	-
Drumstick	Dwarf variety		10.0	-
Tomato	KC1		0.68	-
Snake gourd	MI Short		3.6	-
Bushitao	BS1		26.5	-

DISSEMINATIONOF TECHNOLOGY

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

Details of programmes conducted during the year are given below.

- Over 110 training programmes on OFC production for farmers and for school, university and technical college students with a total number of participants over 2 620 were conducted.
- FCRDI scientists participated in various programmes as resource personnel,
  - Over 30 field demonstrations
  - Seven plant clinics
  - Two national exhibitions : 100^{th} Anniversary and 'Deyata Kirula'
  - Many field visits with extension staff
- Technical advices were provided for over 500 clients who visited the institute and over the telephone.
- About 1 500 of leaflets on technical information were distributed.
- Planting materials issued free for farmers and other institutes.
  - Grapes plants 05
  - Drumstick plants 700
  - Around 60 000 chilli plants (sufficient for 5 acres) of 'Galkiriyagama Selection' were distributed among farmers in Rajanganaya area for seed production
  - Seed material: 125 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)
- Two university students completed their in plant training at the institute. Five undergraduate students completed the final year research project at the institute.

TV/ Radio Programmes

- Four radio programmes and three TV programmes were broadcasted with the participation of FCRDI scientists during 2012.

Development projects

The following activities were completed under the project of 'Farm Development'.

- Basic steps in establishment of the 'Field Gene Bank' in 40 acres
- Establishment of pasture/ fodder lands in 2 acres
- Construction of 2 watcher huts
- Drilling of 2 tube wells
- Expansion of the existing sprinkler irrigation system up to 4 acres
- Purchasing of a combined seeder
- Purchasing of materials for the development of the livestock unit

Contributions to DOA Publications

- Gunewardena, K. N. C.- Contributed to publish the book on maize. Department of Agriculture, Peradeniya, Sri Lanka. 81pp.

- Kannangara, K. N. - Completed the new edition of the Chilli Hand Book
- Kannangara, K. N. - Updated the new version of the Chilli Compact Disc collaboration with Audio Visual Centre, DOA

Newspaper Articles

Seven news paper articles were published with the participation of FCRDI scientists during 2012.

PLAN FOR 2013

RESEARCH

Condiments

Chilli

Future direction:

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

Expected characters of the varieties:

- Targeted yield for green chilli - 18-20 t/ ha and for dry chilli - 3-4 t/ ha
- High pungency
- Resistant/ tolerant to major pests and diseases - Chilli leaf curl complex, anthracnose, cercospora leaf spot, viruses, NLD etc.
- Highly adaptable to all chilli growing ecosystems
- Green chili lines suitable for home garden cultivation

Programme:

- Production of new crosses for chilli hybrid varieties
- Preliminary evaluation of newly developed F1 hybrids National Coordinated Varietal Trial for promising chilli breeding lines
- Purity maintenance and seed multiplication of parental lines
- Production of inbred lines through generation advancement of exotic chilli hybrids
- Transferring of genetic male sterile character to the promising varieties and breeding line
- Production of new crosses (double and three way) for Open Pollinated Varieties
- Evaluation, selection and purification of local landraces and germplasm
- Transferring of virus tolerance (field tolerance) character from Waraniya cultivars to promising breeding lines
- National Coordinated Varietal Trial (NCVT) for promising Chilli breeding lines
- Varietal Adaptability Testing of promising lines
- Evaluation of exotic chilli hybrids
- Breeder seeds production of recommended chilli varieties

Onion:

Future direction:

- Development of big onion varieties

Expected characters of the varieties:

- Target yield (medium duration varieties -3 months)
  - Bulb yield - 35t/ ha
  - True seed yield - 800 kg/ ha
- Targeted yield (short age varieties-2 ½ months)
  - Bulb yield - 25t/ ha
  - True seed yield - 800 kg/ ha

- Long storability (losses < 25 % for 4 months period)
- High pungency
- Bulb size 70 - 90 g
- Bulb color - red/ rose (high priority), yellow/ white (low priority)
- Resistant/ tolerant to major pests and diseases - Anthracnose, purple blotch, thrips and onion caterpillar
- Suitable for off season cultivation

Programme:

- Evaluation and selection of bulb crop of improved big onion lines
- Evaluation and selection of seed crop of improved big onion lines
- Evaluation of big onion varieties for off - season cultivation
- Study the storability of selected big onion lines
- Improvement of new big onion lines suitable for true seed production under prevailing low temperature conditions in *maha* season.
- Generation advancement of big onion.
- Evaluation of improved cluster onion lines raised from seedlings
- Evaluation of seed crop of improved cluster onion lines
- Seeds and bulbs multiplication of promising lines and selected accessions
- Basic seed production of big onion variety Dambulla Selection

Grain Legumes

Mung bean

Future direction:

- Development of mung bean varieties for rainfed & irrigated conditions

Expected characters of the varieties:

- Targeted yield - 2.2 t/ ha
- Early maturity - < 60 days
- Uniform maturity
- Good seed characters
  - Low hard seeds
  - Large seed size - > 65g/ 1000 seeds
  - Shinny green appearance
- High tolerance to MYMV & pod borer

Programme:

- Evaluation and selection of mungbean germplasm.
- Hybridization and selection of mungbean.
- Preliminary yield trial of promising mungbean lines
- National Coordinated Varietal Trial for promising mungbean breeding lines under irrigated and rainfed conditions
- Varietal Adaptability Trials for promising mungbean lines

Black gram

Future direction:

- Development of black gram varieties for rain fed& irrigated conditions

Expected characters of the varieties:

- Targetedyield - 2.5 t/ ha
- Early maturity - < 60 days
- Longer maturity - > 90 days
- High tolerance to pests and diseases
- Large seed size
- Drought tolerant
- Preference for different industries

Programme:

- Evaluation and selection of blackgram germplasm
- Hybridization and selection of black gram

Cowpea

Future direction:

- Development of cowpea varieties for rainfed & irrigated conditions

Expected characters of the varieties:

- Targeted yield - 1.2 t/ ha (rainfed)
  - 3 t/ ha (irrigated)
- Early maturity - <70 days
- Longer maturity - >85 days
- High consumer acceptability
- Resistant/ tolerant to collar rot, pod borer

Programme:

- Hybridization and selection of cowpea
- National Coordinated Varietal Trial - Cowpea
- Evaluation of Cowpea promising lines under rainfed condition
- Chracterization of new promising breeding lines
- Varietal Adaptability Trial - Cowpea

Soy bean

Future direction:

- Development of soy bean varieties for rainfed & irrigated conditions

Expected characters of the varieties:

- Targeted yield - 3.0t/ ha (rainfed)
  - 4.0 t/ ha (irrigated)
- Early maturity - < 75 - 90 days
- Large seed size - >16g/ 100 seeds
- Determinate growth habit
- Longer seed viability - > 3 months
- Tolerant to shattering and lodging
- High consumer acceptability
- Resistant/ tolerant to purple stain disease

Programme:

- Hybridization and selection of soy bean
- Evaluation of soybean germplasm from AVRDC
- NCVT - Vegetable soy bean germplasm from AVRDC
- Maintenance of the existing soy bean germplasm

Oil Seeded Crops

Groundnut

- Seed multiplication of promising lines of ground nut
- Varietal Adaptability Trial - Medium duration promising ground nut lines
- Varietal Adaptability Trial for bud necrosis in ground nut

Mustard

- National Coordinated Variety Trial for Mustard

- Varietal Adaptability Testing for Mustard in farmer fields

Coarse Grains

Maize

Future direction:

- Development of maize hybrids, open pollinated varieties and maize inbred lines (parents) for rainfed & irrigated conditions

Expected characters of the varieties:

- Targeted yield - Hybrids - 7t/ ha
  OPVs - 6 t/ ha
- Medium age: 105 - 110 days to maturity
- Dual purpose - for green cobs and grains
- Seed color -yellow to orange
- Resistant/ tolerant to stem borer, southern rust, sheath blight and helminthusporium leaf spot
- Drought tolerant

Programme:

- Evaluation of selected promising Indonesian OPV in VAT
- Evaluation of elite maize hybrids CIMMYT from Mexico
- Evaluation of elite maize hybrids CIMMYT from India through Asian maize programme
- Evaluation of locally developed promising hybrids
- Evaluation of locally developed promising hybrids
- Development of inbred lines of maize from population 'Hybrid Mix' - Generation advancement
- Evaluation of exotic sweet corn and maize hybrids
- Seed production of promising hybrids and parent lines

Finger millet

Future direction:

- Development of finger millet varieties for rainfed & irrigated conditions

Expected characters of the varieties:

- Targeted yield - 4.0 t/ ha
- Medium age: 3 - 3½ months
- Suitable for both Yala and Maha seasons
- Resistant/ tolerant to blast disease

Programme:

- Evaluation of finger millet accessions in VAT under rainfed and irrigated conditions
- Evaluation new fingermillet accessesions in AYT
- Germplasm evaluation of fingermillet
- Evaluation of foxtail millet in PYT
- Evaluation of sorghum accession in PYT
- Maintenance of recommended finger millet variety (Ravi)
- Multification of sorghum variety ICSV 112

Other Dry Zone Coarse Grains

- Maintenance of promising 'meneri' germplasm
- Maintenance of promising foxtail millet germplasm
- National Coordinated Varietal Trial

Vegetables

Future direction:

- Development of vegetable varieties for rainfed & irrigated conditions

Okra

Expected characters of the varieties:

- Target yield - 15 - 20 t/ ha
- Resistant/ tolerant to yellow mosaic virus
- High consumer acceptability

Programme:

- Varietal improvement of okra (Hybridization)
- Evaluation of exotic germplasm of okra
- Hybridization of evaluated of okra germplasm
- Varietal Adaptability Trials for promising okra lines

Mae/ Vegetable cowpea

Expected characters of the varieties:

- Target yield - 15 t/ ha
- Resistant/tolerant to collar rot disease
- Short age varieties - < 45 days
- High consumer acceptability

Programme:

- Evaluation of vegetable cowpea germplasm
- Hybridization & selection of vegetable cowpea
- Evaluation of mae germplasm (long bean)
- National Coordinated Varietal Trial for Mae (long bean)
- National Coordinated Varietal Trial for brinjal

Fruits

Objectives of the programme:

- Identification of high yielding varieties
- Development of agronomic practices to increase productivity
- Studies on training structures, pruning intervals, impact of flowering hormones etc.
- Establishment of the 'field gene bank'
- Maintenance of germplasm/ mother plants

Programme:

- Maintenance of grapes & Mango varieties.
- Evaluation of wood apple germplasm
- Evaluation of soft seeded guava varieties
- Maintenance of mother plants of three grapes varieties
- Evaluation of exotic melon varieties
- Application of giberalic acid on grapes for quality improvement.
- Evaluation of grape vine training systems
- Study on the long term feasibility of Dragon fruit in the DL1
- Maintenance of mother lines for seed production of drumstick
- Establishment of field gene bank for fruit crops (in 30 ac)
- Evaluation of Papaya hybrids

Entomology

Future direction:

- Development of economically viable, environmentally sound and effective pest management strategies to reduce crop losses due to pests of field crops

Objectives of the programme:

- Identification of pests problems in field crops
- Identification of resistant / tolerant germplasm, varieties and exotic hybrids for major pests
- Identification of donor sources for pest resistance
- Screening of insecticides to control major pest problems
- Development of cultural pest control techniques
- Development of integrated pest management packages

Programme:

- Effect of different nitrogen fertilizer levels/sources on leaf curl complex and yield of chilli
- Seasonal abundance of major pests of chilli
- Effect of different mulches to reduce leaf curl complex in chilli
- Testing of insecticides to control thrips in onion
- Effect of seed treatments to control pests in onion at nursery stage
- Evaluation of breeding lines and exotic varieties for resistance to major pests in onion
- Evaluation of exotic maize hybrids for pest damages
- Evaluation of germplasm/varieties for resistance to major pests in mungbean
- Evaluation of germplasm/varieties for resistance to major pests in blackgram
- Evaluation of germplasm/varieties for resistance to major pests in soybean

Pathology

Future direction:

- Development of economically viable, environmentally sound and effective disease management strategies to reduce crop losses due to diseases of field crops

Objectives of the programme:

- Identification of diseases in field crops
- Identification of resistant/ tolerant germplasm, varieties and exotic hybrids for major diseases
- Identification of donor sources for disease resistance
- Screening of fungicides to control major diseases
- Development of cultural pest control techniques
- Development of integrated disease management packages

Programme:

- Effect of different N levels on major diseases of chilli
- Effect of different N fertilizer on major diseases of chilli
- Fungicide screening for choanephora blight of chilli
- Fungicide screening for Anthracnose & Purple Blotch of onion
- Evaluation of exotic onion varieties for major diseases
- Evaluation of big onion breeding lines for major diseases during off season
- Evaluation of okra varieties /lines for major diseases

- Evaluation of kochchi accessions for major diseases
- Development of variety screening technique for sheath blight of maize
- Germplasm evaluation of mung bean for major diseases
- Germplasm evaluation of black gram for major diseases
- Screening of cowpea promising lines for major diseases
- Screening of soybean lines for major diseases
- Screening of fungicides for Downy Mildew of Grapes
- Development of variety screening technique for Mung Bean Yellow Mosaic Virus (MYMV)
- Development of variety screening technique for viral diseases of black gram

Agronomy

Future direction:

- Development of crop management practices and cropping patterns for dry zone farming systems

Objectives of the programme:

- Improvement of big onion seed production technologies
- Agronomic strategies to narrow down the yield gap in big onion/ chilli
- Agronomic strategies to narrow down the yield gap in legumes
- Development of novel nursery management techniques for chilli, big onion and finger millet
- Physiological studies/ identifying lines for abiotic stresses (drought and temperature)
- Physiological studies on nitrogen fixing ability of different lines of legumes
- Validation of crop models for rice-based cropping systems with special emphasis on water economy and changing climatic scenarios
- Screening of new OFC lines under NCVT and VAT
- Screening of rice lines under irrigated lowland conditions - NCRVT / VAT
- Studying the impact of canopy temperature on spikelet sterility

Programme:

- Testing of an integrated soil management approach to enhance the growth and yield of chilli.
- Preliminary feasibility studies for mother bulbs production during off season and subsequent for seed production
- Demand driven Nitrogen management for chilli
- Screening of OFCs for high temperature tolerance
- Study the nodulation pattern on legumes understress and non stress condition
- Performance of mung bean (*Vigna radiata* (L.) Wilczek) genotypes as affected by irrigation regimes during the Yala season in the low country dry zone of Sri Lanka
- Effect of application of KNO3 on growth and yield of Onion (*Allium cepa*) seed production
- Impact of bulb size and spacing on seed yield of KNO3 treated onion
- Effects of foliar application of methanol on growth and yield of Mungbean (*Vigna*

radiata) and chilli (*Capsicumm annum*), under irrigated and non irrigated condition

- Screening of maize lines for stressed environment based on the leaf photosynthesis
- Evaluation of different crop rotations for "APSIM Oryza" model validation
- Identification of performance of maize,chilli and mungbean based on climatic change
- Study the flowering synchronization pattern of maize.
- Study the impact of canopy temperature on grain sterility of rice
- Screening of rice varieties for the high temperature stress at flowering stage
- Screening of rice varieties for aerobic soil condition for the Dry Zone
- Seed production of promising rice varieties
- Performance of exotic OPV maize varieties under different management levels
- Identification of an alternative nursery management techniques for chilli , finger millet and onion
- Varietal Adaptability Trial for Different OFC's
- Methane emission of rice under different management conditions
- Screening of aerobic rice lines under different weed management conditions

Weed Management

Future direction:

- Development of economically viable, environmentally sound and effective weed management strategies to reduce crop losses due to weeds in OFCs

Objectives of the Programme:

- Studying the weed competitiveness of different varieties of OFCs
- Screening of weedicides to control major weeds in OFCs

Programme:

- Weed control efficacy of Nicosulfuron on maize
- Weed control efficacy of Oxyfluaefen 480 g/ l (a.e.) on onion
- Evaluation of herbicides for post emergence weed control on onion

Soil Fertility, Fertilizers and Environment

Future direction:

- Development of nutrient management strategies for achieving stable production status in rainfed and irrigated conditions

Objectives of the programme

- Increase fertilizer use efficiency
  - Demand driven N management systems for maize, finger millet and chilli
  - Suitable In-situ green manure crops for IPNS of Maize
- Studies on methane emission from rice paddies

Programme:

- Comparative effect of pilled urea and granular urea on growth and yield of chilli
- Determination of N requirement of maize by leaf colour chart

- Effect of foliar application of Cu, Zn and Mn on growth and yield of chilli
- Testing of bio products for rice
- Effect of Zn as micro nutrient on growth and yield of maize
- A study on the response of maize in relation to application of HERP and ESSP

Water Management

Future direction:

- Development of appropriate water management strategies for efficient utilization of available land and water to obtain optimum returns

Objectives of the programme:

- Water management studies on
    - Rainfed agriculture
        - Rain water harvesting and soil/ water conservation
    - Irrigated agriculture
        - Ground water harvesting
        - Development of efficient water management packages for surface and micro irrigation
- Management of problem soils (salinity, soil compaction)

Programme:

- Irrigation water requirement of hybrid maize (Sampath) in RBE soil
- A study on fertigation recommendation for chilli under drip irrigation
- A study on application of sprinkler irrigation systems for onion
- Development of multi-functional soil conservation bund system for rainfed uplands in dry zone

Food Technology

Future direction:

- Quality evaluation of OFC varieties and development of post harvest and value addition technologies

Objectives of the programme:

- Analyzing chemical, physical and sensory properties and food processing qualities of breeding lines
- Development of proper post harvest handling packages
- Development of new value added food products from OFCs
- Introducing low cost storage methods

Programme:

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

Bio Technology

- Development of a QPM incorporated maize line/ variety using molecular markers
- Identification and confirmation of a Bruchid resistance Mung bean (*Vigna radiata*) line/ variety using Molecular Markers
- Identification of resistance/tolerant sources for chilli leaf curl viruses
- Development of transgenic resistance for chilli leaf curl virus
- Development of Embryo rescue technique for chilli wide hybridization
- Development of grape lines/ varieties through seed / shoot tip cultures
- Development of new big onion lines/ varieties through chemical mutagenesis

Breeder Seed Production

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

Dissemination of Technology

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

STAFF LIST

Designation	**No.**
Research Officer	29
Agriculture Economist	01
Programme Assistant (Agriculture)	04
Research Assistant	26
Agricultural Instructor	04
Research Sub Assistant	09
Public Management Assistants' Service	15
Office Assistant (KKS)	02
Driver	05
Budder	01
Storeman	02
Circuit Bungalow Keeper	01
Tractor Operator	04
Watcher	08
Labourer (Permanent)	129
Labourer (Contract)	138
Total	**378**

1.1.1 GRAIN LEGUMES AND OIL CROPS RESEARCH AND DEVELOPMENT CENTRE (GLORDC) - ANGUNAKOLAPELESSA

Grain Legumes and Oil Crops Research and Development Centreis the main agricultural research centre located in Southern dry zone.It mainly focus on the research and development programme of grain legumes, oil seed crops and regionally important vegetable and fruit crops, and transfer technology to enhance agricultural productivity in the country along with its satellite station at Weerawila in Hambantota district. All the research programs are planned based on both national and regional research needs in the thematic areas of crop improvement, agronomy, plant protection and soil and water management.

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

BUDGET

Table 1.1.1.1: Annual budget – 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	6,866,527	6,621,588	96
Recurrent	16,817,600	13,175,871	78
Projects (NARP)			
Development of medium duration , high yielding large seeded groundnut varieties	363,000	335,616	93
Adaptability testing of selected mustard lines	647,000	632,148	98
Development of high yielding stem and root rot disease tolerant , white seeded sesame varieties	435,000	410,570	94
Improvement of drought tolerant cowpea varieties	604,600	554,930	92
Development of high yielding, short age mungbean variety suitable for catch cropping under paddy fields	367,700	353,650	98
Development of efficient water management packages for cowpea and mungbean	950,000	902,156	95

Vote	Allocation	Expenditure	Expenditure %
Identification of virus diseases in cowpea cultivation and develop a control package	431,200	423,647	98
Identification of an effective management package for controlling mosaic virus emergence in mungbean	493,250	491,553	100
Present status of sulphur in soils of groundnut growing areas of southern and uva provinces	600,000	410,570	94
Evaluation of the yield effect of planting method – Finger millet	150,000	148,300	100
Study of the effect of weeds on yield of groundnut and determination of the critical crop – weed competitive period for groundnut	220,400	218,128	99
Germplasm collection, conservation and evaluation of grapes to develop seedless grape varieties	1,031,500	1,019,417	99
Pumpkin development programme	350,000	348,200	100
Pumpkin seed development programme	240,000	236,300	98
Development of vegetable cowpea	75,000	74,344	100
Breeders seed production of papaya variety Rathna	300,000	286,345	97
Collection, establishment and evaluation of banana germplasms from available zones in Sri Lanka.	130,000	125,755	98
Mutagenesis of banana for *Fusarium* wilts disease resistance / tolerance	2,165,000	2,089,345	97
Farm Development			
Construction works of cold room and drying floor, land development (15 ha), land leveling (8 ha), seed production, fencing and micro irrigation system 5 ha.	9,700,000	6,307,262	65
Farm development at ARS Weerawila	1,000,000	993,200	100
Seed production village program groundnut	5,000,000	4,173,494	83
Seed production maize hybrid 'Sampath'	260,000	243,560	94
Total	**49,197,777**	**44,653,903**	**91**

PROGRESS

RESEARCH

Agronomy

- A trial to ascertain the recommendation of planting density for new varieties of cowpea has been successfully completed.
- A trial to find out effect of *in-situ* rain water harvesting on sustainability of rain fed cowpea has been conducted.
- A survey to identify the nature of the rain fed agriculture system in southern dry

zone (DL_{1b},DL_5) has been successfully completed.

- A trial for find out Combine effect of photoperiodism and temperature on growth and yield has been conducted.

National Coordinated Variety Testing (NCVT)

Cowpea – Eleven entries were evaluated in two trials with standard varieties of MICP1, Waruni, Dhawala, MI35 and Bombay.

Horse gram- Five entries were evaluated.

Mungbean - Tenentries were evaluatedwith standard varieties of MI5 and MI6.

Soybean- Fiveentries were evaluatedwith standard checks of PB35

Plant breeding (Cropimprovement)

Oil Crops

Groundnut

- Three month aged variety, with red coloured testa, moderately resistant to bud necrosis disease, wilt and rust disease was released under the name of ANKG1for general cultivation in the country.
- Conducted Variety Adaptability Trial (VAT) for selected two lines of bud necrosis disease tolerant, in six locations in farmer fields.
- Conducted Variety Adaptability Testing trial (VAT) with selectedfive lines of medium duration groundnut varieties in 5 locations.
- Seven large seeded groundnut lines and tenmedium duration groundnut lines were evaluated in Preliminary Yield Trial (PYT).

Following breeders seeds of groundnut were produced.

Variety	Quantity (kg)
Tikiri	115.7
Indi	186.3
Tissa	272.6

Sesame

- Selected sixblack seeded sesame lines were evaluated in preliminary yield trials (PYT)
- Selected sixwhite seeded sesame lines were evaluated in preliminary yield trials (PYT)
- Following quantities of breeders'seeds of sesame were produced.

Variety	Quantity (kg)
Malee	5
Uma	3

Mustard

- Varietal Adaptability Trials (VAT) with selected five lines of mustard in 6 locations were conducted

Grain legumes

Mung bean

- Sixteen F1 generations were advanced to F2 generation

- Five simultaneous maturing mungbean lines were evaluated in Preliminary Yield Trials (PYT)
- Five selected mungbean lineswere evaluated in Major Yield Trial(MYT)
- Seed multiplication of released varieties and promising lines were continued.

Cowpea

- Threebetter performing lines were identified from thirty five lines tested under germplasm evaluation of cowpea in research field for yield and other agronomic traits
- Ten medium duration cowpea lines were evaluated in Major Yield Trials (MYT)
- Fifteen better performing medium duration cowpea lines were evaluated in Preliminary Yield Trial (PYT)
- F3 generation of 9 crosses were evaluated for development of high yielding short/medium duration (60-75 days) cowpea lines with better plant structure

Horse gram

- Five horse gram lines were evaluated inNCVT.

Vegetables

Spine gourd (Thumba)

- Establishment and maintenance of femaleparent stocks were carried out for each recommended Thumba variety.
- Maintenance and conservation were carried out for eighty twoThumbagermplasms
- Thousand five hundredplants were produced from recommended Thumba varieties.

Okra

- Seventy twoF1 progenies were evaluated to develop okra hybrids.

Pumpkin

- Twenty germplasms were characterized in hybrid pumpkin varietal development programme

Vegetable cowpea

- Five lines with two standard varieties (Polon mae and Hawari mae) were evaluated in National Coordinated Variety Testing (NCVT) Trial.

Brinjal

- Three lines were evaluated with standard varieties (BW11 and Amanda) in National Coordinated Variety Testing (NCVT) trial

Improvement of fruit crops

Wood apple and Beli

- Collection, establishment and evaluation of wood apple and belli germplasm were initiated. Six accessions of wood apple were collected and 2000 wood apple root stocks were produced. Five hundred root

stock of Beli were produced during the year.

- About 5ha of land was cleared for the establishment of Wood apple and Beli field gene bank

Banana

- Twenty three accessions from different banana types were collected and multiplication was continued
- Isolated banana mother plant orchard with 250 'Agra' Kolikuttu and 54 "Nadee" Ambul plants were established and maintained for quality mother plants production to cater for island wide tissue culture plant propagation (NARP Project).

Papaw

- One hundred and eighty papaya plants from variety 'Rathna' were established and maintained for breeder seed production.
- Trials were conducted trials to develop papaya ring-spot virus resistant papaya variety/s with good yield characteristics. Seeds were collected from generation 2 in order to establish generation 3 for field evaluation

Mango

- Hard and soft pruning were done in 300 plants in Mahaweli farms at Kachchigalara, Kattakadua, Mahakannda and Mahagama. Data collection related to rejuvenation and rehabilitation is continued.

Citrus

Sweet Orange

- Fifteen lines were evaluated under NCVT-Citrus

Grapes

- Collected 3 seedless grapes accessions and established the field experiment for evaluation

Tissue culture and biotechnology

- Experiments were carried out for *In-vitro* mutagenesis of banana for *Fusarium* wilt disease resistance / tolerance. Shoot tip culture initiation and multiplication of shoots were completed
- Experiments were carried out for Micro-propagation of Spine-gourd (*Momordica dioica*) through tissue culture. Shoot tips culture initiation and establishment were completed.

Soil science

- A soil survey was conducted to find out present soil micro nutrient status in Southern Dry Zone. Hundred samples collected from Galle, Matara, Hambantota and Monaragala districts were analyzed for S, Zn and Fe, and analysis for other micro nutrients will be continued.
- A trial was conducted to develop a Sulphur recommendation for ground nut, and it responded when applying sulphur at 5-10ppm.

- It was found that there was acombine effect of Nitrogen & Zinc on yield of hybrid maize (var. Sampath).

Water management

- Observational trail was completed to determinethecrop co-efficient and crop water requirements of Mung bean in Dl1b and DL5agro ecological regions of Sri Lanka.
- Development of soil salinity map to the Angunakolapelessa farm field was initiated and a temporal map is prepared.
- Trial was conducted to study the improvement of water holding capacity by applying different soil amendments and the trial is continued.
- A trial was initiated to determine the optimum basin size for different surface irrigation layouts for different dry zone soils in Sri Lanka (NARP project).

Food Science

- Methodologies were successfully tested to extract Embul banana nectar
- Evaluation of nutritional status was carried out for the recommended Mung bean varieties and promising lines.

Pathology

- Trials were conducted to identify the best method for control *Sclerotium rolfsii* using *Trichoderma harsiana.* Seed and soil treatment before planting were effective. (NARP project)
- Trials were conducted to study the plants parts efficacy to control the *Sclerotium rolfsii* in groundnut and it was found that the lowest disease incidences were recorded in the treatment of *Mikania cordata* leaves incorporated to soil before planting

Entomology

- Trials were conducted to manage mungbean yellow mosaic virus disease, and it was found that the package consisting seed treated with Thiomethoxam along with sprays of Thiomethoxam followed by Buprefezin in ten day intervals and establishment of yellow sticky traps along with fingermillet intercrop were highly effective.
- Trials were initiated to identify major pests associated with mustard cultivation and their level of damage caused.
- Six sesame lines tolerant for stem and root rot disease were identified through screening

Weed science

- The Critical crop – weed competitive period for groundnut lies between 3 to 8 weeks after planting

TECHNOLOGY TRANSFER AND TRAINING

- A mega field day was conducted on 28thof January2012
- Radio programmes were conducted on

a. Safe handling of pesticides, Pest and disease control in chilli cultivation
b. Important and future direction of oil crops.
c. Sesame and ground nut cultivation in the country

- Training on
  a. Statistical analysis for technical staff
  b. Oil crops and grain legumes cultivation for agriculture teachers
  c. Other field crops for technical officers of southern province
  d. Sesame and groundnut cultivation for farmers in Hambantota, Jaffna, Mulathiew and Vaunia.

Services provided

- Analysis of soil test based fertilizer recommendation- 350 samples analyzed. In addition, following services were also provided.
  a. Farmer advisory service
  b. Crop clinics
  d. Seeds and Planting material production

Seed Production

Table 1.1.1.2: Seed production in the year 2012

Crop	Seed purpose (kg)	Consumption (kg)
Groundnut	4,431	-
Sesame	1,849	787
Cowpea	7,71.5	-
Black gram	215	-
Mung bean	95	-
Paddy	34,553	16,594
FingerMillet	-	51

PLAN FOR 2013

Plant Breeding – Oil Seed crops

Groundnut

- Hybridization and selection of Ground nut varieties
- Preliminary Yield Trials of
  - Large seeded ground nut varieties
  - Medium duration ground nut varieties
- Varietal Adaptability Testing of
  - Ground nut bud necrosis disease tolerant varieties
  - Medium duration ground nut varieties
  - Red testa groundnut variety.
- Breeder seed production of groundnut (Walawa, Indi, Tikiri and Tissa varieties)
- Seed multiplication of 04 promising groundnut accessions.

Sesame

- Germplsm evaluation
- Hybridization and selection of sesame varieties
- Preliminary Yield Trials of black seeded sesame
- Breederseed production of Sesame varieties (Malee & Uma)

Mustard

- Seed multiplication of selected mustard lines

Plant Breeding – Grain Legumes

Mung beans

- Hybridization and selection of mung bean varieties
- Preliminary Yield trials of selected simultaneous maturity mung bean lines.
- Major Yield trials of selected mung bean lines
- Multiplication of seeds (recommended varieties of Mung bean)
- National Coordinated Varietal Testing trials of selected mung bean lines
- Vareital Adaptability testing of selected mung bean lines

Cowpea

- Evaluation of cowpea germplasm for yield **a**nd pest ,disease tolerance
- Major Yield Trials of selected medium duration cowpea lines
- Preliminary Yield Trials of medium duration cowpea lines
- Development of high yielding short/medium (60-75 days) cowpea verity with better plant structure (Evaluation of F5 & F6 generations)
- Hybridization program for medium duration cowpea variety for rainfed *Maha* season
- Seed multiplication of National Coordinated Varietal Testing for nominated cowpea lines

Horsegram

- Germplasm evaluation of Horse gram
- Seed multiplication of NCVT nominated horse gram lines

Agronomy

- Conducting farmer field trials to confirm results of plant density for newly developed varieties of cowpea
- Evaluation of the effect of planting density on crop performances for mustard
- National Coordinated Varietal Testing trials - cowpea , mung bean, soybean and Kollu.
- Effect of *in-situ* rain water harvesting on sustainability of rain fed cowpea
- Analysis of survey data of the rain fed agriculture system in southern dry zone (DL1b, DL5).
- Finding out the optimum planting time for Sesame

Weed science

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

Soil Science

- Effect of Nitrogen and Zinc on growth and yield of hybrid maize (Var. Sampath)
- Effect of different sulphur sources on ground nut
- Testing of bio-fertilizer for N-fixing and P – solubilization
- N- response for newly released ground nut (var. ANKG1)

Water Management

- Determination of the optimum basin size for different surface irrigation layouts for different dry zone soils in Sri Lanka *(NARP Project))*
- Determination of crop co-efficientand Crop Water Requirement of mung bean DL1b and DL5Agro Ecological Regions of Sri Lanka
- Determination of crop co-efficient and crop water requirement of mung bean DL1b and DL5Agro Ecological Regions of Sri Lanka
- Development of soil salinity map to the Angunakolapelassa farm field

Biotechnology

- *In-vitro* mutagenesis of banana for *Fusarium* wilts disease resistance / tolerance
- Development of a suitable micro propagation technique for Spine-gourd (*Momordica dioica*)

Pathology

- Identification of the best method for control*Sclerotium rolfsii* with *Trichoderma harsiana*- Farmer field trial
- Study of the plants extract efficacy to control the *Sclerotium rolfsii* in groundnut- farmer field trial
- Line screening of sesame for stem and root rot disease

Entomology

- Identification of possible management package for controlling mosaic virus emergence in Mungbean
- Comparison of effect of different integrated techniques on suppression of mosaic virus incidences in mungbean
- Screening of mungbean germplasam for mosaic virus tolerance
- Identification of faunal diversity and
- development of an effective controlling package for major pests associated with mustard cultivation
- Identification of optimum heat or cold stress condition for controlling *Callosobruchus maculates* under storage conditions

Food science & technology

- Evaluation of nutritional status of the mungbean varieties grown in Sri Lanka
- Improvement of methodology to extract Embul banana nectar

Division of Vegetables

- Establishment and maintenance of female parent stocks of recommended Thumba varieties.
- Maintenance and conservation of Thumba germplasmlasm
- Production of planting material of the recommended Thumba varieties.
- Germplsm collection, evaluation and selection of pumpkin
- Hybrid okra varietal development programme

- Hybrid development program of Pumpkin
- National Coordinated Varietal Trial of pumpkin
- Varietal evaluation of big onion for off season cultivation in southern region.

Division of Fruits

- Collection, Establishment and Evaluation of wood apple, lime,pomegranate,banana,Guava, water melon.
- Breeder seeds production of papaya variety Rathna.
- Establishment of isolated banana garden for the production of disease free mother plants for the island wide tissue culture propagation programme
- Collection, establishment and evaluation of germplasm from available zones in Sri Lanka.
- Development of papaya ring-spot virus resistant papaya variety/s with good quality and quantity yield characteristics

Foreign Trainings

- Mrs. W.M.P.N. Dilusha (Research Officer) - Training on oil crops comprehensive technology for developing countries in China.
- Mr Gamini Abeywickrama (Research Officer) - Training on oil crops comprehensive technology for developing countries in China.

STAFF LIST

GLORDC, Angunakolapelessa

Designation	No.
Additional Director	01
Research Officer	14
Economist	01
Farm Manager	01
Research Assistant	16
Agriculture Instructor	07
Research sub Assistant	05
Administrative Officer	01
Management Assistant	05
Tractor Operator	02
Driver	05
Plumber	01
Watcher	14
Labourer (permanent)	45
Labourer (contract)	120
Total	**238**

ARS, Weerawila

Designation	No.
Research Officer In-Charge	01
Research Assistant	02
Farm clerk	01
Driver	01
Watcher	02
Labourer (permanent)	11
Labourer (contract)	06
Total	**24**

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

Regional Agricultural Research and Development Center, Aralaganwila has responsibilities to develop relevant technologies and putting them in to practice in the mandated regions of the Mahaweli Systems B, C, D & G, Eastern province and inter-provincial areas. Other than the regional programs, the center collaborates in the nationally coordinated research and development activities. Though, the center administratively responsible for research and development activities of Other Field Crops, it deals with rice as well as fruits and vegetables considerably. The research program is executed under different disciplines such as Agronomy, Entomology, Genetics and Plant Breeding, Plant Pathology, Horticulture and Soil & Water Management.

BUDGET

Table 1.1.2.1: Annual budget – 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	9,848,439	9,153,653	93
Capital	5,138,000	2,919,007	57
Projects			
Farm development program	7,500,000	4,370,000	58
Papaya breeder's seed program	300,000	281,000	94
Banana NARP	50,000	48,000	96
Water management NARP	1,140,000	1,071,919	94
Total	**23,976,439**	**17,843,579**	**74**

PROGRESS

RESEARCH

Agronomy

Rice

National Coordinated Rice varietal Trials (NCRVT) were conducted for all age classes (4-41/2 months, 31/2 months and 3 months)in collaboration with RRDI, ,Batalagoda.

Twenty two rice varieties/lines were screened under flooded and alternative wetting and drying irrigation systems in NCB soils at RARDC, Aralaganwila. Both weeded and unweeded treatments were tested along with the above irrigation treatments. Varietal effect within the

alternative wetting and drying environment for the grain yield was the highest in Bg366 (5.72 tons per hectare). Grain yield of varieties within alternative wetting and drying irrigation and without weed pressure for the grain yield was highest in Bg300 (6.50t/ha). Bg07-2828, Bg358, Bg366, Ld8-15-30, Bg10-1399, Bg10-2907 and Ld 6-7-8 were recorded a yield around five tons per hectare. However, responses of varieties with weed pressure under alternative wetting and drying irrigation for the grain yield was highest in Bg366 (6.57 t/ha). Bg10-1407, Bg07-2828, Bg357 and At08-593were recorded higher yields more than national average yield as 5.48, 5.11, 5.00 and 4.55 tons per hectare respectively.

Response of varieties, in flooded irrigation and without weed pressure for the grain yield was more than five tons per hectare in all tested varieties except Ld8-15-15. The highest yield was recorded in Bg300 (9.85 t/ha). Further, responses of varieties with weed pressure under flooded irrigation for the grain yield were highest in both Ld3-12-50 and Ld8-15-30 (9.22 t/ha). Bg250, Bg357, Bg2828, Bg359 and Bg358 were recorded grain yield of +7.64, 7.62, 7.58, 7.57 and 7.54 tons per hectare respectively

Further, BG 357 and BG 2828 recorded more than five tons of grain yield per hectare under the both irrigation conditions. Therefore, Bg2828 was the best variety/line in all tested conditions.

Maize

Three different Nitrogen rates (150, 225 and 300kg/ha) and four potassium rates (15, 30, 45, and 60 k_2O kg/ha) along with two splits (basal and four weeks after sowing of nitrogen and two splits of K_2O at the rate of 45 and 60 kg/ha) were tested for maize variety "Sampath". Nitrogen rates of 225 and 300 kg/ha was recorded highest maize yield. Potassium at the rate of 45 Kg/ha has significantly increased the maize yield. Interaction effect of Nitrogen and potassium for the yield was not significant. However, 225 N kg/ha with 45 K2O and 300 Nkg/ha with 15 k_2O kg/ha were recorded 4.45 and 4.47 tons/ha maize yield respectively.

Genetics and Plant Breeding

Cluster onion

Thirty four lines of cluster onion were evaluated according to the morphological characters. Six lines were selected for Preliminary Yield Trial. Eleven lines were selected as bolting type onion and 6 lines as short duration type onion. The NCVTs were conducted with 4 entries along with 2 checks in 3 locations.

Cowpea

It has been produced 107 kg of cowpea (variety Dhawala) breeder seeds as quality assurance planting material.

Underutilized crops

Thibbatu: It has been maintained field gene bank, and produced 1 kg of breeder seeds for producing quality assurance planting material.

Spine gourd: It has been introduced new accessions to the existing gene bank and evaluated for heat tolerant and quality characters of the available germplasm. A hybridization program was initiated using exotic and local cultivars. Quality planting

materialswereproduced from existingvarieties and distributed among interested farmers.

Karapincha: Germplasm collection of Karapincha was initiated and maintained to select a high quality variety for the cultivation in homegardens.

Horticulture

Banana

Evaluation of seven banana accession belonging to seeni group were started in July 2011 and this will be continued for another 6 seasons.

Papaya

Breeder seeds production of the variety Ratna was started. One kilogram of breeder seeds was produced, and it was handed over to the Seed and Planting Material Division for further multiplication.

Mango

Ten promising mango accessions were maintained in the field gene bank at RARDC Aralaganwila, and growth and reproductive data were collected for varietal development program.

Sweet potato

Selected new four lines of sweet potato were tested with two check varieties in RCBD trials with three replicates. These were under 2.5 months variety and others belonged to 3.5 months category. According to yield data, 2.5 months Malaysian variety recorded the highest yield (22.6 t/ha) while HORD C-5recorded the lowest yield.

Plant Pathology

Red Onion

- Effect of the duration of bulb treatment and the effective fungicide to control fungal bulb rot in cluster onion were tested. A research was conducted successfully in both seasons in Aralaganwila and Thirunelweli as a coordination program. Effective treatments were identified.
- One experiment was conducted to select best red onion variety for the region in terms of disease incidence. A research was conducted successfully in both seasons at Aralaganwila, Kilinochchi, and Kalpitiya as a coordination program. Best varieties were identified.
- A study was conducted to evaluate the effect of different organic manure levels on diseases incidence of cluster onion raised by true seed and bulbs. A research was conducted successfully in both seasons in Aralaganwila. Best organic manure levels were identified.

Entomology

Tibbatu

Controlling measures for the brinjal hardwood borer (*Euzofera ferticella*) for thibbatu (*Solanum violacum*) crop was studied, and it was revealed that the pest damage started from the basal area in small plants, and damage started in small plants when they were in the age of 2.5-3

months. Damage at initial stage can be controlled when basal area is covered with dried weeds as a physical barrier. Tested mosquito nets, black color polythene and polysack materials were not successful as a physical barrier, but napthalin balls hanged on stems can be tested again.

A research on pests such as predators, parasitoids and pollinators associating with fruit crops and non conventional vegetables in eastern dry zone was carried out, and following pests were identified. Hardwood borer (*Euzofera ferticella*),Shoot and pod borer(*Leucinodes orbonalis*),Ephilachna beetles(*Epilachna sp*), Leaf hoppers(*Amrasca devastans*), Tree hopper, Aphids *(Aphis gossypi),*Capsid bug (*Helopeletis annotoni*), Lace wing bug(*Urentiuss echinus*), Nizara bug(*Nizara viridula*), Cotton mealy bug(*Phenococcus solenopsis*) *and* two other species, Mites (*Teteanychus* sp), two scale species.

Soil and Water Management

Soil science

Determination of irrigation water requirement for maize using IW/CPE ratio

Seven irrigation treatments (IW/CPE = 0.25, 0.5, 0.75, 1, 1.25, 1.5 and 1.75) were tested in RARDC, Aralaganwila during the yala season of the year 2012. Results revealed that a highest crop growth and yield recorded from the treatment of IW/CPE = 2.5 treatment. However,there was no significant yield difference between treatments of IW/CPE = 2.5 and 3.

Soil nutrient dynamics and dry matter yield of mung bean under different organic manure application in Non Calcic Brown Soil

A field experiment was conducted at Regional Agricultural Research and Development Center, Aralaganwila, to study the soil nutrient dynamics and dry matter yield of mung bean (*Vigna radiata* (L.) Wilczek) under different organic manure application in Non Calcic Brown soil. Gliricidia (*Gliricidia sepium*), Ipilipil (*Leucaena leucocephala*), Guinea grass (*Panicum maximum*), rice straw, cattle manure, poultry litter and compost incorporated at the rate of 10 t/ha, was tested in a randomized complete block design in three replicates.

Litter bag technique was performed to determine the rate of organic manure decomposition and nutrient release. Eight litter bags per plots were used for this study. One bag was retrieved from each plot at one week interval for the period of eight weeks. Gliricidia (6.745g/week of decomposition rate and 3.74 week of half life) recorded highest decomposition rate and shorter half life. However, Guinea grass recorded the highest amount of N and K release after one week of incorporation while rice straw recorded the highest P release. Highest amount of remaining N was recorded in Gliricidia (0.83%) while poultry litter recorded the highest amount of P (0.009%) and Guinea grass recorded the highest amount of K (0.82%) after the 8 week of incorporation. Incorporation of poultry litter

showed highest plant height (29.50 cm), number of leaves per plant (13.167) and seed yield (952.16kg/ha) of mung bean. Although some other organic manure recorded the higher decomposition rate and rapid nutrient release, it was not reflected in growth and yield of mung bean.

Soil pH, EC, organic matter, total N, available P and exchangeable K was increased by the application of organic materials than the initial soil. Highest total N, available P and exchangeable K content were recorded in Poultry litter incorporated plots. According to the results, it can be concluded that poultry litter can be used to get highest growth and yield of mung bean with improvement of soil fertility.

Water Management

- Evaluation of Soil Conservation Measures on Soil Erosion, Runoff Generation and crop yield in Non calcic brown soils was carried out at RARDC, Aralaganwila. Runoff generation of 2973 m^3/ha was recorded, and it was considerably high in the sole crop treatment of okra. Soil erosion is also can be high as 6 t/ha in contour drain treatment. The results of total soil loss and total runoff indicated that agronomic measures were more effective than mechanical soil conservation methods.
- Determination of effect of different water management practices with applying weedicides in cutting down water requirement for paddy cultivation in Non Calcic Brown soil. Saturate condition ,5cm Standing water up to hardening, Rotational irrigation (standing water up to 5 cm in one irrigation) were the water treatments and No Weedicide (Zero), Weedicide (3.4-DPA, MCPA), Weedicide (Preimergent weedicide -GOAL) were the weedicide treatments. Yield was higher in 5cm + 3.4 DPA/MCPA and 5cm rotational + 3.4 DPA/MCPA combinations.
- An experiment was conducted to determine the optimum basin size for different surface irrigation layouts for Non calcic brown soils under NARP Project. Irrigation efficiency, degree of leveling and Uniformity were calculated for the treatments.

DEVELOPMENT ACTIVITIES

Dragon fruit

Two hundred and fifty potted plants for field establishment were distributed throughout the year.

Spine gourd

Five hundred potted vines were distributed to establish mother vines.

Tibbatu

Breeder seeds of *Bindu* variety(200g) were distributed among farmers on requests in all over the country.

Workshops

- Research review workshop was held at RARDC Aralaganwila, to

commemorate 30 years research achievements.

PROJECTS AND OTHER PROGRAMMES

- **Red onion coordination program in 2012**

  Farmer training programs were conducted on red onion cultivation and red onion disease management throughout the country. Nearly 750 farmers and officers were trained.

- **Supervision of university research students in their researches**

  Two final year students of the Rajarata University conducted two individual research projects at the research centre for their partial fulfillment of the degree programme. They were 'Effect of Nitrogen and potassium fertilizer rates on growth of maize' and 'Determination of the optimum basin size for different surface irrigation layouts for different dry zone soils in Sri Lanka'.

DISSEMINATION OF TECHNICAL KNOWLEDGE

Leaflets

Onion: Disease on red onion in Sinhala and Tamil medium as a Department of agriculture publications.

Field days and Trainings

- **Training programmes**: Officers from different disciplines conducted training programmes for AOs, FAs, farmers and school children.
- **Crop clinics:** Officers attended in these clinics as resource persons. Other than these, technical solutions were provided to farmers' field problems such as entomological, pathological, soil science and etc.
- **Provincial and Mahaweli Technical Group Meetings**: Required technical assistance were provided at preparatory meetings for Mahaweli B, C and G for both the seasons. Officers attended in Eastern, Sabaragamuwa, South and Uva PTWGs (Provincial Technical Working Group Meetings) too.
- Technical solutions were provided for field problems of the farmers specifically for *Mahaweli* Systems of B and C; the plant protection issues were based on field visits and many more based on sample analysis.

Services

Soil testing: Eight hundred and twenty soil samples were analyzed and recommendations were given accordingly.

PLAN FOR 2013

AGRONOMY

Onion

- Finding of least cost method for flower induction of cluster onion

GENETICS AND PLANT BREEDING

Onion

- Characterization of germplasm
- Varietal improvement of cluster onion for pest and disease resistant
- Varietal improvement of cluster onion for bolting and non bolting type
- National Coordinated Varietal Trial of cluster onion
- Varietal Adaptability Trial of cluster onion

Spine gourd

- Screening and hybridization programme.
- Breeder seeds production

Thibbatu

- Breeder seeds production

UNDERUTILIZED CROPS

Karapincha

- Field establishment of germplasm and starting of evaluation.

Mung bean

- NCVTs coordinated by FCRDI

Cowpea

- Breeder seeds production variety Dhawala
- NCVTs coordinated by GLORDC

Kollu

- NCVTs coordinated by GLORDC Initiation of varietal development for the region

HORTICULTURE

Banana

- Continuation of banana NCVT program

Papaya

- Breeder seed production program for variety Ratna

Sweet potato

- NCVT program to evaluate performance of variety

Sweet orange

- Performance of different varieties of sweet orange with different planting spacing

Wood apples

- Performance of wood apple witrh different spacing and pruning methods

Brinjal

- National Coordinated Varietal Trial

Bitter gourd

- National Coordinated Varietal Trial

Cucumber

- National Coordinated Varietal Trial

Pumpkin

- Adaptability trial

PLANT PATHOLOGY

Cluster onion

- Effect of the duration of bulb treatment and the effective fungicide to control fungal bulb rot in cluster onion
- Selection of best red onion variety in terms of disease incidence for the region
- Effect of different organic manure levels on diseases incidence of cluster onion raised by true seed and bulbs
- Evaluation of different nursery methods on cluster onion true seed cultivation
- Technical and social aspects of agrochemical use in agricultural areas.
- Disease identification and control method identification of OFC and other regional needs

SOIL AND WATER MANAGEMENT

Cluster onion

- Effect of irrigation interval on growth and yield of cluster onion growing on the dry zone soils (NARP project)
- Evaluation of micro sprinkler irrigation system for cluster onion (NARP project)

Chilli

- Fertigation studies on chilli for drip irrigation systems (NARP Project)
- Crop suitability mapping for Welikanda series soil (a case study)
- Evaluation of Agronomic Soil Conservation Measures on Soil Erosion, Runoff Generation and Crop Yield: A Case Study in Low Country Dry Zone of Sri Lanka.

STAFF LIST

Designation	No.
Research Officer (SLAgS)	8
Farm Manager	1
Research Assistant	7
Agriculture Instructor	3
Acting Administrative officer	1
State Management Assistant	2
Store Keeper (MA)	1
Driver	5
Electrician	1
Watcher	12
Tractor Operator	3
Carpenter	2
Blacksmith	1
Mason	1
Circuit Bungalow Keeper	1
Budder	1
Labourer	30
Labourer (Contract)	50
Total	**130**

1.1.3 REGIONAL AGRICULTURE RESEARCH ANDDEVELOPMENT CENTRE (RARDC) NORTHERN REGION - KILINOCHCHI

Regional Agriculture Research and Development Centre, Kilinochchi has been given a mandate with regard to all the agricultural related activities in catering the needs of local and National farming Communities.Although the activities in the Station were dull during last two decades,considerable research activities have been geared up again followed by the dawn of peace.

The Center has five Satellite stations in each district *viz;* Kilinochchi, Jaffna, Vavuniya, Mannar and Mullaitvu. These Research stations are affiliated to Field Crops Research and Development Institute, Maha- illupallama, and conduct Research and Development activities mainly focusing on Other field crops and rice which are economically important to the region. Commendable activities were also undertaken in horticultural development too.
All Research stations are functional except ARC, Mullaitivu. A land in extent of five hectares was allotted earlier at Oddusuddan area by local authorities in order to established Agricultural Research Station for Mullaitivu district. However, it was not able to establish the station due to unsuitability of land, lack of human recourses and other facilities.

However, research and development activities are in progress at Regional Agriculture Research and Development Centre, Kilinochchi, Agriculture Research Station, Thirunelvely, Agriculture Research Centre, Vavuniya, Rice Research Station, Paranthan and Rice research station, Murunkan..

Infrastructure facilities such as buildings, internal roads and fence have been constructed at RARDC, Kilinochchi and RRS, Paranthan, under the special project implemented by the Ministry of Agriculture.

BUDGET

The budgetary allocations and expenditures under different votes are presented in the following table.

Table 1.1.3.1: Annual budget - 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	4,984,000	4,899,129	98
Capital	2,830,000	2,581,025	91
Projects			
Farm development project	1,650,000	1,369,714	83
Total	**9,464,000**	**8,849,867**	**94**

PROGRESS

CROP IMPROVEMENT

Red onion

Red onion shallot type, variety – ThirunelvelyRed,320 kg Breeder's lot was produced for lateral spread.

Selected 3 hybrid multiplier (MH) onion were maintained for high yield and other traits.

Three multiplier lines namely TMV-1,TMV-2 TMV-4 were selected and included in the NCVT programme.

NCVT Programme

NCVT on onion was conducted with selected lines from ARS/Thirunelvely & RARDC/ Aralaganvila. Two multiplier lines were selected from ARS,Thinnevely namely TMV-1, TMV-2 were included in the NCVT programme.

3 Hybrid multiplier (OH) onion were maintained through bulb.

Chilli

Six chilli lines were tested with checks MI Green and KA2. Line ICPN 18-7 recorded the highest green chili yield of 27 t/ha but it resembles characters of capsicum and it was suitable neither for green nor dry chili. Two linesfrom ARS/Thirunelvely namely TVC 4 & TVC5 performed well and yielded 15.3, 14 t/ha green chilli respectively.

Blackgram

Thirty three lines were tested and Six lines were selected based on the performance for hybridization program to develop high yielding YMV resistant blackgram variety.

Groundnut

Six local lines and twenty PGRC collections were collected for further evaluation to develop high yielding well adapted to local condition Groundnut

Luffa

Seven lines 10020xIn 17, 10656x9895, In 19,2338x10014, La 33xTD, Naga, LA33 were tested and Naga recorded the highest yield of 33.9t/h.

Potato

In an evaluation trial of potato varieties Arnova , Cal White, Red Lassoda, Zafira and Rodoph were tested and Cal White and Red lassoda recorded high yield. The highest yield of1030 g/plant was recorded in Cal white.

Green gram

MIMB 901, MIMB 902, MIMB 903, MIMB 904, MIMB 905, MIMB 906, MIMB 907, MI 6, MI 5 and ARI were tested. MIMB 904 gave highest yield. During Yala season, 14 lines were evaluated and MIMB 901 gave highest yield.

Ground nut

ICGV 01276, ICGV 86590, Red testa, Indi and Tissa were tested. Highest yield of 3120 kg/ha was recorded in the variety Tissa.

Mustard

AP 26, C 108, C 189 and, Buththala (check) were tested. Check variety Buththala gave highest yield of 810 kg/ha.

Tomato

Varieties Maheshi , HF 03, Rajitha , MI 121, MI 127, were tested Bathiya gave highest yield of 18 t/ha.

Brinjal

EGH 5, EGH 6, EGH 7, EGH 8, AMANDA, ANJALEE and BW 11 were tested. Highest yield recorded in the varieties of Anjalee (at ARS, Thinnavely), EGH-5 (at ARC, Vavuniya), EGH 8 (at RARDC, Kilinochchi) were 10.5 t/ha 54.42 t/ha and 43 t/ha respectively.

Capsicum

HYW, 300xHYW, CA 8, 1782 HYW were tested. 1782 HYW gave thehighest yield of 10.5 t/ha.

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Cowpea

In Maha season nine lines and three checks were testedand trial was affected by bad weather. However in Yala season six lines and three checks were tested and ANCH 14 gave highest yield out of the lines tested.

Sweet potato

Seven lines were tested in Maha 2011/12 and Yala 2012 seasons. Malaysian gave highest yield more than 30 t/ha in Maha atARC, Vavuniya and 28 t/ha at RARDC, Kilinochchi

Mae

Five new short aged long pods lines were tested against two checks. T 39-2 gave a yield of 6.2 t/ha which was three times and more than ten times of check varieties polon mae and Hawari mae respectively.

Rice

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

Varieties of 2½months, 3months and 3½months age groups were tested in RRS/Paranthan, ARS/Vavuniya and ARS/Murunkan under both rain-fed and irrigated conditions.

2½ months, two 3 months, 3½ months and 4-4½ months age group lines were tested in Maha 2011/12, and results were reported to NCRVT coordinator, RRDI. Yala 2012 trails were severely affected by the unfavourable weather condition. Under 2 ½ months group, check variety Bg 250 was superior than that of others. In 3 months age group highest yield of 6.41t/ha received by line Ld 762. At 08-593 yielded highest in the second 3 months group. In the 3 ½ months group line, Bg 08-1258 gave the highest yield of 6.36 t/ha. Bg 10-551 and Bg 08-1909 gave more than 7 t/ha in 4-4 ½ months age group

PLANT PROTECTION

Green gram–Pod borer management

Four boarder crops were tested in which Castor performed well to use as boarder crop to control the pod borer attack in green gram.

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

Potato varieties of Arnova, Golen star, AIDA, Atlas, Cal white Red lassoda, YP-03-107, Rossana were tested.

Incidence of late blight disease was low in the Cal white and Red lassoda.

Management of onion disease by using organic manures

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

Evaluation of organic pesticides against the onion disease

Neem seed water extract, Garlic sap, Gliricidia leaves and chemical cholorothalonil were tested along with control treatments. Lowest number of bulbs affected by diseases and the highest marketable yield obtained by using cholorothalonil but there was no significant difference among the treatments.

Effect of fungicides & duration of bulb treatment for management of bulb Rot

Five fungicides Captan , Thiram, Fluzinam , Thiophanate methyl 50% & Thiram 30% wp, Tebuconazole 250ml/l and five duration of bulb treatments 30 min, 1 hour, 3 hour, 6hour and 24 hour were tested along with the control. Lowest number of bulb rot was observed in the Thiophanate methyl 50% & Thiram 30% wp for 30 min bulb treatment. It is in progress.

Management of yellowing in Bitter gourd

Poultry manure ,Compost, Recom NPK, Recom PK N – Ammonium sulphate, Recom NPK & 50g Mg So $_4$ / wine at basal,2 &4 WAP were tested with Control.

Recom NPK & 50g Mg So $_4$ / wine at basal ,2 &4 WAP gave the highest yield of 13.5t/ha and it delaysyellowing in leaves. It is in progress.

Seed Production

The following amounts of seed were produced in the under mentioned crops.

Table 1.1.3.2: Seed production during 2012

Crops	Variety	Amount
Maize	Ruvan	250kg
Finger millet	Oshada	300kg
Green gram	MI6	65kg
Chilli	MiGreen	1100kg(pods)

Breeder Seed Production

During the period under review, the amount of breeder seeds produced has been given below.

Table 1.1.3.3: Breeder seed production during 2012

Crops	Variety	Amount
Bitter gourd	Thinnelvely white	10.6Kg
Snake gourd	Thinnelvely long	6 Kg
Brinjal	Thinnelvely purple	2 Kg
Tomato	KC-1	100g

Soil and water management

- Soil samples collected from salinity affected area in Kilinochchi were tested for identification of the salinity status in the district.

- Soil profile moisture study was carried out at RARDC, Kilinochchi and it was

confirmed that 9 – 10 days is the irrigation interval for RYL during Yala season.

- Soil moisture study was carried outin Vavuniya districtusing remote sensing, and it was identified that soil moisture could be retrieved in Vavuniya district.

- Five hundred fifty five soil samples were tested under FAO project and farmer field sample were also tested.

- Soil samples were analyzed at Arivialnagar, Kilinochchi in order to give recommendation for pasture cultivation and crop cultivation.

- Twenty water samples were analyzed from DATC wells at kilinochchi and farmer's well at Kilinochchi, Mullaitivu and Vavuniya, and remedial measures were introduced to farmers.

- ARC, Vavuniya are at the final stage of water saving method in Cucubitacea crops. It also participated in the DOA's Agrarian base soil fertility mapping programme and NRMC's ground water study of Vavuniya division.

IPNS in Chili

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

Organic fertilizer Production &Use

Twenty tons of compost were produced and a pack of 10 kg of inoculum each were issued for 250 farmers in the Jaffna Peninsula.At issue, 30 % of the compost were utilized for research purposes.

An amount of 200kg sun-hemp seeds were produced.

Gliricidia and Ipil-Ipil cultivations were established for green manure and compost production.

Testing of soil & water samples

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

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

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

Maintenance of the fruit germplasms

Mango(3 Villard, 3 Karuthakolumban), 14 Jak,(Local collection)20 Banana,(Kathali, Kappal, Monthan, Emban (Ash, Green), Itharai, Cavandish Lime (Local) Sweet Orange(Bibile), Pomegranate (Soft seeded varieties. -Nimali, Thaya) varieties were established.

Five hundred pomegranate seedlings were produced and handed over to DD (Extension)to issue the farmers who settled in Kilinochchi area.

ADVISORY SERVICES PROVIDED

- Conducting visiting lectures on Remote sensing at Vavuniya campus of University of Jaffna.
- Participation as resource person – Sewalanka and Oxfam GB on soil and water management
- Visiting of fields with farmers to other stations under Oxfam GB program
- Training of staff on soil sampling and interpretation of the soil testing reports for recommendation
- Conducting workshop on soil sampling at farmer field schools

Exhibition

An exhibition was conducted at Oddichcuddan Central College.

PLAN FOR 2013

- National Coordinated Varietal Trial (NCVT) for promising Soyabean lines
- Evaluation of groundnut germplasm, selection and purification
- Seed multiplication of promising groundnut lines
- National Coordinated Varietal Trial (NCVT) for promising Groundnut breeding lines
- National Coordinated Varietal Trial for Mae (long bean)
- National Coordinated Varietal Trial for Brinjal
- National Coordinated Varietal Trial for Capsicum
- National Coordinated Varietal Trial for Tomato
- National Coordinated Varietal Trial for Amaranthus
- National Coordinated Varietal Trial for Luffa
- Maintenance of Mango varieties.
- Evaluation of Papaya hybrids
- Effect of micro climate on leaf curl complex and yield of chilli.
- Management of Leaf folder in rice plant by using *Calotrophis* leaves
- Management of rice mealy bug through integrated pest management in farmers field
- Evaluation of *Cyperus iria* resistance to herbicides
- Evaluation of Aerobic rice lines
- Soil profile moisture studies using modeling techniques
- Temporal variations of LST (Land Surface Temperature)
- Surface soil moisture studies
- Testing of soil samples for its fertility &quality
- Water quality analysis
- Breeder seed Production of mandated crops
- Crop improvement of Chilli
- Crop improvement of Red onion

STAFF LIST

Designation	No.
RARDC, Kilinochchi	
Deputy Director (Research)	01
Research Officer	03
Agricultural Instructor	03
Research Assistant	01
Research Sub Assistant	01
Watcher	01
Labourer (Permanent)	26
ARS, Thirunelvely	
Research Officer In Charge	01
Research Officer	02
Agricultural Instructor	03
Research Assistant	03
Research Sub Assistant	01
Watcher	01
Pump Operator	01
Labourer (Permanent)	07
ARC, Vavuniya	
Research Officer In Charge	01
Research Assistant	01
Research Sub Assistant	01
RRS, Paranthan	
Research Assistant	01
Labourer (Permanent)	01
ARS, Murunkan	
Research Assistant	01
Labourer (Permanent)	06
Total	**67**

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

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

The mandate of HORDI undertakes demand-driven research on horticulture crops, which is to be productive, eco-friendly,sustainable, economically viable and socially equitable. In addition its research mandate, the institute involves in training of farmers, undergraduate and diploma students as well. Conducting awareness programmes for the dissemination of new technologies to the farming community and other stake holders is also included in the programme of the institute.

BUDGET

Table 1.2.1: Annual budget – 2012(Rs.)

Vote	**Allocation**	**Expenditure**	**Expenditure %**
Capital	22,102,908	18,377,145	83
Recurrent	82,503,697	81,636,752	99
Project			
Hybrid Seed production for fruit and Vegetables	5,000,000	3,901,305	78
ANSOFT	1,150,000	919,451	80
Farm Development	25,285,600	25,059,194	99
National Agricultural Research Plan NARP	19,153,000	14,034,066	73
Korean Project on International Agriculture (Vegetable Cultivation)	3,127,500	1,153,852	37
Korean Project on International Agriculture (Fertilizer management)	2,510,000	904,515	36
Integrate Management System for Plant Genetic Resource	1,698,019	597,480	35
Tissue Culture	27,500,000	27, 495,000	100
Total	**190,030,724**	**146,583,760**	**77**

PROGRESS

PROJECTS

Hybrid Seed Production of Vegetables and fruits

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

Natonal Aricultural Reserch Plan (NARP)

Under the NARP project, an amount of 9.0 million rupees was allocated for the year 2012.

This project aims to develop new varieties of vegetable, fruits and flower crops, improve the existing seed production technology of potato, and to develop pest and disease management packages, appropriate agronomic and nutrient management packages in order to enhance the productivity of horticultural crops.

ANSOFT project

ANSOFT project is aimed to promote traditional and sustainable small organic farms in Asia. In order to strengthen the organic farming activities in Sri Lanka, a working group under the ANSOFT project was established. Necessary initiatives have been taken to collect and compile information on present organic farming technologies among farmers. Development of new technologies in relation to nutrient management and pest and disease management in vegetable crops are in progress.

Farm Development Project

Farm development project was initiated to enhance the infrastructure facilities at research farms/units with the aim of improving productivity of the selected research farms/units.. In the first phase, 12 units / research farms were selected for the establishment of irrigation facilitates, protective fences and net houses. In addition, uncultivated lands were cleared and cultivated. Facilities improved in each farm and the production of planting material are summarized in the following table.

Table 1.2.2: Progress of Farm Development Project

Name of the Research unit / Farm	Development of Infrastructure facilities	Production of planting materials
RARDC, Bandarawela	Construction of fence & Land clearing	Potted seedlings - 8365 (Orange & Mandarin)
ARS, Girandurukotte	Rehabilitation of existing irrigation canals.	
ARS, Kalpitiya	Improvement of irrigation system Construction of Net house	Grapes 4900, Pomegranate 13,870
ARS, Eluwankulama	Improvement of irrigation system & Land clearance Construction of Net house	3500 Mango rootstocks, 100 lime plants
ARS, Rahangala		Mandarin (Grafted 2000), Orange (Grafted 2000), Pears (Grafted 900)
ARS, Muthukandiya	Establishment of field irrigation system	Orange (Rootstock 2000) wood apple (Rootstock 250) Thuba karawila 200 wines potted
ARS, Maduruketiya	Establishment of irrigation system	Budded plants: Mango - 375, Orange - 600, Wood apple - 200, Thuba karawilla - 1200 Seedlings: Lime - 980, Amberella - 70, Katu anoda - 100, Pineapple - 400,Pomegranate – 75 Root Stock: Mango - 1400, Orange - 1500 Mango - 265, Citrus - 657, Wood apple - 76, Thumbakarawilla - 80 vines, Other - 50
ARS, Bibila	Construction of poly house Establishment of field irrigation system	Citrus budded 1002, rootstock 2500, Mango budded plants 485, Orange (Bibila sweet 500), Mandarin (Madhu 220)
ARU, Eraminigolla	Construction of potting shed & Land Development	Rambutan Grafted 1004 root stock 3000, Jackfruit Grafted 302 Root stock 500

Name of the Research unit / Farm	Development of Infrastructure facilities	Production of planting materials
HRF, Ambatenne	Renovation of irrigation system, Construction of net house, plant house	Budded plants (Jack fruit 1000, Durian 1000, Star fruit 750, Guava 500) Seedling (Jack fruit 1500, Durian 1000, Star fruit 500, Guava 1500, Rambutan 2000) passion fruit 250, Katurumurunga seedling 1500, Tantin 500, Rose apple 1000 rooted cutting
HRF, Ulpothagama	Renovation of existing irrigation system, Construction of net house	Mango grafted - 8962, Rootstock - 6000, Lemon - 300, Orange rootstock - 2500, Ambarella - 140
HRF, Walpita	Construction of irrigation system renovation of net house	Rambutan (Grafted - 10245, Rootstock - 13000), Mango(Grafted - 1352,Rootstock - 2300), Butter fruit (Grafted - 1186), Durian (Grafted - 227), Other (Grafted - 190, Rootstock - 500), Lemon - 911
HRF, Pasyala	Construction of poly net houses Development of irrigation system	Rambutan grafted - 7400 Rootstock - 10000, Mango Grafted - 300 Rootstock - 600, Lemon - 500, Pineapple - 1400, Roseapple - 25
HRF, Weerapana	Construction of net house (30' x 80') & Construction of potting shed	Rambutan (Grafted - 1445, Rootstock - 3000) , Durian (Grafted - 250), Goraka (Rootstock - 10000, Grafted - 2500) , Mangosteen (Grafted - 1400) , Mandarin (Grafted - 305, Root stock - 5000) Rose apple (Grafted - 250, Rootstock - 1000) Mango (Grafted - 980, Rootstock - 3000)

Korean Project of International Agriculture (KOPIA)

- **Vegetable Cultivation Technology**

Sri Lanka has a long tradition of cultivating vegetables, and a large number of locally improved varieties of vegetables as well as imported varieties are grown by the farmers at present. However, there is a gap between the yield potential of the varieties and the yield levels obtained by the farmers. It is hypothesized that demonstration of advanced technology of other countries, where high yield levels are obtained, is a means of bridging this gap by disseminating knowledge for both local scientists and farmers.

The KOPIA – Vegetable project focuses on demonstration and verification of improved vegetable production technology and identification of adaptable Korean vegetable varieties for local cultivation. In addition, improving the human resource capacity on vegetable production and technology and strengthening the collaboration between Sri Lanka and Korea relating to research on vegetable production are other objectives of the project.

- **Fertilizer Management (KOPIA)**

The KPOIA -Fertilizer management project was undertaken basically to demonstrate the farmers about the economically viable and environmentally friendly fertilizer use. The concept of utilizing the nutrients remain in the field and circumstances of unnecessary use of fertilizer inputs are the two major issues to be addressed by the project. Project would emphasis the use of not only key fertilizer elements but micro elements as well. Besides, project will focus on strengthening the human resource capacity and increasing collaboration between the two countries.

Tissue Culture

The project of "Quality planting material production of economically important crops through Tissue culture techniques" was started in 2011 to fulfill the increasing demand of planting materials of Horticultural Crops such as Banana, Pineapple, Seed potato, Strawberry and floricultural crops. under this project tissue culture laboratories were facilitated and renovated to increase the production by ten times. Other infrastructure facilities including net houses and polytunnels were also developed.

VEGETABLE DIVISION

Vegetable division of the institute mainly involves with the breeding vegetable varieties for quality and yield while ensuring pest resistance. Though development of vegetable hybrids was high priority, development of open pollinated varieties is not ignored. Agronomic studies on vegetables are also conducted as required. Development activities include the production of basic seeds in addition to dissemination of technology via various modes.

Yard long bean

- A total of five locally developed open pollinated yard long bean lines were evaluated for their stability under diverse research environments. Among these lines, four lines showed higher yields (790 – 867 g/ plant), field resistant to collar rot disease, early flowering and pod setting and good keeping and eating quality. Testing of their adaptability under different agro ecological regions will be carried out during the fourth coming seasons.
- Four open pollinated yard long bean varieties, which showed high yields and resistant to collar rot disease, were selected for further evaluation based on their yield and quality.

Luffa

One promising hybrid and one open pollinated variety wereidentified.

Bean and Winged bean

One bean variety was released. HORDI Green having yield potential of 28t/ha has been released for the farmers.

One winged bean germplasm showing high yieldwas collected.

Mae

"Gannoruwa hawari Mae" was released. This variety is an early harvesting variety having the yield potential of 30t/ha.

Brinjal

One high yielding "*lenairi*" brinjal hybrid was nominated for release and the hybrid was released under the name of "*Lenairi 1*"

Three hybrids were selected for adaptability studies.

Tomato

18 exotic tomato varieties were tested for their yield performance. 14 varieties were selected for further testing.

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

Capsicum

New F1 Hybrid (1782xHYW) has consistently shown higher yield.

- Further testing of the promising hybrid variety HCA1was undertaken to verify its adaptability.
- Evaluation of exotic varieties - Capsicum introductions 21348, HP210, FST 403 and the "Jalapeno" types "Perfecto" and "Magnificio" were identified as acceptable for commercial introduction. Five other prospective tomato varieties were deemed unsuitable for commercialimportation for field testing.

Cucumber

- One cucumber hybrid namely HORDIGreen F1 having a yield potential of (crispy taste, outer skin green color& uniform shape) was released to the farmer use. This variety can be used for making salads and prepare dishes.
- Another cucumber F1 hybrid having high yield and good appearance supposed to be releasedand is at the DUS test stage.

Bitter gourd

- Hybrids developed on Bitter gourd are presently at the end stage of testing. Two hybrid varieties are at NCVT level while one has been nominated for NCVT testing.

FRUITS AND TISSUE CULTURE DIVISION

Fruit and Tissue culture Division undertake research and development work on fruit crops and development of necessary protocol for invitro propogation of fruit crops to increase the productivity and production of these crops. Research effort on fruit crop was mainly focused at development of fruit varieties with better quality and yield having tolarence/resistance to pest and diseases. Division also give due emphasis on the development of good agronomic packages to increase productivity of fruit crops.. Development activities included the production of planting materials, raise the production capacity of research farms through infrastructure development. In addition dissemination of technology via various modes was simultaneously undertaken.

Banana

From the Banana accession evaluated for high yield, good quality and Panama tolerance, three promising "Seeni kesel" accessions were further evaluated. One "Embul Kesel" accession and one "Seeni Kesel" accession were included in NCVT programme. Mutation breeding programme of banana was initiated with shoot tip culture programme.. Screening for Panama disease resistance is in progress. The collected 37 "Embon" accessions were further evaluated during the year. The NCVT programme designed for banana was co-ordinated.

Papaya

With the aim of developing suitable in-bred Papaya variety population improvement of 12 lines was carried out.

Evaluation programme was commenced at four locations in Dry, Intermediate and Wet Zone for papaya hybrid seed produced.

Citrus

Fifteen local and exotic varieties were evaluated. Three exotic varieties and one local selection were selected for further evaluation. Planting material production is in progress.

Durian

Evaluation of durian varieties was continued under NARP project. Evaluated 14 accessions and vegetative part characterization was performed in 5 accessions. Six accessions produced flowers and 7 different crosses were made to find out the better cross combinations giving quality fruits. Fruit quality data was recorded in these crosses and evaluation work is in progress.

Uguressa

Evaluation of the collected accessions continued during the year. One accession produced few fruits during this year and the other accessions are not yet commenced flowering. Further evaluation is in progress.

Mango

Exotic and local selections of mango were evaluated. Eight selections performed well and evaluation is in progress.

Different combinations of rootstocks and inters tock varieties of mango are being evaluated the Research farm Ulpothagama. Data were collected on their vegetative behavior. Some trees produced few fruits at the first bearing. Study is in progress.

Dragon fruit

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

TISSUE CULTURE

Banana

"Kolikuttu" banana can be multiplied successfully under *in-vitro* propagation techniques and about 500 plantlets can be produced from a shoot tip explants. Different "kolikuttu" varieties having different genotypes responded differently. Presently recommended variety "Agra" did not respond well for in-vitro multiplication. Experiments are continuing to increase the multiplication rate of var."Agra".

Grape

Grape var.Thompson seedless could be introduced successfully for *in-vitro* propagation. Shoot tips and tender internodal cuttings can be used as initial materials and average 4 shoots can be multiplied within a two week subculture cycle. Plants have been introduced for hardening process and field evaluation. Another seedless var. "Sonata" also successfully multiplied and experiments are continued to improve the rooting phase.

Field evaluation of Tissue culture plants

Tissue cultured Banana (Nethrampalam) was established in the field for performance evaluation. Economically affected variations are not observed. Tissue cultured Pineapple plants (var.Mauritius) were established in the field and evaluation is being continued.

ENTOMOLOGY DIVISION

Development of an IPM package for citrus crop

A research project was carried out to develop an IPM package for citrus crop. A survey was carried out at Peradeniya, Teldeniya, Bandarawela and Madolsima to identify the pests, damaging the crop. Studies to evaluate varieties for resistance/tolarance to pests and diseases were performed. Two varieties (Rahangala and HORC-29) were identified as less susceptible to leaf miners and three varieties "Arogya" and two exotic varieties) were identified as less susceptible to mites than other varieties tested.

Evaluation of the pest control efficacy of plant extracts

Studies were conducted to identify the pest control efficacy of several plant extracts in order to develop pest control strategies for organic farming and home gardens. Out of 25 preparations aqueous extracts of neem seed kernel, Japala (*Croton tiglium*, Euphorbiaceae) seed kernel, Neem leaf , Sweet fig, *Acorus calamus* rhizome, *Anona muricata*, *A. senegalensis* and *A. reticulate* seed and garlic showed promising results. Mineral oil and teepol mixture also showed significant adverse effects on the mortality, feeding and growth on the insects.

Identification of a new pest in ginger cultivation

A new pest causing heavy damage to ginger crop was identified as the rhizome fly, *Mimegralla coeruleifrons.*It was found thatthe adult flies lay eggs on the exposed rhizomes and stems closer to the soil surface. The wounds caused by the maggots in the rhizome allow easy infection of a complex of soil microorganisms and other soil born pests of the rhizomes which aggravated the rotting of rhizomes. None of the tested insecticides could control the pest. Further studies were handed over to the Export Agriculture Research Institute.

Adaptability of the improved IPM package for pumpkin virus diseases in Mid Country Wet Zone

The adaptability of the improved IPM package for pumpkin virus disease control was studied in the Mid Country Wet Zone at Gannoruwa. The study revealed that the virus infected pumpkin at Gannoruwa is PRSV (Papaya Ring Spot Virus) which is transmitted by aphids. PRSV is a different type from other viruses that infect pumpkin at Wariyapola where a replicated trial is being carried out. The trial will be continued to test its adaptability.

Effect of the size of reflective polythene mulch in controlling pest and diseases of pumpkin

The effect of the size of reflective polythene mulch was tested for controlling pest and diseases of pumpkin to improve the IPM package. The study showed a higher yield increment over the control can be obtained by using ash colour reflective mulch, preferably 4 ft wide.

AW-IPM technology for fruit fly and melon fly control

Area wide Integrated Pest Management package (AW-IPM) for the control of melon flies and fruit flies was demonstrated in the DOA centenary celebration exhibition at HORDI, Gannoruwa. The package was implemented in the main exhibition field in front of the HORDI main building in approx. 4 ha area cultivated with number of cucurbit crops including luffa, bitter gourd, snake gourd, cucumber and pumpkin. The package was highly successful and can be recommended as a mature technology to disseminate to the farmer as an effective, low cost, economical and environmentally sound technology.The package consists of field sanitation, timely application of protein bait, use of pheromone traps and bagging of fruits.

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

Exotic luffa varieties, *AARTI, LFCT-672, NS 474, NS 475, NRGH 22* and *LA33xTD* were evaluated at HORDI, Gannoruwa, for yieldperformances and pest and disease resistance/tolerance. Compared to local varieties *LA 33* and *NAGA*, varieties, *LA33xTD, AARTI* and *NRGH 22* were significantly better with pest and disease tolerance..

Management of pest and diseases of grapes (*increase the fruit size)* in variety "Thompson seedless"

Under the pest management, a pest in grape cultivation was observed . The coleopteran beetle causing severe bud destruction was identified as *a bud eating beetle* (Coleoptera: Chrysomelidae) from farmer fields in Kalpitiya. The Genus identification, biology, damage and control measures will be further studied.

PLANT PATHOLOGY, MICROBIOLOGY & MUSHROOM DIVISION

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

Screening of exotic hybrids for resistance to bacteria wilt

Eleven tomato and five capsicum hybrids imported from various countries were screened for resistance to bacteria wilt caused by

Ralstonia solanacearum. All varieties showed moderate resistant to bacterial wilt disease and can be nominated for further testing for adaptability and yield performance.

Inspection and laboratory testing of seed potato consignments

Seventy four consignments of seed potatoes from different countries were inspected and tested for their freeness from quarantine pathogens. Diseases such as common scab (*Streptomyces* spp.), Netted scab (*Streptomycesreticulisscabies*), Silver scurf (*Helminthosporium solani*) and black scurf (*Rhizoctonia solani*) were observed on tubers of potato seed lots. Rubbery rot caused by *Geotrichum candidum* rarely observed in seed potato lots. However, all seed lots were accepted for cultivation in farmers' field as disease incidences and severities were below the permissible levels mentioned in the regulation.

Disease diagnosis and advisory service for disease management of crops

Over 280 disease affected plant samples including fruit crops, vegetables, tubers, spices, ornamentals, other field crops and rice received from farmer fields and private farms were clinically tested for diagnosis of fungal, bacterial and virus diseases. Among the fungal diseases, root rot, leaf spots, mildew and anthracnose were commonly observed in fruit and vegetable cultivations in many locations. Black rot of cabbage caused by *Xanthomonas campestris* was identified as severe problem of all varieties of cabbage in most of the cabbage cultivating areas. Panama disease was reported to be the most devastating disease of banana. Passion fruit collar rot / canker reported from Hambanthota was found to be caused by *Fusarium solani* and this was the first report of the disease in Sri Lanka.

Virus detection by ELISA test

ELISA test was performed for the accurate identification of plant viruses of imported hybrid seeds and planting materials. Early and reliable diagnosis of viral diseases through ELISA is a prerequisite for seed health testing and virus control strategies for crop cultivation. Sixty eight samples of exotic cucurbit seeds were tested for CGMMV among which three samples were found positive for the virus and rejected for further evaluation. Tomato (eight samples) were tested for TSWV. All samples were found free from the virus.

Bio-efficacy of new fungicides against anthracnose (*Collettotrichum gleosporiodes*)in Capsicum and downey mildew of Cucurbits

Four new fungicides against anthracnose in Capsicum and two new fungicides for downy mildew of cucurbits were evaluated under natural infections at farmers field at Matale. All four fungicides tested Amistar 25% SC (at the rate of 10ml/10l), Nativo 75 WG (at 6g/10l), Cabriotop EC (at 20g/10l) and Fluzinam 500g/1SC (at 10ml/10l) can be effectively used to control anthracnose of capsicum.

Bio-efficacy of new fungicides against downy mildew of Cucurbits (*Pseudoperanospora destructor*)

Two new fungicides such as Cabriotop EC (Metiram 55%+pyraclostrobin5%) and Amistar 25% SC showed the effective control of downy mildew of cucurbits..

Serological and molecular detection of viruses associated with cucurbit yellowing syndrome

Seven viruses associated with different cucurbits were identified using serological and molecular methods. It included cucumber mosaic virus (CMV), papaya rings spot virus (PRSV), tobacco rings spot virus (TRSV), tomato rings spot virus (ToRSV), cucumber green mottle mosaic virus (CGMMV), zucchini yellow mosaic virus (ZYMV) and begomoviruses. An integrated management package was developed for the management of cucurbit viral diseases.

Evaluation of *mae* (yard long bean – *Vigna unguiculata*) varieties and breeding lines for collar rot and root diseases

A several fungal pathogens were identified from collar rot infected plants. They included *Fusarium* spp.,*Rhizoctonia solani*,*Sclerotium rolfsii* and *Pythium* spp. Popular cultivars and breeding lines still under testing were evaluated for the field resistant to collar rot. All varieties were found infected when grown in highly infected fields. However, breeding lines 39-11 and 39-9 showed high resistance/tolerance.

Identification of major biotic constraints in grape cultivations

A survey was conducted in major grape growing area (Kalpitiya) to find out economically important major diseases of grapes. Among the many diseases identified during the survey, downy mildew (*Plasmopora viticola*), powdery mildew (*Uncinula necator*), rust (*Physopella ampelopsidis*), ripe rot (*Glomarella* sp.) *Pestalotia* leaf spot and *Phomopsis* blight were predominat. *Fusarium* root rot was the commonly observed root disease in grapes cultivation. Suitable fungicides were identified for the control of these diseases.

Disease management strategies for organic vegetable production

The package developed included the amelioration of well decomposed organic matters in to soil 2 weeks before planting and one month afterplanting at the rate of 20t/ha. *Trichoderma viride* grown on saw dust medium(50g/hole) was added to each planting hole at the time of planting. Vermi-compost washings were sprayed every week. If any pest outbreak was observed, neem water extract was sprayed. Field sanitation and other cultural and agronomic practices towards disease management were adopted whenever required. Major diseases of tomato, okra and cabbage were managed below the economic threshold level with the proposed package of practices.

Evaluation of environmentally friendly natural polymer compounds for the enhancement of yield and management of diseases

Experiments were conducted to find out the potential use of chitosan fungicides and chitosan oligomers for the manage*m*ent of diseases and the enhancement of yield on tomato, okra and rambutan. Spraying of chitosan fungicide and chitosan oligomer showed significant reduction of yellow leaf vein mosaic virus in okra. However no effect had been observed on the incidence of powdery mildew and cercospora leaf spots of Okra.. Blight and Cercospora leaf spots of tomato had significantly been controlled. Further, 16-25 percent yield increase could be achieved with the application of chitosan. Application of chitosan significantly controlled the powdery mildew disease on rambutan.

Development of molecular method for the detection of BBTV and BSV in banana

PCR as a molecular tool was developed for detection of BBTV using primers specific for BBTV-DNA1 component. A PCR product of 1100 bp size fragment was consistently amplified from BBTV infected banana.

Similarly BSV was also detected using BSV specific primers which consistently amplified 731 bp segment of conserve region of reverse transcriptase and RNase H gene from BSV infected plants.

A novel multiplex PCR method was developed to concomitant detection of BBTV and BSV in a single assay using master mix containing above both primer pairs. The assay was validated using banana samples infected with one or both viruses collected from field.

Tomato

18 exotic tomato varieties were tested for their yield performance. Fourteen varieties were selected for further testing.

Molecular detection and characterization of bean yellowing virus disease

A set of begomovirus group specific universal primers was used for detection of begomoviruses through PCR using 1:25 diluted total DNA preparations as template DNA The study showed that PCR using the selected primer set was specific and sensitive for detecting begomovirus causing bean yellowing disease in bean.

Molecular detection and characterization of TYLCV

TYLCV infected samples were tested for *begomovirus* using a set of begomovirus group specific universal primers.The core Coat Protein (CP) gene fragment of 520 bases of *begomovirus* was consistently amplified with all samples showing symptoms of TYLCV. Further, a PCR method was developed to quick and reliable detection of TYLCV using a pair of specific which consistently amplified a PCR product of 1650 bp from infected plants. Methods can be used in early diagnosis of the disease, insect

transmission studies and evaluation of varieties for resistance to the disease.

Development of talc-based formulation of *Trichoderma viride*

The talc based formulations of *Trichoderma* spp. were developed. The shelf life and survival of Trichoderma on talc was periodically evaluated for 12 months. The results showed that *Trichoderma* spp could survive evenup to 12 months of storage in air tight triple layer aluminum bags.

Development of an IPM package for citrus pest & diseases

Survey was conducted to determine the disease incidence in citrus growing areas during 2012. Powdery mildew, pink stem and Scab were the most prevalent diseases in citrus cultivation at Bibile, Maduruketiya, Bandarawela Madolsima. and Gannoruwa. Drying of citrus plants (20% DI) followed by infection of *Phytophthora* root rot was observed in Theldeniya area due to drought conditions prevailed and due to the adoption of poor agronomic practices.

Twelve varieties (8 exotic + 4 local varieties) were screened against powdery mildew at HORDI, Gannoruwa under natural infection. Five varieties (3 exotic + 2 local) free form infection of powdery mildew.

Development of an IPM package for control pumpkin viruses

Pumpkin samples showing yellowing with leaf curl collected from Wariyapola and Markandura were negative for six viruses tested, (CGMMV, TORS, CMV, PRSV, TRSV, WMV and ZYMV) but, positive for Begamovirus.

A destructive disease causing drying of leaves followed by wilting of plants was observed in pumpkin cultivation at Wariyapola and Gannoruwa research fields and farmers field at Moragollamgama as well. The disease was identified as a bacterial disease *Erwinia trachypilla.*

Development of technology for cultivation of indigenous mushroom variety

Fruiting bodies ofindigenous mushroom variety growing on mango tree at Gannoruwa School was identified as an edible oyster mushroom. Pure culture was obtained successfully in 14 days. Mother and commercial spawns were produced successfully using paddy seeds. Mycelium of indigenous mushroom was successfully grown 145 g/bag was obtained. Variety will be further evaluated under NCVT in different agro ecological regions.

ROOT & TUBER CROPS, FLORICULTURE AND HOME GARDEN DIVISION

Root & Tuber Crops

- **Sweet potato**
  - The variety Malaysian gave high yields (> 35t/ha) with good quality, attractive red skin colour, white flesh and short age.
  - NCVT programme was conducted in five locations with this variety.
  - VAT programme was conducted in four districts.
  - CIP with high dry matter content was evaluated. CIP 440186 gave significantly high yields with good quality.
  - Out of the eleven salt tolerant CIP lines, five lines namely 199076-1, 199062-1, 440224, 440262-1 and 440183 gave high yields. These lines will be evaluated under saline condition to select the promising lines suitable for saline areas.

- **Cassava**

  A new variety HORDI 6 having high yields and marketing qualities such as well developed root tuber with long stalk and attractive skin colours (brown outer skin and pinkish inner skin) was released officially with the name HORDI Mu 1.

- More than 50,000 basic planting material of all the recommended varieties of root and tuber crops were distributed to different clients. Germplasms of all the root and tuber crops were maintained for future use.

Floriculture & Home Gardening

- **Collection, maintenance and improvement of endemic and indigenous flora having potential ornamental values**

  Two new wild ornamentals and 4 exotic Gerbera hybrids were added to the collection.

- **Collection, Maintenance and evaluation of underutilized crop varieties adaptable for home gardening**

  Underutilized vegetable crop varieties having high adaptability for home garden situations were maintained and been tested under home garden situation..

  Five new crops were introduced to home garden crop collection as two lab bean varieties, two lima bean varieties and one Canavalia species.

AGRICULTURECHEMISTRY DIVISION

Main functions of the division of Agricultural Chemistry are conducting research on soil fertility, plant nutrient management and organic farming. In addition division provides advice and the recommendation of soil test based fertilizer application for food crops. Further it provides analytical services on request for soil, plant, water, chemical fertilizer, compost and manures. Similarly conduct training programme in relation to soil and fertilizers and their management for farmers, extention officers, officers in private companies, School children and university and NDT students. Clients are being provided with advises on the use and mangment of fertilizer and handling deficiency situations.

Nutrient Management of Organic Vegetable Crops

The effect of different organic nutrient management options on vegetable yield were tested using Capcicum and Bean as the test crops.

The different organic nutrient management practices had no significant effect on the capsicum pod yield in Maha season and bean yield in yala season. However, highest fruit yield of capsicum was reported in Green manure + Compost + compost tea spray treatment. In yala season, highest bean yield was recorded with application of green manure and compost treatment (10.7t/ha) followed by application of green manure, compost and compost tea spray treatment (10.5t/ha). Incorporation of green manure with compost has some positive effect on vegetable yield.

Long term application of fertilizer and manure

In a long term study conducted for more than 10 years showed that application of compost together with inorganic fertilizer always performed better than either compost alone or inorganic manure alone treatments. Application of inorganic fertilizer alone continuously and application of no fertilizer gave the lowest yields in the long run. Therefore, results indicate the value of adding organic manure together with inorganic fertilizers. Integrated use of organic manure with inorganic fertilizer may be attributed not only nutrients supplied but also to the many beneficial effects that organic manure are known to impart in the soil – plant system

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Different nutrient sources on organic vegetable yield

The effectiveness of different types of organic nutrient sources such as Cattle manure (20t/ha), Poultry manure (10t/ha), vermicompost (40t/ha) , compost (40t/ha) were tested and compared with DOA recommended NPK on vegetable yield in mix cropping of cabbage, capsicum and knolkhol in maha season and cabbage, carrot and beet root in yala season.

The different organic nutrient sources have some effect on the capsicum and cabbage yield and no significant effect on knolkhol yield in maha season. Whenconsidered the total mean yield of

three vegetable crops, highest yield in maha season was found in compost treatment (25.2t/ha) and followed by poultry manure treatment (24.4t/ha) while lowest yield was found in vermi compost treatment (16.2t/ha). The highest total mean yield of three vegetable crops (Cabbage + Beet + Carrot) in yala season was observed in the chemical fertilizer treatment (18.7t/ha) and followed by the application of poultry manure treatment (16.6t/ha). .

Potassium management for banana under annual planting system for enhancement of crop productivity

This study was conducted to determine the response to the addition of K in the mid country wet zone to determine the best sequential application rates of potassium for banana. This project is sponsored by the National Science Foundation of Sri Lanka.

Study on heavy metal contents in edible part of the aquatic plants

Heavy metal such as iron, copper, manganese and zinc contents in edible part of the aquatic plants (kohila, kangkung, welalakola, rampe and ikiriya) were tested. Resuts showed that there was alocation specific and species specific variation of the heavy metal contents in edible part of the aquatic plants.

Mn and Fe contents in all the samples were much higher than Cu and Zn. Maximum level of Cu in all the samples did not exceed the harmful level (1.0-64.0mg/kg). However, results showed majority of the samples exceeded permissible level of Mn (35 mg/kg) and Fe (200 mg/kg) Study is in progress.

Drinking water quality of selected villages in Anuradhapura District

Drinking water quality of 11 rural villages in the Anuradapura district was monitored for selected chemical parameters to determine the suitability for drinking purposes. Acidity of the drinking water samples collected from the study locations ranged from 6.7 - 7.5 and they were within the acceptable range of 6.5 - 7.5. High electrical conductivity reflects the degree of salinity or salts in water and therefore, considered as an important parameter of assessing the quality of drinking water. Results showed that electrical conductivity, which indicates the salinity status of water, is comparatively high in the tested locations. More than 58 % of the water samples showed medium salinity while 35.8 % were of high salinity. Only 5.4 % of the water samples were with low salinity. The chloride contents of water samples tested ranged from 19 - 1217 mg L^{-1} in the study area. In the present study, 22 % of the water samples collected exceeded the permissible level.

Therefore, this study was concluded that high salinity with high electrical conductivity of drinking water in the areas is a major problem. Fluoride, calcium, sodium and chloride contents are also remarkably high in drinking water in majority of the wells studied. Heavy metal contents of the drinking water sources were however very low.

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

Heavy metal contents (Fe, Cu, Mn, Zn, Cd, Cr, and Pb) in phosphate fertilizers imported from different countries were tested. Phosphate fertilizers from different countries contained appreciable amounts of some heavy metals (Fe, Cu, Mn, Zn,Cd, Pb. and Cr) as impurities. Metals like Fe, Cu, Mn and Zn are considered as micronutrient also. Therefore, addition of TSP in to soil can provide micronutrients to the soil. Study is in progress.

Study on micronutrient status of soil in different cropping systems

Micronutrient contents in soils from different cropping systems were studied. Results of soil from four locations showed that soils from Marassana area gave the highest amount of available Fe (21.9-205.7mg/kg), Cu (0.16-3.76mg/kg) and Mn (12.5-122.1mg/kg) while the highest Zn level (0.42 – 28.4mg/kg) was found in Anuradapuraarea (rice – rice cropping system). Lowest Fe (2.4-26.4mg/kg) and Cu (0.15 -1.2mg/kg) were found in Nuwara Eliya area and the lowest Mn (0.38 – 6.0 mg/kg) was found in Anuradapura area. However, except soils from few locations, majority of the locations were not deficient in above micronutrients. This study will be continued further.

Study on heavy metal status in animal wastes

Heavy metal contents (Fe, Cu, Mn, Zn, Cd, Cr, and Pb) were determined in different types of animal fresh dung (Poultry, Cattle, Piggery and Goat) collected from farms throughout the country. Results showed that content of Fe was the highest in all type of animal dung, and out of which goat dung showed the highest (6.8g/kg) among the four types of animal dung. Highest Cu (0.11g/kg) and Mn (0..39g/kg) was found in poultry dung while the highest Zn (0.63g.kg) and Cd (0.5mg/kg) were found in pig dung and highest levels of and Pb (1.39mg/kg) was found in cattle dung while highest Cr content (0.51 mg/kg) was found in goat dung.

Soil fertility evaluation programme in Different cropping systems in Sri Lanka

This study was conducted to assessment of the soil fertilityparameters associated with different cropping systems at selected ASC division covering all the districts in Sri Lanka. Sample collection and analysis of the most of the parameters were completed and analysis for micronutrients will be progressed.

Analytical Service

During the year 2012, about 280 soil, 19 water samples, 35 plant samples and 120 compost samples were analysed and recommendations were submitted.. It is noted that number of plant samples with various problems in micronutrients received for analysis is of the rise during the year 2012 as compared to the previous years. The revenue collected from soil and compost analysis during the year from these analytical services amounts to Rs. 150,490.00(Rupees one hundred fifty thousand four hundred and ninety)

Students' projects

Two undergraduate students from the University of Peradeniya have completed their final year projects. In addition one student from NDT Agriculture of Hardy Advanced Technological Institute, Ampara and one students from National Apprentice and Industrial Training Authority have completed their "in plant Training" at the division.

EXTENSION, ECONOMICS AND DATA MANAGEMENT DIVISION

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

During this year this division conducted awareness programme for the following institute / School and farmer organization.

It was assisted in publishing 25 numbers of horticulture technical bulleting / leaflets. Assistance were given to island wide exhibition conducted by various organizations by providing posters and technological information. Number of 8499 leaflets were sold to interested individuals and organizations. Dissemination of technology also done by answering telephone calls. This division has organized 58 training programmes on horticultural crops conducted by scientists in this institute.

Table 1.2.3: Training programmes conducted during 2012

Category	Number of participants
School children	15,990
School teachers	503
Teachers training collages	445
Farmers / entrepreneurs	241
University Students	134
Private Technical Collage	35
Technical Institute	172

Agriculture Museum

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

CENTRAL LIBRARY

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

- More than 251 foreign periodicals were received thought the year as complimentary copies and on exchange basis. In addition Library paid 5750 Sterling Pounds as annual

subscription to Commonwealth Agricultural Bureau International (CABI).

- More than 1000 users visited the library to acquire information. About 850 books were circulated among library members through regular reader services and Inter Library Loan Schemes..
- Over 60 retrospective searches were made at the request of the Research Officers. About 42 searches were done through the assistance of CARP. User seminar was held for the research officers of the department.
- About 200 Research Officers obtained information using Internet facilities. AGRIS CD-ROM System also helpful them to get current information and we have succeed to update WEBAGRIS database with the latest Sri Lankan agricultural information of Annals of the Sri Lankan Department of Agriculture Journal and Tropical Agriculturist Journal articles. In addition, we are able to exported agricultural data to National Agricultural Bibliography of 2012
- AGRINET Content Pages Service (SDCP) was continued and more than 150 Content Pages were distributed among department users.
- The Central Library distributed the Tropical Agriculturists Journal to local and foreign institutions during 2012 (Vol. 160) and provided inputs as more than 1000 articles and 3200 books to the PURNA database.

DEVELOPMENT & TECHNOLOGY TRANSFER ACTIVITIES

Vegetables

- **Seed and planting material distribution of leafy vegetable**

A total of 1.72 kg seeds of Amaranthus, Nivithi, Sarana, Packchoi and Asamodagam was produced. Further, 1132.8 kg planting materials of Gotukola, Mukunuwenna, Kankung, Minchi and korean Gotukola were produced and distributed among farmers and extension

- **Training programs**

Training & advisory services

Postgraduate Directed Study - 01 Undergraduate students - 04

NDT student – 02

Farmers- 87

Extension staff – 11

- **Breeder seed production**

Breeder seed of Pandurupolon mae 31.5kg and Sena mae 8 kg were handed over to the Seed Division.

- **Cucumber agronomy**

(Response of cucumber F1hybrid variety (single cross) to application of N, K levels and splits) The preliminary study revealed that potential yield of H18 could be obtained just by using DOA recommended fertilizer dosage.

Fruits & Tissue Culture

- It was conducted 4 training programmes for officers and 7 training programmes for university students.
- Four training programmes were conducted for 105 farmers.
- It was solved problems of farmers those who visited the office and gave necessary advice. Answers were given for about 360 problems directed over the telephone on fruit crop cultivation. Replied more than 100 letters received regarding the fruit crop cultivation and problems of farmers, students etc.
- It was organized 1 day training programmes for 18 model villages established under Deyata Kirula Exhibtion in Anuradhapura and conducted training on fruit crop cultivation in each village (about 800 farmers)
- One research papers were published with the collaboration of other officials. 1. K.G.S. Seneviratne and K.T.M.S. Perera, Flower bud pollination during daytime for higher fruit set in red-fleshed dragon fruit (*Hylocerus* spp.) Annals of the Sri Lanka Department of Agriculture, 2012. 2. K.G.S. Seneviratne and D.K.N.G. Pusphakumara, Madan (Syzygium cumini), Chapter 8, in Underutilized fruit trees in Sri Lanka, Volume 2, ISBN 978-955-9224-34-1, 2011, Pg 148-157.
- Eight paper articles were published.
- One university student and 4 NAITA diploma students were supervised for training studies on Fruit Crop Cultivation and tissue culture for the year 2012.
- Participation in the stall preparation and stall duties in Deyata Kirula 2012 held at Oyamaduwa, Anuradhapura.
- Contribution to the Centenary celebration exhibition held at Gannoruwa. Organized and prepared the fruit orchards and organized the fruit stalls at HORDI.

• Research Farms

Four research farms i.e. Pasyala, Walpita, Ulpothagama and Ambathenna and one adaptive research centre Wagolla are supervised by Fruit division. Infrastructures were developed in all farms and research and development activities were conducted. Cultivation of Pineapple was started (4ha) in Pasyala and Walpita farms and Mango trees (about 1000) were rehabilitated in Walpita and Ulpothagama farm. Planting material production was carried out in all four farms.

• Projects

Tissue culture planting material production project funded under the DOA special projects was initiated. Laboratory facilities were expanded to maintain about 4000 culture vessels. From next year 50,000 banana plants and 100,000 Pineapple plants will be produced annually.

- **Production of basic planting materials of banana & pineapple**

Table: 1.2.4: Current status of tissue cultured plants

Crop	Variety	Plants	
		In-vitro	Plant House
Banana	Ambon	15,000	1200
	Kolikuttu	10,000	800
Pineapple	Mauritius	25,000	1500

Root & Tuber crops and Floriculture

- A 1.5 acre block is established with Root and tuber crops in Malwaththa Farm, Ampara under the Deyata Kirulle-2013 District development programme to supply planting material to the farmers in the area.

- **Integrated management system of plant genetic resources Project**

Under this project of integrated management systems of plant genetic resources twenty five Doiscorea accessions (belonging to *Dioscorea alata*, *Dioscorea esculenta* and*Dioscorea bulbifera* spp) were collected. These accessions were established in HORDI fields for multiplication and conservation. Characterization of collected accessions has been started.

Under this project of integrated management systems of plant genetic resources seventeen varieties were collected. These accessions wereestablished in home garden for multiplication and conservation. Characterization of collected accessions has been started.

- **CO_2 Enrichment project**

A tomato hybrid variety was tested in this project. Plants enriched with CO_2 gave high yields

- Two exhibitions were conducted
  Deyata Kirulla- Oyamaduwa
  Centenary exhibition- Gannoruwa

- **Radio programme and Training Programmes**

One radio programme was conducted in SLBC National Service (Tamil) on Root and tuber crops cultivation on 09-11-2012. Two training programmes on 31-05-2013 and 06-12-2013 were conducted at HORDI, Gannoruwa on Root and Tuber crops cultivation and Home gardening (Tamil medium).About 60 people participated. (SLBC Listeners group and Students from Aysha Siddeeqa Educational Institute).

Nine training workshops on designing and development of home gardens were conducted. 375 participants of different organizations and requested individuals were trained and technical bulletins on home gardening were provided. 1215 seed packets with 7 varieties were distributed.

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

Entomology

- Contribution as resource persons for crop clinics-06
- Contribution as resource persons for training programmes/ organic farming- 20
- Advisory work to solve insect pest problems with farmers- 75
- Contribution to two exhibitions including DOA centenary exhibition and advised about 1500 farmers to solve pest problems
- Evaluation of exotic seed cultivations- 07
- Maintained the insect zoo of the Ag. Tech Park and information provided for about 40,000 people visiting the insect zoo.
- Management of bee garden and bee colonies for demonstration- Increased the availability of pollen and nectar for bees throughout the year by maintaining a collection of different flowering plants and demonstrated to about 500 people. Extracted 11 kg of honey from bee colonies.

Pathology & Mushroom

- A number of 1082 personnel were trained on oyster mushroom cultivation and 113 certificates were issued forregistration as small scale mushroom produces.
- A number of 70 personals were trained on paddy straw mushroom cultivation while 88 personals were trained on mushroom spawn production.
- Advices given to 09 farmers by post, 730 through telephone and 507 farmers visit to HORDI
- Disseminated mushroom cultivation technologies for 26 G.C.E. (AL) students on their "Kewala project".
- A number of 40 university students from Jaffna were trained on mushroom cultivation and spawn production.
- Assist to an Agriculture Diploma student for his project. (Ampara)
- Two exhibitions were conducted 1) Dayata Kerula- Anuradhapura, 2) Govi sathiya– Gannoruwa (100 years of DOA). Further, exhibits including posters and exhibits and guidence were provided for three exhibitions conducted by D.D. officer Mannar & Gampaha and High Education Institute, kuliyapitiya.
- Practical training workshops were conducted on mushroom cultivation & spawn production with the involvement of different non-government and government organizations (Agro Enterprise Development & Information Service Department of Agriculture - 23 personnel were trained, ISTI Maha-Ilupallama - 30 personnel were trained, ADA office Kegalle - 30 AI were trained, IFAD (Gampola and Ambalanthota)-142 were trained, Wedatha Center ,Horana and Ratnapura - 56 and 58 personnel were respectively trained, Mahaweli Authority Moragahakanda -24 personnel were trained, Central Environmental Authority -54 personnel were trained)
- Participatory technology dissemination activities via electronic media: Four radio programs - Oyster mushroom cultivation in paddy straw ,value added products from

dried mushroom (Rangeri Dabulu radio) ,Spawn production(Kadurata radio) and Two T.V (ITN and Rupawaheni) programes were conducted.(New edible indigenous mushroomvariety and Low cost Spawn production – Govibimata arunalu) Paper article (Oyster mushroom cultivation in paddy straw) was published in Rewera news paper.

- Two spawn production units was established at Laheru mushroom atMapanamadulla and Saduni mushroom at Genigathhena
- Distribution of 217 packet of paddy straw mushroom, 07 packet of oyster mushroom spawns to strengthening cultivation of paddy straw mushroom and oyster mushroom among farmers.
- Enhancement of passion fruit production by cultivating 30 ac with 45 farmers in Kalthota, Balangoda

Chemistry

- **Soil fertility evaluation programme in Different cropping systems in Sri Lanka**

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

- **Analytical Services**

During the year 2011, about 2000 soil, 200 water samples, 27 plant samples and 100 compost samples were analysed and reports were submitted. It is noted that number of soil samples received for analysis is on the rise during the year 2011 as opposed to previous years. The revenue collected during the year from these analytical services amounts to Rs. 168,830.00(Rupees one hundred sixtyeight thousand eight hundred and thirty).

OTHER ACTIVITIES

Pathology & Mushroom

Awards

- W.A.R.T. Wickramaarachchi - Award for Best Poster presentation on " A novel molecular techniques for mass indexing of tissue culture plants for BBTV" at Annual symposium 2012 of Department of Agriculture, Sri Lanka (held on 20-21 September, 2012 at Plant Genetic Resources Centre, Gannoruwa, Peradeniya, Sri Lanka).

- W.A.R.T. Wickramaarachchi - University of Agricultural Sciences Gold Medal for General Meritfor securing the highest Overall Grade Point Average (OGPA) in PhD (Plant Pathology) – awarded at the 46th Annual Convocation of University of Agricultural Sciences, Bangalore, India held on 13th April 2012.

Training / workshop attended during 2012

- R.G.A.S. Rajapakshe – RCA/ IAEA Regional executive management meeting for policy makers and end-users on green radiation processing for agricultural environmental and industrial applications at Vietnam from 27-31, August, 2012
- W.A.R.T. Wickramaarachchi – International Banana symposium and training workshop at Taiwan from 19-24 of November, 2012
- W.A.R.T. Wickramaarachchi - K Ramakrishnan (Ex- Dean), University of Agricultural Sciences Memorial Gold Medal for overall best Performance in PhD (Plant Pathology)) – awarded at the 46th Annual Convocation of University of Agricultural Sciences, Bangalore, India held on 13th April 2012.

Students' projects

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

PLAN FOR 2013

Vegetables Division

Development of Hybrid varieties in Brinjal, tomato, capsicum, bitter gourdand luffa

- Development of open pollinated varieties of beans, yard long bean, winged bean
- Seed production of traditional vegetables
- Breeder seed production of tomato, brinjal, yard long bean, luffa, bitter gourd and winged bean this time only Mae breeder seeds are included.
- Seed production of parental lines of already released F1 Hybrid varieties. Only in the coming year/.
- Strategic and basic research to enhance the efficiency of hybrid seed production and to development of appropriate management package

Fruit & Tissue Culture

- Exploration, conservation and propagation studies on Uguressa in Sri Lanka
- Hybridization of Durian varieties to identify better combination of parents for high yield and quality andidentification of better parental combination for the production of a Durian Hybrid.
- Exploration, conservation and evaluation of jack fruits for high yield and quality
- Hybridization and selection of dragon fruit to develop quality high yielding varieties
- Effect of inter stock and rootstock variety on dwarfing of mango
- Exploration, conservation and evaluation of Embon banana accessions to identify high yielding and quality varieties
- Development of papaw hybrids using available inbred lines and evaluation of hybrids for yield and other qualities
- Development of high yielding, good quality and disease resistant banana varieties through induced mutation.

- Selection of high yielding, good quality and disease tolerant banana germplasm.
- Development of high yielding, good quality rambutan varieties through induced mutation.
- Development of high yielding, good quality papaya varieties/hybrids
- Development of package of practices to improve yield and quality of rambutan
- Study the Effect of seed size and growing medium of rootstock and grafted plants of Jak fruit variety Father long.
- Establishment of four model villages.
- Development of four research farms and planting material production.

Root and tuber crops &Floriculture

- Varietal development programmes in sweet potato and manioc.
    - Varietal evaluation of selected cassava varieties
- NCVT programme in selected varieties of sweet potato in five locations.
    - A VAT programme in selected varieties of sweet potato in four locations.
    - Varietal evaluation of high dry matter content and high salt tolerant CIP lines of sweet potato.
    - Time of harvesting in selected variety
- Basic planting material production of recommended
- Germplasms maintenance of all the root and tuber crops
- Awareness programmes on root and tuber crops. Etc
- Maintenance of Model Home garden at HORDI
- Collection, maintenance and evaluation of underutilized crop varieties adaptable for home gardening
- Training workshops on designing and development of home gardens
- Improvement of endemic and indigenous flora having potential ornamental values as Novel product
- CO_2 enrichment project with Tomato hybrid variety
- Collection, conservation, characterization and evaluation of underutilized crop varieties adaptable for home gardening under the project "Integrated management systems of plant genetic resources"
- "Enhancing agricultural mechanization technologies for crop production and post harvest processing of cassava"

Pathology

- Screening of brinjal, tomato and capsicum germplasm for wilt and collar rot
- Laboratory and green house testing of imported seed and other planting materials for disease diagnosis
- Effectiveness of natural polymer compounds (chitosan) for bacterial disease control (in-vitro)
- Pilot scale testing of chitosan on pest control of Rambutan, Bitter gourd, Chili and leafy vegetables
- Testing of natural polymer compounds (hydrogel) for growth enhancement and pest control in fruit crop nursery plants and leafy vegetables (green house study)

- Efficacy testing of commercial formulation of *Tricoderma* inoculum
- Management of pests and diseases of grapes and increase the fruit size in the "Thompson Seedless"
- Studies on stem bulging of passion fruit
- IPM Packages for Mae collar rot
- IPM Packages for pumpkin viruses
- IPM Packages for citrus diseases
- Study on seed borne nature of capsicum and bean anthracnose
- Molecular detection and characterization of major viral diseases of tomato, cucurbits and capsicum
- Evaluation of new formulation of fungicides against downy and powdery mildew of cucurbits
- Evaluation of formulation of fungicides against early and late blight
- Evaluation of formulation of fungicides against anthracnose
- Evaluation of formulation of fungicides against Okra powdery mildew
- Disease diagnosis and advisory service
- Testing of bottle cultivation method for oyster mushroom
- Protocol development for milky mushroom cultivation
- National Coordinated varietal evaluation trial for *Pleurotus sajor-caju*and *Pleurotus flabellatus*
- Identification of cultivation method for local mushroom variety
- Identification of mushroom varieties using DNA technology
- Identification of cultivation method for exotic mushroom variety

Entomology

- Testing of improved IPM package for pumpkin in research fields & in farmers fields (NARP project)
- Review of chemical package recommended for management of pumpkin virus diseases
- Screening of insecticides against citrus pests – Leaf miner, black flies, aphids (NARP Project)
- Screening of matricides against citrus mites (NARP Project)
- Field evaluation of botanicals against cabbage pests in organic farming fields
- Screening of insecticides against banana weevils
- Post release survey on the field efficiency of the exotic parasitoid, *Acerophagus papayae* in controlling papaya mealy bug
- Investigations on the relationship of the usage of pesticides, fertilizer and drinking water quality with Chronic Kidney disease of unknown etiology (CKDU)
- Identification of causal factors and management of passion fruit stem bulging
- Management of pest and diseases of grapes and increase the fruit size in variety "Thompson seedless"
- Insecticides effect on bee pollination in egg plant
- Review of IPM package recommended for management of cucurbit virus diseases with emphasis on insecticides
- Identify a management package for the control of sweet potato weevil: *Cylas formicarius*

Chemistry

- Effect of different organic fertilizer sources on vegetable yield under organic farming
- Nutrient management of organic vegetable cultivation `
- Long term effect of compost application on soil vegetable yield and soil quality
- Potassium management in Banana
- Fertilizer management in Pineapple
- Soil fertility evaluation study on different ASC regions in Sri Lanka

STAFF LIST

Designation	No.
Director (Actg.)	01
Additional Director (Actg.)	02
Research Officer	18
Administrative Officer	02
Programme Assistant (Agriculture)	09
Public Management Assistant	15
Farm Clerk	4
Agriculture Instructor	19
Research Assistant	15
Research Sub Assistant	13
KKS	01
Driver	08
Store man	02
Mechanist	02
Machine Operator	01
Carpenter	02
Welder	01
Electrician	01
Lawn Mover Operator/Grass Cutter	02
Land Mover Operator/Tractor	02
Water Pump Operator	01
Bee Demonstrator	01
Circuit Bungalow Keeper	02
Sanitary Labourer	01
Unskilled Labouer	81
Watcher	08
Total	**214**

1.2.1 FOOD RESEARCH UNIT (FRU) – GANNORUWA

The Food Research Unit functions under the administration of Horticultural Crop Research and Development Institute (HORDI). The major tasks undertaken by this unit includes research on post harvest technology, product development and quality evaluation of samples derived from crop improvement programmes and conducting technology transfer activities. The FRU also has collaborative programmes with the other crop research institutes of the DOA, the provincial agricultural system, other government and non-government organizations and the private sector on technology development, transfer and use of food machineries. In addition, the unit provides the necessary facilities and guidance for under-graduate and post-graduate students to conduct their research on diverse aspects of postharvest and processing technologies.

BUDGET

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

Table 1.2.1.1: Annual budget – 2012 (Rs.)

Vote/ Project	Allocation	Expenditure	Expenditure %
Capital	1,900,000	446,558	24
Recurrent	1970500	1,632,990	83
Projects			
Value addition – Fruits, Vegetables & Cereals (NARP)	2,000,000	1,079,552	54
Improving income of rural farmers through establishing a food processing factory	11,219,560	1,759,744	16
Total	**17,090,060**	**4,918,844**	**29**

PROGRESS

Findings and Product Development

- Pumpkin based snack was introduced using pumpkin flesh.
- Carambola (*Averrhoa carambola* L.CV. ¨FWANG TUNG¨) was successfully and minimally processed when harvested at green yellow stage and given under suitable environmental conditions.
- The best curing treatment for sweet potato varieties to extend the storage life, by storing under sand was found.
- Processed products were developed using Kiriala (*Xanthomonas saggilifolium*),

Rajaala (*Dioscorea alata*), Katuala, Kukulala and Buthsarana. The products developed are: Buthsarana cake, Buthsarana, muffin, Kiriala chips, Kiriala pikckel, Kiriala instant pickle, Kiriala snacks, Kukulala chips and pickle, Rajaala chips and pickle.

- Kesipissan (*Cyclea burmanni*) was successfully used for the production of Jelly with fruits.
- Dragon fruit based products; Jam, Jelly, Yogurt, Ready to serve drink and rice dragon fruit pudding were produced.
- Rice flour was used to develop the products; Biscuit containing 100% rice with Amaranthus seeds, chocolate cake containing 100% rice, muffin containing 100% rice and "Wandu" containing 100% rice with fruits.
- Pumpkin ready to serve drink and pumpkin flour products were developed.

Development Activities

- Project on "improving farmer income through establishment of a processing factory" funded by Korean Government was continued. A small scale processing plant was established at Food Research Unit for training small scale producers. A few training programs were conducted to train small scale processors. A new project of US$10000, funded by Republic of Korea, has been approved to produce a post harvest manual on postharvest handling of tomato.
- Awareness programs were conducted with the multimedia presentations and practical sessions were also conducted to introduce the sector of food processing and post harvest technology. Posters, Leaflets on the subject were prepared and distributed.
- The buildings of Food Research Unit were successfully renovated.
- Training of University students – Five undergraduates from University of Uvawellassa, Peradeniya, Sri Jayawardanapura and Ruhuna successfully completed their 3-4 months assignments at FRU.
- Training of Diploma students – Three students of HARDI Technical College studied at FRU FOR 4 months and produced the assignment for technical college.
- Actively participated in the 'Deyata Kirula' and Centenary exhibitions of Department of Agriculture and exhibition was successfully carried out to make aware the people on post harvest technology and food processing sector with distributing leaflets (new leaflets on food processing and post harvest technology of fruits, vegetables, root and tuber crops rice and soya were prepared).

Technology Transfer

- FRU continued to provide laboratory analytical facilities. During the year, several samples of ready-to-serve beverages, chutney, cordial, jam, dehydrated fruits & vegetables, pastes, bites, french-fries, received from private sector, small and medium scale processors were analysed to ensure quality of products for the local market.

- One hundred fifteen reports on vegetables 34 reports for fruits, 26 reports for yams and 5 reports for mushroom were issued for breeders of Department of Agriculture.
- AGEDIS sponsored training – Two training programs were conducted with private sector participation on fruits and vegetable processing and rice based products.
- Training programs on post harvest technology of fruits and vegetables and Processing were conducted for Private Sector organizations, District Training Centers – Agriculture, Vidatha Centres, Agriculture Ministry, Chamber of Commerce, Department of Industries, Teacher Training Institutes, Schools, Agriculture Instructors, Diploma students and University students.
- Four training programs (225 individuals) on rice based products, 45 programmes (1250 individuals) on processing of fruits and vegetables, 11 programs of milk based products, 15 programmes of candies, 49 programmes of Soya bean based food products , Yams, corn & mushroom products and packaging were conducted at the FRU premises and other institutions.
- NineAgriculture Schools with 350 students were trained on post harvest technology and food processing. Three university student groups (110) were trained on post harvest technology, food processing methods. Programs were conducted for 7 groups of technical Colleges (250 students). Fifteen Vidatha programs were also conducted on food processing. School teachers and teacher instructors (Agriculture and Home science sections) were trained on post harvest technology and food processing areas.

Publications

- FRU participated as a member of subject matter editorial board of second editions (2012) of the Department publications; cultivation of pineapple and cultivation of mango.

PLAN FOR 2013

- Development of preserved Pumpkin products.
- Reducing post harvest diseases of Mango, Banana and Papaya through increased defence mechanism.
- Reducing internal browning of Pine apple through increased K application.
- Improving fruit juice quality of Passion fruit through increased K application
- Development of preserved mango products using Tom EJC variety.
- Preparation of Dragon fruit products
- Preparation of Green Chilli products.
- Development of Chilli powder using local Chilli varieties
- Development of Corn, Kurakkan and Soya flour mixture for local food preparation.
- Preparation of nutritious instant Rotti and Pittu mixtures.

STAFF LIST

Designation	No.
Research Officer	03
Agriculture Instructor	03
Research Assistant	02
Agriculture Monitoring Officer	01
Program Assistant	01
Management Assistants	02
Sub Lab Assistant	02
Driver	02
Electrician	01
Labourer	05
Labourer (Contract)	07
Watcher	02
Total	**31**

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

Regional Agricultural Research and Development Centre, Bandarawela along with its satellite stations Rahangala and Maduruketiya and experimental farms at Bibile and Muthukandiya functions as the main organization for development of appropriate agricultural technologies in the Uva region and Balangoda segment of Sabaragamuwa province. Although the main task is carrying out Research programmes, the Centre engaged in production and distribution of quality planting materials of potato, fruit and flower crops with the aim of enhances agriculture production of the farming community within the mandated area.

BUDGET

Table 1.2.2.1: Annual budget - 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	14,044,500	13,131,124	94
Capital	4,966,686	1,434,520	29
Projects			
KOPIA (Vegetables)	200,000	61,484	31
KOPIA (soil)	254,000	100,220	39
Development of citrus industry in Sri Lanka	592,000	537,985	91
ANSOFT	75,000	71,421	95
Tissue culture	2,800,000	2,261,066	81
Hybrid seed production (tomato)	200,000	189,809	95
Farm development	1,400,000	1,285,505	92
Seed potato production	10,500,000	8,587,600	82
NARP			
Citrus varietal/germplasm evaluation	150,000	144,506	96
Technology development for seed potato production & varietal improvement	600,000	588,844	98
Beans	500,000	405,936	82
Improvement of yield & quality of Banana	50,000	49,963	99
Total	**36,332,186**	**28,849,983**	**79**

PROGRESS

Research and development activities carried out during the year under review were focused on vegetables, potato, sub tropical and temperate fruit crops and floricultural crops.

RESEARCH

- Seven pole bean cultivars were evaluated for their yield and other performances. Cultivar BN 16 and ACC 6116 gave higher average yield compare to the check variety KWG
- Six bush bean cultivars were evaluated for their yield and other performances. Cultivar BB 2904 gave higher average yield compare to the check variety Wade
- Hundred and forty-three bean germplasm was collected and 28 promising lines were selected and evaluated. From them 15 lines were selected for further testing.
- Locally developed 123 potato lines were multiplied for further evaluation.
- Seeds of parental lines of tomato variety Bhathiya were produced and the amounts produced were 1236 g of Female (P3) and 1346 g of Male (P4) lines.

AGRONOMY

Potato

- A growth media evaluation study conducted in poly-tunnels, for the production of good quality potato seeds, revealed that rice husk charcoal and sub soil (1:1) as basic medium and rice husk charcoal and sub soil (2:1) as the filling medium is the best.

PLANT PROTECTION

- An environmentally friendly fungicide Kaligreen® (Potassium bicarbonate) was evaluated against Powdery mildew (*Leveillula taurica*) on tomato, grown in poly-tunnels. Second season results confirmed the previous results providing good control of the pathogen. Therefore, the product, Kaligreen®, can be recommended as a safer fungicide to manage powdery mildew on greenhouse grown tomato.
- Antifungal effect of nine botanicals and synthetic chemical Pyraclostrobin were evaluated *in-vitro* on *Diplocarpon rosae*, the causal organism of black spot of rose. Results revealed that cinnamon (*Cinnamomum verum*) leaves, Philippine red lime (*Citrus auranfiIolia*) peel, Adathod (*Adathoda vasica*) leaves, lime (*Citrus limonia*) leaves and garlic (*Allium sativum*) bulbs are superior among tested materials.
- Experiment on Evaluation of efficacy evaluation of new insecticides to control bean pod borer (*Maruca vitrata*) revealed that, Flubendiamide 20 WG, a new molecule, @ 1.25 g/10 L was effective in controlling the pest. The new product produced similar results as the recommended chemical Novaluron 100g/L EC.
- Citrus rust mite (*Phyllocoptruta oleivora*) is an emerging threat to citrus cultivation in Sri Lanka. An experiment was conducted at RARDC research field to find out suitable insecticides to minimize the pest population.

Results revealed that Sulfur 80% WP @ 80 g/ 10 L or Abamectin 18g/L EC @ 6 ml/10 L is highly effective against the pest.

- Different crops were intercropped with cabbage to find out the best crop combination to reduce cabbage pests. Experimental plots of cabbage intercropped with leeks *(Allium ampeloprasum var. porrum*), or mint (*Mentha spicata*) combination showed the lowest severity of caterpillars. The experiment is continuing and the output will generate valuable information for organic farmers.
- A study was conducted to find out the suitability of pinus (*Pinus caribaea*) fins as a cheap alternative to coir dust in tomato cultivation in poly-tunnels. Tomato plants grow on chopped pinus fins mixed with coir dust (1:1) performed similarly as plants grown on coir dust alone, the common growth medium, and produced good yield. Therefore, it can be concluded that, pinus fins can be used as a substitute for coir dust up to some extent in tomato cultivation in poly-tunnels.
- Popular rose (*Rosa hybrida*) cultivars grown in UCIZ were screened for their resistance/tolerance to gray mold (*Botrytis cinerea*) and cultivar "Grand gala" showed good tolerance to the disease.
- Based on the request made at Uwa PTWG meeting, an initial study was conducted to find out the rice root knot nematode (RRKN; *Meloydogyne graminicola*) situation at farmer fields in Lunugala. Results indicated that two paddy fields at Gannilayaya and Lewgala in Udakeeruwa have been infected with RRKN. However, the population density is not very high (±45%) to cause yield loss.

In addition to the research activities, the division provides advisory services to farmers in order to solve their field problems on pests and diseases. Almost 120 farmers brought their samples to the division and solved their problems during the period under review. Most of the problems are diseases on bean and flower crops.

HORTICULTURE

- Sub soil is the best potting medium for rooting of Pear semi hardwood cuttings. The success rate was 47 % with sub soil medium.
- An experiment is initiated to study the effect of rootstocks on fruit quality of citrus. The required amount of rootstocks was prepared during the period under review.

TISSUE CULTURE

- The cost of production of tissue-cultured potato plants can be reduced using Kitul flour (0.7%), an alternative to agar, as a solidifying agent.
- Tissue cultured strawberry plants, using leaf explants, showed some tolerance to anthracnose disease (*Colletotrichum gloeosporiodae*). Disease intensity was low in leaf-regenerated plants than runner-regenerated plants.
- Sucker production of filed grown gerbera plants can be increased by applying 6-10 ppm of benzyleaminpurine.

FLORICULTURE

- Twenty-two plants/m^2 densities is required to maximize the cut flower production of roses (*Rosa hybrida*). To maintain this density, 30x15 cm plant spacing has to be practiced.
- A greenhouse trial is established to study the effect of leaf removal on flower production of gerbera (*Gerbera jamesonii*).

SOIL SCIENCE

- Seed sized tuber production of potato can be increased with the application of 50 kg/ha of P and 75 kg/ha of K.
- The recommended doses of chemical fertilizers of tomato and bean can be reduced up to 75% with using additional amount of organic fertilizers. No yield reduction observed on tomato for three seasons and on bean for four seasons.

SPECIAL PROJECTS

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

SERVICES

Breeder seed production

- DOA-SCS certified breeder seeds of Pole bean varieties Keppetipola Nil (208 kg.), Balangoda nil (26 kg), Bangarawela green (43) and Bush Bean variety Wade (3 kg) were produced.
- Inoculum of 1500 packets of 5 kg compost were produced under Production and Promotion of Organic Fertilizer, and disturbed among farmers for compost production.

Soil test based fertilizer recommendation programme

- Three hundred and thirty three samples were tested and fertilizer recommendations were given accordingly.

TECHNOLOGY TRANFER ACTIVITIES

- Officers of the RARDC participated for 04 PTWG meetings held in Uva and Sabaragamuwa Provinces and provided technical training to extension officers in pre-seasonal training programmes.
- Conducted several training programmes for farmers on cultivation of flower crops, potato, pear and avocado. Some of those trainings were held at farmer fields.
- Provided advices for pests and diseases management to farmers who cultivate vegetables, fruits, flower crops and potato.
- Conducted training programmes for more than 1500 school students and 175 farmers.

PLAN FOR 2013

Vegetables

- NCVT of bush and pole bean
- AYT of pole bean
- Germplasm collection and evaluation of Brinjal
- Germplasm evaluation of Potato
- Breeder seed production of pole bean
- Parental seed material production of Tomato var. Bathiya
- Evaluation of Korean varieties (Lettuce, Chinese cabbage, Radish, Red pepper, Cucumber, Sweet pumpkin) and technology
- Technology development to increase product quality and quantity of crops grown in poly-tunnels

Potato

- Production of quality seeds through Rooted Stem Cuttings.
- NCVT & VAT trials collaboratively conducting with ARS Sita Eliya.
- Establishment and technology develop-ment for hydroponic and airophonics seed potato production.
- Technology development for yield maximization of potato mini-tubers and RSC.

Horticulture

- Evaluation of local and Japanese varieties of Orange and Mandarin at ARS Moneragala, ARS Rahangala, and RARDC Bandarawela.
- Maintenance of temperate fruit crop mother plants viz; Apple, Peach, Pear, Chinese guava, Nectarine, Avocado, Carombola etc.
- Evaluation of rootstock varieties and materials for orange.
- Enhancement of post harvest storage life of pear and peach.
- Citrus flower induction studies.

Plant Protection

- Screening of fungicides and insecticides for diseases and pests of vegetables, fruits, potato, and flower crops.
- Evaluation of plant extract to reduce black-spot disease of roses
- Development of IPM package for Citrus.
- Use of plant extract to reduce leaf disese in cabbage
- Study the fluctuation pattern of whitefly population on pole bean
- Find out the suitability of *Tithonia diversifolia* herbal extract to control diamondback moth of cabbage
- Screening citrus varieties and chemicals for citrus rust mites
- Evaluation of effectiveness of acaricides on controlling local mite populations
- Study the effect of mulches on thrips population and tomato spotted wilt virus (TSWV) incidence

Floriculture

- Evaluation of propagating materials of gerbera.
- Increase of flower quality of chrysanthemum.

- Effect of leaf removal on flower production and quality of gerbera
- Effect of Plant Growth Regulators on flower production and quality of Chrysanthemum
- Effect of the age of planting material on growth and flower production of Chrysanthemum

Tissue Culture

- Increased sucker production in gerbera through growth hormones
- Introduction of appropriate protocol for *in-vitro* propagation of Gerbera through different explants
- Enhance the production of potato micro tubers.
- *In-vitro* rooting of Pears

Soil Science

- Establishment of N, P, and K fertilizer levels for seed potato production.
- Development of fertilizer management package for G_o production in poly house.
- Development of complete nutrient solutions for hydroponic and airophonics.
- Testing of different fertilizer management practices on cabbage.
- Effects of micro nutrients on Tomato

STAFF LIST

Designation	**No.**
Deputy Director (Research)	01
Research Officers	12
Agriculture Monitoring Officer	01
Economist's Assistant	01
Programme Assistant	05
Research Assistant	07
Agriculture Instructor	05
Laboratory Sub Assistant	01
Administrative Officer	01
Public Management Assistant	09
KKS	02
Drivers	02
Tractor Operator	01
Budder	01
Mason	01
Carpenter	01
Watchers	07
Circuit Bungalow Keeper	01
Labourer (Permanent)	41
Labourer (Contract)	49
Total	**149**

1.2.3 REGIONAL AGRICULTURAL RESEARCHAND DEVELOPMENT CENTRE (RARDC) - MAKANDURA

The regional Agricultural Research and development Centre (RARDC) at Makandura caters to the agricultural research and development (R&D) needs of the Gampaha, Kurunegala and Puttalam districts. The two agricultural research station (ARS) at Kalpitiya and Vanathawilluwa, the three adaptive research units (ARU) at Tabbowa, Iginimitiya and Wariyapola. These station / units strengthen the R&D network in handling location specific research and development programmes. While catering to the R & D needs based on national priorities in the RARDC network of the Department of Agriculture (DOA), research efforts are being also directed at the specific needs of the provincial councils. The centre has also established linkages with the other institutes and centers of the DOA and outside organization such as the Faculty of Agriculture and Plantation Management, University of Wayamba, Makandura, Lanka Phosphate Ltd., Industrial Technology Institute (ITI) etc. to carryout commodity and factor research and extension and communication.

The research and development activities of the center are focused mainly on developing and integrating technologies for coconut based cropping system to sustain crop productivity in the coconut lands. The technologies are developed for the mandated fruits, vegetables, root and tuber, mushrooms, floriculture and condiments crops. The other areas of research and development are compost production, vermi compost, organic farming, vegetable breeder seed production, fruit crop planting material production, farmer field crop productivity demonstration, on farm trials, soil test based fertilizer recommendation program. Provincial Technical Working Group (PTWG) focused farmer problems driven research, location specific research activities etc.

BUDGET

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

Table 1.2.3.1: Annual budget - 2012 (Rs.)

Vote/ Project	Allocation	Expenditure	Expenditure %
Capital	7,184,989	2,274,260	32
Recurrent	6,997,220	6,497,217	93
Production of compost and promotion of usage	4,588,000	3,755,000	82
NARP - Pumpkin	10,000,000	992,000	10
NARP- Anthurium	1,275,000	1,221,350	96
Tissue culture Project	2,800,000	2,670,000	95
Pomegranate	900,000	890,000	99
Total	**33,745,209**	**18,299,827**	**54**

PROGRESS

Fruit breeding and Tissue culture

- Hybridization programme of pineapple.
    - Planting material production of H1, H2, H3 and H4was initiated using stem cutting technique.
    - Backcross program of Hybrid with Mauritius was started.
- Germplasm collection and evaluation of pineapple.
    - Germplasm collection was re-established in the yield. (11 cultures).
- Planting material production of pineapple and Banana using Tissue culture technique.
    - Pineapple cultures were in multiplication state.
    - Banana cultures were initiated.

Fruit Agronomy

- Pomegranate hybridization program

  1st harvest and fruit quality parameters in F1 generation were taken
- Banana germplasm collection, evaluation and characterization
- Hybridization programme of pomegranate
- Variety Evaluation of Banana (Seeni)
- National Coordinated Variety Trial – Banana
- Effect of plant growth regulators on semi hard wood cuttings of pomegranate

Floriculture

- Development of low cost shade house for cultivation of *Anthurium andraeanum*
- Fractionation effect of the total nitrogen supply on development and yield of *Anthurium andraeanum*
- Four red promising lines of *Anthurium andraeanum*were submitted to the variety release committee meeting at ISTI, Gannoruwa.

Soil Science and Compost

- 66 compost samples were analyzed for evaluating their quality standards.
- 44 soil samples received under soil test based fertilizer recommendation programme were analyzed and issued.
- 384 soil samples sent by Provincial Department of Agriculture (NWP) regarding IPNS were analyzed and fertilizer recommendation for paddy was given.
- 34 plant samples were analyzed for research purposes.
- 79 soil samples collected from Thabbowa & Arachchikattuwa ASC regions

Entomology

- Comparison of organic and conventional cultivation systems in Banana
- Comparison of organic and conventional cultivation systems in Pineapple

Pathology

- Evaluation of five mushroom varieties in the NCVT
- Evaluation the spreading rate of sigatoka

disease of banana in organic and conventional farming methods for Amban, seeni, kolikuttu and Ambul banana varieties.

Vegetable

- Breeder seed production – TA2 (Snake gourd) – 5.420kg
- Breeder seed production -Thinnevely (Bitter gourd) -1.650kg
- Select two local pumpkin varieties for NCVT

Root and Tuber crops

- Testing the effect of different N-P-K levels on crop yield in sweet potato cultivation in Low country intermediate zone. The trial was established in Sept. 2012 and it was being harvested now. Seasonal progress will be included in the seasonal report.
- Productivity improvement of Cassava through new canopy management technique.
- The productivity improvement in quality cassava tubers (hormone testing)

Technology dissemination

Table 1.2.3.2: Technology dissemination during 2012

Topic of the programme	Leaf lets	Field days	Soil testing	Exhibition
Compost	364650		66	03
Soil	-	-	441	-
Mushroom	400	-	-	-
Pathology	-	01	-	-
Pineapples	2500	-	-	-
Pomegranate	5000			
Floriculture	3800	02	-	-

Planting material production -2012

Table 1.2.3.3: Planting material production during 2012

Institute	Name of Plants	No of plants sold
RARDC-MK	Dragon Fruit	365
	Anthurium	500
	Pineapple	-
	Banana	500
ARS-Kalpitiya	Pomegranate	5278
	Grapes	614
	Guava	1781
	Dragon Fruit	50

Training programmes

Table 1.2.3.4: Training programmes conducted during 2012

Topic of the programme	No of Programmes	No. of Participants
Compost	50	3600
Mushroom	07	200
Pineapples	06	300
Floriculture	07	508
Home garden	40	1800
Root & Tuber	06	175
Banana	20	400
Dragon Fruit	10	300
Vegetable	08	185
ARS, Kalpitiya - Pomegranate, Guava, Grapes, Dragon Fruit	10	284

Advisory Services

Table 1.2.3.5: Advisory services provided during 2012

Field	No of Advisory during the year 2012
Compost	500
Mushroom	210
Pineapples	150
Floriculture	18
Home garden	10
Root & Tuber	150
Dragon Fruit	250
Banana	350
Pathology	200
Entomology	05
Vegetable	35

PLAN FOR 2013

Fruit breeding and Tissue culture

- Pineapple hybridization program
- Germplasm collection and evaluation of Pineapple
- Planting material production of Pineapple & Banana by tissue culture techniques
- Development of protocol for micro propagation of new Anthurium varieties (Mk30, Mk36)
- Development of protocol for micro propagation of Hybrid pineapple
- Establishment and maintain of demonstration yield for pineapple

AgronomyFruit

- Banana germplasm collection, evaluation and characterization
- Hybridization programme of pomegranate
- Variety Evaluation of Banana (Seeni kesel)
- National Coordinated Variety Trial – Banana
- Effect of plant growth regulators on semi hard wood cuttings of pomegranate

Entomology

- Pest management in guava, pomegranate and annona
- Monitoring on spatial and temporal distribution of scale insects in mango
- Use of safe chemicals to control of mango scale insect

Soil science and Compost

- Availability of phosphorous by adding ERP with different levels at compost production
- Training programmes on Mushroom cultivation and mushroom seed production
- *Zea maize* trial (organic / inorganic fertiliser trial

Vegetable

- Pumpkin – Pest control (Vectors for virus) by using with reflective mulches& weedcontrol
- NCVT and breeder seed production (Bitter gourd - Thinneweli and Snake gourd - TA2)

Water management

- Evaluation of micro irrigation system for pineapple cultivation

Pathology

- Different soil amendments to control tomato bacterial wilt

- Collection and conservation of locally available mushroom varieties for future studies

Floriculture

- Ex -Situ conservation and utilization of genetic resource of Anthurium
    - Breeding
    - Evaluation
    - Planting material production
    - Catalogue making

Root and tuber crops

- Testing the effect of different N.P.K levels on crop yield in sweet potato cultivation in the Low Country Intermediate Zone.
- Productivity improvement of Cassava through new canopy management technique.
- The productivity improvement in quality cassava tube (hormone testing)

STAFF LIST

Designation	No.
Deputy Director (Research)	01
Research Officer	11
Agricultural Monitoring Officer	02
Programme Assistant	04
Agricultural Instructor	22
Research Assistant	08
Research Sub Assistant	01
Farm Manager	01
Farm Clerk	01
Driver	03
KKS	01
Mason	01
Watcher	06
Mechanic	01
Nurseryman	01
Electrician	01
Circuit keeper	02
Tractor operator	04
Sanitary labourer	01
Water pump	01
Grass Cutter Operator	01
Labourer	56
Labourer (Contract)	60
Total	**190**

1.2.4AGRICULTURAL RESEARCH STATION (ARS) - SITA ELIYA

Potato is the priority crop of this station followed by vegetables, fruits and some floricultural crops. Crop improvement programs include varietal development and introduction and selection of suitable high yielding varieties. Enhancement of crop productivity is done through development of improved agronomic packages, use of good agricultural practices for the management of pest, disease and nutrient. Further, national programs are being continued to up lifts quality and quantity of seed potato, planting materials of strawberry and some ornamentals. Also, research on seed production of potato and some exotic vegetables are conducted for further improvement of locally developed technology.

BUDGET

Table 1.2.4.1: Annual Budget – 2012 (Rs.)

Vote/ Project	Allocation	Expenditure	Expenditure %
Capital	1,860,000	740,275	40
Recurrent	4,332,914	4,448,243	103
Expansion of seed potato production	5,000,000	4,489,265	90
Improvement of seed potato production technology	1,063,000	847,304	80
Development of new potato varieties for local conditions	800,000	793,842	
Evaluation of citrus varieties	100,000	67,773	68
Promotion of quality planting materials of important crops through tissue culture	2,710,000	2,440,010	90
IFAD	500,000	331,280	66
Total	**16,365,914**	**14,157,991**	**87**

PROGRESS

RESEARCH

Agronomy

- Among the fifteen commercial potato varieties tested for adaptability, Mondeo, Sifra and YP 04-108 found to have high yield potential (30-35t/ha) and suitable for the cultivation in the UCWZ.
- Experiments conducted to identify effective and efficient propergules for pre-basic seed production revealed that micro tubers are equally good as G_0tubers for G_0 pre basic mini tuber production under hydroponic system.
- Improved cut-potato tuber technology seed found to be equally good as whole seed tubers in the UCWZ area. This technology helps to minimize the seed potato requirement.

Plant Breeding

- Selected 4 locally developed potato lines (M-18, 19, 01-12-10 and 01-09-05)evaluated under NCVT.
- Selected 5 locally developed potato lines (01-11-01, 99-25, 01-10-01, 01-08-15 and A-17)for NCVT in 2013.
- Selected 107 locally developed lines from 2814 lines to develop heat tolerance varieties for nontraditional areas base on a total of 107 seedlings were selected based on yield and tuber characters for agro-morphology studies and multiplication.
- Selected 24 locally developed lines from 107 lines to developed high yielding varieties.
- Evaluated 5 locally developed lines under Advance Major Yield Trial (AMYT).
- Started seed multiplication for 12 locally developed potato linesX-2, 01-05-03, 01-05-04(R), 01-07-06, 01-12-03, 01-12-11, 01-12-18, 01-13-01, 01-13-08, 01-16-07, 99-99, and 01-04-06).
- Establishment of 107 locally developed potato lines in Bandarawela, Kalpitiya and Thirunelweli research stations to identify heat tolerant varieties.

Tissue Culture

- Developed a protocol to increase size and number of potato **Micro Tubers**
- Developed a protocol for *in-vitro* callus induction and plant regeneration of potato cultivars to create new varieties.

Entomology

- Developed a low-cost and efficient laboratory method for mass rearing of Black cut-worm (*Agrotis ipsilon*) to be used in the bio control research on*Bacillusthuringiensis*.
- Developed a package of practices (especially for the seed potato production program) for efficient and effective management of potato pests (including Cut-Worms, Tuber Moth, Aphids, Mites) having the lowest Ecological Impact Quotient (EIQ) as compared to the present management practices followed by farmers. Virtako 40% WG (Thiamethoxam 20% + Chloranthraniprole 20% w/w - a mixed formulation of a neo-nicotinoid and a diamide) found to be effective as a soil treatment for the control

of cut-worms and as a foliar spray for the control of Aphid and Tuber Moth.

- Identified an effective pheromone (from InsectScience.co.sz) for monitoring Potato Tuber Moth in the field and store houses that can be used for mass trapping of male moths.

Pathology

- The following fungicides found to be effective in controlling Late Blight of potato under farmer's field condition; Amistar (@ 1.0 ml/l); New source of Mancozeb 80% WP @ 2.5g/lit and Propineb 70% WP @ 2.5g/lit.
- Flutrifol (@ 1 ml/5l and 1.5 ml/ 5l) found effective in controlling Powdery Mildew of Zucchini.
- Out of 19 potato breeding lines, 01-16-15 were found tolerant to late blight and gave higher yield under disease control conditions. These lines were selected for further evaluation.
- New potato lines screened against different diseases of potato: a) 34 lines against late blight; b) 14 lines and four varieties against powdery scab.

Soil Science

- A new fertilizer formula is developed for hydroponic seed potato production and is subjected for further modifications
- A study was initiated to find out the effect of micro nutrients on consumption potato production for consumption under KOPIA project

Vegetable

- Identified Beet varieties (Detroit Dark red 2 'Cristal', Red star and AX RB 462F1) to perform well in terms of yield and tolerance to pest & disease in UCWZ conditions.
- Identified Cabbage varieties (CBS 153, Supper Green, and White Cabbage – Balashi and White Cabbage – Bandung) suitable for UCWZ conditions in terms of yield, head characters & tolerance to common diseases.
- Identified cauliflower varieties (Rocky, Balvany, White Flash, Milky Way and Candid Charm) performing well in terms of yield, curd characters under local conditions.

DEVELOPMENT ACTIVITIES

Agronomy

- Production of one million pre basic seed potato (G_0) by Hydroponic, Aeroponic and Geoponic system
- 664,210 of pre basic seeds (G_0) were issued to farmers for open field multiplication.
- Established a new aeroponic unit in Sita Eliya farm.
- Introduced G_0 seed production technology using geoponic to 26 farmers in Kikiliyamana andgeoponic & hydroponic for Galpalama provincial DOA seed potato farm.
- One more farmer entered in G_0 seed potato production using hydroponic system increasing total number of farmers to eight under IFAD project.

- A farmer society was formed to produce G_1 G_2& G_3 using G_0 produced by IFAD farmers.

Plant Breeding

- 100kg G1 seeds of newly released variety Golden Star were produced

Tissue Culture

Potato

- 12,253 numbers of *in-vitro* plantlets of variety Granola were issued for formal seed potato production programme. Further 2,283 Granola, 123 Golden Star and 45 Desiree were issued for in-formal seed production programme.
- 135 Raja, 36 Desiree, 50 Anova, 100 CIP *in -vitro* plants were issued for experimental purpose.

Strawberry

- 1079 numbers of *in-vitro* plants and 3639 numbers of *in vitro* derived planting materials were issued for private farmers.
- 200 numbers of plant *in vitro* plants used for runner production in research station

Floricultural Crops

- A total of 3036 baby's breath,1021 madona lily, 396 gerbera, and 506 lemonium plants were produced and distributed among private growers

Entomology

- A total of 893 soil samples tested for PCN analysis from Govt. seed potato farms.
- A total of 8250 natural bio control agents of *Liriomysa huidrobrensis* were released to field and glass houses during 2012.

Pathology

- 1091 soil samples were tested for Bacterial Wilt.
- 25 plant samples were received for diseases diagnosis and control recommendations.
- 10.5kg oyster and 14 kg button mushrooms spawn were distributed among farmers.
- Seventy three plant samples were virus indexed for PLRV,PVY, PVX, PVS, PVM and PVA collected from different phases of seed production ie. *in-vitro*, RSCC, Pre-basic ,basic seed potato and farmer fields population.

Soil Science

- 1502 Soil samples were tested for fertilizer recommendations,

pH	-	514
EC	-	514
Phosphorus (P)	-	237
Potash (K)	-	237

Workshops/ Presentations

- One officer participated in the training on Seed potato production, certification and supply chain Management in the Netherlands.

- 3 Research officers participated in a computer training programme at the In-service training centre, Gannoruwa.
- One officer underwent a training on Pathology
- Induction training for newly recruited 7 Research Assistant in In-service Gannoruwa.
- Pest & disease Management training for Govt seed potato farm staff
- ASDA presentation on Babys' Breath

Trainings

- Five B.Sc. undergraduate students completed their final year specialization projects during 2012.
- 154 university students, 312 agriculture Diploma students, 190 School students, 49 agriculture related officers, 30 School teachers and 347 farmers were trained on potato cultivation and management, potato seed production, floriculture, strawberry cultivation and protected agriculture.

PLAN FOR 2013

Agronomy

- Evaluation of commercial potato varieties for adaptability and yield
- Development of new techniques for pre-basic & basic potato seed production
- Storage studies for mini tubers and different generations of seed tubers
- Effect of within row spacing on yield of potato under farm management conditions

Plant Breeding

- Evaluation of locally developed 4 potato lines under NCVT and VAT in Nuwara Eliya and Badulla districts.
- Evaluation of locally developed 5 potato lines under NCVT in Sita Eliya and Bandarawela research stations.
- Evaluation of 107 locally developed potato lines in Bandarawela, Kalpitiya and Thirunelweli research stations to identify heat tolerance varieties.
- Evaluation of locally developed potato 12 lines under AMYT.
- Evaluation of locally developed 7 potato lines under MYT.
- Evaluation of CIP germplasm to select desirable traits and to select parental lines.
- Evaluation of locally developed 24 potato lines under OYT.
- Characterization of available potato germplasm in ARS Sita Eliya.
- Evaluation of 15 imported potato varieties to select suitability to Sri Lankan conditions.

Tissue Culture

- Study on healthy planting material production for Pears, Apple and Citrus
- Morphology and molecular analysis of Granola in Sri Lanka
- Development of protocol for Chrysanthemum and Statist
- Evaluation and improvement of the different varieties of Strawberry

Entomology

- Continue the Potato Cyst Nematodes (PCN) control program in Government seed potato farms in Nuwara Eliya through regular Monitoring of PCN populations to determine the status of PCN infestation in selected lands prior to seed potato planting.
- Study the efficacy of Bt formulations for Biological control of cutworm (NARP); a major pest problem in Nuwara Eliya area
- Mass rearing of the potato leaf miner, *Liriomyza huidobrensis* and the larval parasitoid, *Diglyphus iseae* for inundate release of *Diglyphus iseae* to enhance the effectiveness of the larval parasitoid for the control of leaf miner
- To evaluate the efficacy of some safer, new insecticides for the control of Black Cut Worms (*Agrotis ipsilon*)
- Develop environment friendly (with low Environment Impact Quotient (EIQ) value) methods for the management of potato pests including Potato Tuber Moth; especially for the seed potato production program and identify insecticides with different Mode of Actions to replace the recommended toxic insecticides
- Evaluate the efficiency and effectiveness of chemical and non-chemical methods for the management of Potato Tuber Moth in storages.
- Biological control of white grub in Strawberry and Vegetable. Determine the efficiency and effectiveness of Bt strains against white grub in of Strawberry and Vegetables

Pathology

- Fungicide Screening Against Potato Late Blight
- Screening of Commercial potato varieties and new potato breeding lines against Late Blight
- Study the effect of hot water treatment on seed born inoculums of Black Rot (*Xanthomonas campestris pv. Campestris* / XCC) of cabbage.
- Epidemiological studies on Powdery Scab of potato (*Spongospora subterranea*)
- Screening of potato varieties against powdery scab of potato
- Collection and maintenance of *Phytophthora infestans* isolates from different potato growing locations.
- Development of new technology for production of spawns of oyster mushroom.

Soil Science

- Test different nutrient formulations for hydroponic & aeroponic systems
- Test new fertilizer formula for seed potato production
- Test influence of secondary and micro nutrients on potato yield and quality under KOPIA project
- Nitrogen,Potash, and Potasium management on seed potato production in collaboration with RARDC, Bandrawela.
- Develop methods for land improvement and soil conservation

Vegetable

- Develop efficient seed production technology for carrot & beet root
- Evaluate the introduced exotic vegetable varieties, namely Carrot, Cabbage, Leek varieties, Cauliflower for their adaptability
- Evaluate identified new technologies to enhance vegetable production

STAFF LIST

Designation	No.
Research Officer In-Charge	01
Research Officers	04
Agriculture Monitoring Officer	01
Programme Assistant	03
Research Assistant	07
Agriculture Instructor	04
Research Sub Assistant	01
Administrative Officer	05
Public Management Assistant	01
Driver	02
Store Keeper	01
Tractor Operator	01
Nursery men	01
Watcher	01
Labour	16
Labour (Contract)	43
Total	**93**

1.2.5 AGRICULTURE RESEARCH STATION (ARS) – TELIJJAWILA

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

Allocation received and expenditure incurred during 2012 are given in Table 1.2.5.1.

Table 1.2.5.1: Annual budget -2012 (Rs.)

Vote	Allocation	Expenditure	Exp %
Recurrent	4,746,020	4,666,665	98
Capital	2,250,000	1,385,222	62
Projects			
NARP - *In-vitro* mutagenesis of banana for *Fusarium* wilt	519,000	501,057	97
NARP" (Mushroom) Programme	1,119,000	1,097,091	98
Productivity Enhancement of Banana-Crop Coordinator)	1,200,000	1,190,866	99
Promotion of quality planting material of important crops through tissue culture technology	1,190,000	1,187,206	99
Total	**11,024,020**	**10,028,106**	**91**

PROGRESS

RESEARCH

Genetics and Plant Breeding

Mae

- Five lines with 2 recommended varieties of *Vigna sesquipedalis* (mae) were evaluated under NCVT.
- Preliminary Yield Trials were conducted for an introduced mae accession.
- Germplasm were screened to identify suitable lines as mae/vegetable cowpea and 6 accessions (mae/vegetable cowpea) were selected for further evaluation.

Brinjal

Three lines with 1 OP variety and 1 hybrid of brinjal were evaluated under NCVT.

Horticulture

Banana

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

Pineapple

Development of an efficient nutrient management package and application of leaf trimming practice to enhance the productivity of pineapple.

Mango

Development of improved agronomic practices and a management package for mango fertilizer application.

Pathology and microbial biotechnology

Mushrooms

- The suitability of spent mushroom substrate (SMS) of *Pleurotus* mushrooms as a potential growth substrate for a subsequent cultivation and also as a bio-pesticide for foliar disease management of leafy vegetables was investigated and proven.
- Cost efficacy of inclusion of SMS of *Pleurotus* in growth substrate to substitute legume seed powder was studied and proven.
- Optimum pH level to improve *Pleurotus* yield was investigated.
- .Preliminary investigations were carried out to explore the possibility for the artificial cultivation of an indigenous mushroom.

PROJECTS

NARP

Evaluation of nutritional profiles and antioxidant and antimicrobial properties of some selected mushrooms

Instruments and chemicals were purchased (laminar flow cabinet and autoclave) and laboratory facilities were improved.

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

Cultures of cultivar Agra were multiplied. Laboratory facility was improved at ARS, Telijjawila to facilitate the research.

Tissue culture

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

A building (155sq.ft) for small scale tissue culture laboratory was constructed and purchased essential equipments and other inputs.

Productivity Enhancement of Banana

- Completed 06 blocks at Udawalawa and Mahawali area in 300 ha.
- 18 training classes were conducted.
- A field programme was organized at ARS, Teljjawila.
- Product development was started with one commercial investor in Matara district and about 7800 mother plants have been established in Matara and Gampaha districts aiming 50000 suckers.

OTHER

- 30A three phase power connections were obtained for the main building.
- Production of planting materials and compost

Pineapple	- 50000
Kiriala	-75
Banana	- 6885
Cassava	- 495 m
Leafy vegetables	- 220 kg
Compost	-26 tons

- Constructions of vehicle garage was completed
- New home garden was developed
- A store room for mushroom production unit was built
- Construction of tissue culture laboratory was completed.

Conferences/Seminars attended

ABSD 2012: Sri Lanka –India conference on Biotechnology for sustainable development.

ISAE2012: International symposium on agriculture and environment organized by University of Ruhuna.

PLAN FOR 2013

Plant Breeding

- Seed production of selected vegetable cowpea accessions and evaluation for yield and other agronomic characteristics.
- Screening of available vegetable cowpea and mae germplasm for year round production.
- Development of high yielding pest and disease tolerant pineapple varieties with high quality fruits through induced mutation.
- Germplasm collection, characterization, management, evaluation and selection of banana.
- Germplasm collection, characterization, evaluation and selection of local traditional vegetables in low country.
- Identification of major problems in economically important fruit crops in Matara district and management through multidisciplinary crop management practices.

Horticulture

- Collection and management of low country under-utilized fruit crops and development of new propagation methods.
- Identification and management of major pest, disease and agronomic problems of economically important fruit crops in Matara district.
- Integrated management of pineapple mealy bug.
- Adaptability testing of low country vegetables and tuber crops.

Pathology / Microbial Biotechnology

- Devising safe and consumer-friendly pest management strategies for oyster mushrooms.
- Optimization of the cultivation protocol of oyster mushrooms.
- Domestication of ingenious mushroom/s.
- Explore possibilities for the cultivation of medicinal mushrooms.

Biotechnology

Projects

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

- Further multiplication of shoot tips.
- Establishment of CLMs.
- Radio sensitivity/ EMS dosage testing for shoot tips.
- Establishment of scalp cultures.
- Establishment of Embryogenic Cell Suspension Cultures (ECS).
- Irradiation of shoot tip cultures.
- *In-vitro* multiplication of irradiated shoot tips.

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

Identification of low cost micropropagation protocols for banana, pineapple and some selected floricultural crops.

Other activities

- Training on micropropagation (with low cost options).
- Construction of a propagator as a low cost option for acclimatization of tissue cultured plants.
- Construction of poly house for maintenance of tissue cultured plants.

STAFF LIST

Designation	No.
Research Officer In Charge	01
Research Officer	02
Programme Assistant	03
Research Assistant	02
Agriculture Instructor	05
Research Sub Assistant	01
State Management Assistant	02
Office Assistant	01
Store men	01
Driver	02
Watcher	05
Labourer	04
Sanitary labourer	01
Contract laborer	30
Total	**60**

1.2.6 AGRICULTURAL RESEARCH STATION (ARS) – GIRANDURUKOTTE

The Agriculture Research Station, Girandurukotte, established in 1980 by the Mahawali authority of Sri Lanka, is responsible for research and development activities in agriculture, and in particular for addressing the field problems pertaining to crop production of the farming community in Mahaweli system "C". This Station was handed over to the DOA in 1984 and functioned under the administration of FCRDI since year 2000 and the station was affiliated to HORDI Gannoruwa.

The station focused on research and development activities to improve the productivity of vegetables, fruits and root and tuber crops.

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

BUDGET

The allocation received and the expenditure incurred under different votes and projects during year 2012 are given in the Table 1.2.6.1.

Table 1.2.6.1: Annual budget - 2012 (Rs.)

Vote/ Project	Allocation	Expenditure	Expenditure %
Capital	1,278,143	415,325	32
Recurrent	3,714,750	3,384,862	91
Hybrid seed Production programme of Maize (Sampath)	125,000	124,849	100
NCVT of Banana	50,000	50,000	100
NARP Citrus Project	100,000	98,165	98
Seed Paddy Production of Bg 366	77,810	75,260	97
Papaya Seed Production Programme (Rathna)	1,300,000	1,094,722	84
Hybrid Brinjal seed production programme	280,000	279,097	100
Farm development project(Irrigation canal repair, seed paddy production, Rehabilitation of Mango tree)	3,400,000	3,252,611	96
Soybean seed production programme under farm development project	700,000	673,217	96
Paddy production programme under farm development project	400,000	347,855	87
Total	**11,425,703**	**8,701,240**	**76**

PROGRESS

SEED PRODUCTION PROGRAMME

Hybrid brinjal ("Amanda") Seed Production

Hybrid Brinjal seeds production programme was established in 0.1ha during 2012 and produced 14 kg of F1 seeds

Breeder seed production

MI-5 Okra breeder seed production programme was established in 0.1 ha during 2012 and produced 29 kg of seeds.

Seed paddy production programme

During 2011/12 maha and 2012 yala seasons, 41.2 MT of Bg 366 produced as a seed paddy and 26.8 MT of AT 308, 8.8 MT of Bg 379/2 and 10.4 MT of Bg 366 were produced as production stock.

Registered seed production programme of black gram (MI-1)

Black gram registered seed production programme was carried out in 1.5 Ac during 2012 and produced 250 kg of black gram (MI-1) seeds.

Seed production programme on open pollinated maize varieties

Open pollinated maize seed production programme was established in 100 m^2 during 2012 and produce seed as follows.

Variety	Yield (Kgs of cobs)
(a) Lamuru	47
(b) Gumaraga	14

Seed production programme on papaya (Rathna)

Extracted 5.3kg of certified seeds

PLANTING MATERIAL PRODUCTION

Table 1.2.5: Planting material production during 2012

Crop	Varieties	Production in 2012
Banana	Seeni kesel, Embul kesel, Kolikuttu, Ash plantain, Kandula and Other varieties.	108 Suckers
Papaya	Rathna	63 of potted plants
Kiriala	Isuru	220 plants
Cassava	Kirikawadi and Jaffna selection	858 meters of stems
Sweet potato	Gnnoruwa sudu Ranabima Ama and Dahawala	31 Kg of cuttings
Passion fruit	-	73 potted plants

RESEARCH

Fruits

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

Varieties –

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

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

- National coordinated varietal trial of Banana

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

Vegetables

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

	2011/12 Maha	2012 Yala
1. Brinjal	06 Varieties	05 Varieties
2. Mae	07 Varieties	07 Varieties
3. Capsicum	05 Varieties	05 Varieties

Rice (NCRVT)

- National coordinated rice varietal trials of 2 ½ month, 3 months, 3 ½ months, 4 months and 4 ½ months age groups were tested in 2011/12 Maha and 2012 Yala seasons.

Other Field Crops/ Root & Tuber Crops

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

Crop	2011/12 Maha	2012 Yala
Sweet potato	06 Varieties	06 Varieties
Mustard	06 Varieties	05 Varieties
Cowpea	-	08 Varieties

- Varietal adaptability test (VAT) of following crops were conducted under farmer field and research station during 2011/12 maha

Crop	Farmer field	Research station
Mustard	04 Varieties	-
Ground nut	05 Varieties	05 Varieties

TECHNOLOGY DISSEMINATION

Several awareness programmes were conducted at ARS Girandurukotte during year 2012Also, more than 328, including school children, farmers and government officers visited the Station for collection of information and other services, during the year.

Training

- Mr. P.G.S. Shantha (RO) and Mr. H.M.L. Niran (RO) participated to training programme on soil conservation and land development, which was organized by NRMC from 14th to 18th May, and 3rd to 7th September, 2012

PLAN FOR 2013

- National coordinated variety trials of selected vegetables (NCVT).
- National coordinated rice variety trails (NCRVT).
- National coordinated variety trials of selected tuber crop and OFC
- Basic and standard seed production of Papaya variety “Rathna”
- Production of seeds and planting materials of root and tuber crops, fruits, vegetables and OFC.
- National coordinated variety trails of banana
- Identification of suitable year round cropping pattern for high value crops (Vegetables and OFC) under irrigation in Mahaweli system C
- Adaptability testing of beet root varieties suitable for mahaweli system C
- Collection of traditional vegetable varieties along with GPS informations
- Evaluation of exotic and local citrus accessions for their desirable characters
- Evaluation of exotic Mango varieties for there desirable characters
- fruit crop rehabilitation and productivity improvements programme
- Extension and training programmes for school children and farmers.

STAFF LIST

Designation	**No.**
Research Officer In Charge	01
Research Officer	02
Agricultural Instructor	05
Research Assistant	03
Research Sub Assistant	02
Public Management Assistant (III)	01
Tractor Operator	01
Storemen	01
Carpenter	01
Watchers	04
Unskilled labourer (Grade III)	24
Labourer (Contract)	36
Total	**81**

1.3 FRUIT CROPS RESEARCH AND DEVELOPMENT CENTRE (FCRDC) - HORANA

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

BUDGET

Table 1.3.1: Annual Budget - 2012 (Rs.)

Vote/ Project	Allocation	Expenditure	Expenditure %
Capital	2,105,000	1,364,086	65
Recurrent	3,895,803	3,379,397	87
Develop good quality high yielding cultivar of mango from existing germplasm for cultivation	1,000,000	780,930	78
Asian Network for Sustainable Organic Farming Technology (ANSOFT)	75,000	70,267	94
Evaluation of promising banana accessions in different agro ecological regions (NARP)	100,000	94,779	95
Establishment of bio diversity garden of tropical fruits at Horana	7,000,000	5,973,044	85
Development of high yielding, good quality F1 durian and mandarin hybrids	200,000	190,769	95
Hybrid seed development year 2012 - Okra	340,000	315,551	93
Hybrid seed development papaya , passion fruit and mango	200,000	190,047	95
Development of high yielding good quality citrus (orange and mandarin) varieties (NARP)	1,675,000	1,404,478	84
Development of high yielding good quality papaya varieties (NARP)	388,000	343,238	88
Development of promising durian varieties for commercial cultivation (NARP)	300,000	202,872	68

Vote/ Project	Allocation	Expenditure	Expenditure %
Promotion of quality planting material of important crops through tissue culture technology	3,650,000	2,407,583	66
Farm development	1,520,000	1,311,910	86
National mango development programme	3,000,000	2,642,803	88
Total	**29,856,800**	**20,636,230**	**69**

PROGRESS

CROP IMPROVEMENT

Evaluation of promising accessions of soursop (*A.muricata*) for yield and quality characteristics

Soursop is one of the better known fruits of high nutritive value. But it is mostlyconfined to back yard gardens. It needs attention to improve its productivity and quality. There are marked differences in sweetness and productivity in soursop. Among them a cultivar with promising characteristics could be identified. Therefore, with the objective of selecting a superior cultivar, studies were initiated in 2004.

Evaluation of 10 accessions of sour-sop during a period of 2007-2012. Four promising cultivars were identified.

Among them, 01 cultivar of high quality with fine texture, tasty and juicy flesh having a high brix value, was selected. The selected cultivar was capable of producing an average yield of 29 fruits/tree (35.7 kg) at the 5^{th} year after planting. Planting materials are being producing to popularize this cultivar.

Relationship between the fruit weight; seed weight and number of seeds per fruit of soursop

There was a positive co-relation between fruit weight and number of seeds per fruit. Similarly, fruit weight and seed weight were also positively correlated. This shows that as fruit weight increases, both seed number and weight also increase. Therefore, fruits with moderate weight are more favourable over the large sized fruits of sour- sop.

Evaluation of papaya hybrids

The papaya is increasingly becoming more important in commercial cultivations because of the rapid retun of investment due to its early maturation and high yield. Presently, the majority of commercial papaya cultivation consisted with foreign cultivars of which their seeds are imported from foreign countries by investing considerable amount of foreign exchange. Though the improvement of local papaya variety or hybrid will take several years it is essential to develop our own varieties and therefore the breeding programme at FCRDC was focused to achieve this aim. Two inbred lines were developed after 6 year of the programme and thereafter those two inbred lines were used to develop hybrids of papaya. Two hybrids which gave promising results at

the station was selected to evaluate at different agro ecological zones in Sri Lanka and now the seeds are being producing to prepare seedlings for this purpose.

Development of papaya varieties (Funded by NARP Papaya Project)

Continuous development of varieties is essential to replace old varieties and therefore papaya improvement progremme consisted with the populations in second generation are being evaluated to select individuals for next generation advancement.

Development of passion fruit varieties (Funded by hybrid seed production project – HORDI, Gannoruwa)

Development of a synthetic/ composite passion fruit variety is one of the ways to distribute a passion fruit variety by seeds. It assists to incorporate more desirable characteristics in a commercial variety and help to break the virus cycle which spreads through cuttings. Therefore, the Passion fruit development programme at FCRDC gave more effort to produce a synthetic variety in passion fruit. Seed production in 2^{nd} Synthetic generation was completed during 2012 and the third generation will be established for further improvement and multiplication.

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

Development of mango hybrids was initiated during 2007 with the objective of incorporate desirable quality characters into presently cultivated varieties. Seven hybrids produced by using Karthakolomban, Vellikolomban, Willard and Numdocmai are being evaluated in the field. The hybridity of the seedlings have to be confirmed because if not they should be maintained in the field for several years. Therefore, the DNA analysis for conforming hybridity was initiated with the collaboration of PGRC and the DNA extraction protocol was perfected.

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

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

Selection of promising varieties of Durian

A total of 68 durian accessions including 24 collected accessions, 3 introductions, 3 HORDI promising lines and 36 seedling trees were evaluated with recommended varieties. Among them 12 promising varieties were selected and out of them 4 varieties were proposed to the VRC meeting. Two varieties were released and other two varieties were conditionally released for Farmer cultivation.

Development of durian F_1 hybrids

700 durian hybrid individuals are being evaluated in the field condition. And another 100 F1 individuals are to be established for

evaluation. Crossing programme with promising lines are being continued.

Variety development of Citrus spp.

Under the collection and selection programme 14 ‘heen naran’ (*Citrus crenatifolia*), 32 mandarin(*Citrus reticulata*), 8 orange (*Citrus cinensis*), 16 pumello (*Citrus grandis*) and 7 lime (*Citrus aurantifolia)* are being evaluated. Three promising mandarin varieties were selected and evaluated at 8 different agro ecological zones.One promising pumello accession was selected.

Introduced eight Japanese exotic orange and mandarin varieties are being evaluated at 8 different agro ecological zones. Among them three promising varieties were identified.

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.

Hybridization programme is in progress. 50 developed F1s were grafted and are being evaluated

Develop good quality high yielding cultivar of mango from existing germplasm for cultivation (funded by NARP Mango project)

Collection and selection of promising mango accessions were started in 2011 at FCRDC Horana. In 2012 ,51 new accessions from farmers fields and other government farms were collected and established in the gene bank. From the previous collection one promising accession was identified. The identified accession is capable of high yielding with 325 grams of average fruit weight and of pulp to skin ratio 4.7. Rounded shape fruit is consist of 14^0 total soluble solid. Plant materials are being produced.

Germplasm evaluation of banana

National coordinated varietal trial of ‘seeni kesel’ (group 1), ‘puwalu’, ‘suwandel’, ‘kolikuttu’ (group 2) and ‘emban’, ‘bin kesel’ (group 3) is being conducted. As the first crop 38% of plants have produced bunches and the evaluation is in progress.

Evaluation of Avocado accession for yield and quality

Twenty four avocado accessions were established at FCRDC, Horana. Four promising accessions were identified as promising. Among them, 01 accession of high quality (9% fat, creamy, not fibrous) was given about 190 fruits/tree (58kg) at the age of 9 yrs. Evaluation is being continued

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

This program was initiated in late 2002 and by the end of 2008, 203 different fruit accessions were established in the field gene banks in an area of 3.73ha. These gene banks comprised of following accessions.

Table 1.3.2: Germplasm collection in field gene banks

Fruit	No. of accessions
Beli	24
Citrus	47
Lavulu	05
Lovi	04
Jak	32
Weralu	17
Uguressa	22
Goraka	33
Gaduguda	13
Durian	35
Sapota	17
Anona	14
Wax apple	26
Strawberry guava	07
Wild guava	07

Characterization and evaluation is being continued to identify promising varieties for recommendation. In addition during 2012, 13 accession of jak and 8 accession of gaduguda were added to the respective gene banks.

Sapodilla (*Manilkara zapota*)

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

Weralu (*Elaeocarpus serratus*)

In the field gene bank there are 14 accessions collected from farmer fields and propagated by wedge grafting techniques. From 2003 to 2010 their growth performance, yield, fruit quality and fruit size were evaluated. Most promising accessions HOW 5, 7, 9 and 13 were nominated for official release and all nominated accessions were released by the committee for farmer cultivation

Goraka

Thirty two accessions of goraka have established in the field gene bank. Three promising accessions (HoG-3, HoG- 8 and HoG- 11) were officially released by the variety releasing committee for farmer cultivation.

Uguressa

Twenty two accessions of uguressa were collected and established in the field gene bank at FCRDC. Characterization and evaluation are being continued to identify and select high yielding, good quality accessions for recommendation

Lavulu

Five lavulu accessions were collected and established at FCRDC, Horana. Three promising accessions were identified. Identified accessions HoLav3, HoLav4 and HoLav5 were given about 75 fruits/tree (18kg), 100 fruits/tree (25kg) and 90 fruits/tree (18.5kg) respectively at the age of 7 yrs. Evaluation is being continued.

Lovi

Four lovi accessions were established at FCRDC, Horana. There was no significant variation among collected accessions.

Development of hybrid varieties of okra with desirable characters suitable to LCWZ (funded by hybrid seed development (Okra) project)

Four hybrid varieties were selected from the studies conducted using fourteen inbred lines and their 91 cross combinations. These cross combination were evaluated in the National Co-ordinated varietal trials. Three hybrid varieties HB 100, HB 95 and HB 93 were tested for their adaptability in the wet zone and intermediated zones. Based on yield, quality and tolerance to leaf vain mosaic virus HB 100 was selected and submitted to variety releasing committee and was released for farmer cultivation.

Development and purity maintenance of Green chilli variety

Ten 'varaniya' Green Chilli farmer selection were tested and four 'varaniya' types were selected according to pungency and external characters. These four types were purified and evaluated for yield. 'Varaniya' green type was selected and initiated seed production and included in the National co-ordinated varietal trial 2011/2012 Maha season. Seed production programme is being continued.

CROP PROTECTION

Identification of causal agent of Quick die-back disease of Jak, Citrus and Annona

Die-back disease is the progressive death of shoots, branches and roots generally starting at the tip. The progress of the disease is rapid. The pathogen kills the tree within four to six weeks and death of the upper most branches is noticed.

Disease samples including dead branches and roots of Jak fruit *(Artocarpus heterophyllus)*, Citrus (*Citrus reticulate*) and Annona (*Annona muricata*) were collected from the wet zone (Kalutara, Gampha, Galle districts) and laboratory tests were conducted for identification of the causal agent.

Lasiodiplodia theobromae is identified as the causal agent for die-back disease, which was isolated from the diseased parts and the pathogencity was confirmed by the re-inoculation test.

Response of fungicides against the die-back pathogen of Jak, Citrus and Annona

The efficacy of contact and systemic fungicides to control the die-back disease was tested under *in-vitro* and field conditions. The treatments consisted of a control and eight fungicides namely, Copper (as cupric hydroxide), Chlorothalonil, Mancozeb, Sulphur, Carbendazim 500g L^{-1} SC, Carbendazim 50% WP, Tebuconazole 250g L^{-1} EW and Hexaconazole 50g L^{-1} EC.

Effect of fungicides on the mycelia growth of *Lasiodiplodia theobromae* revealed that Cabendazim 500g L^{-1} SC and Tebuconazole 250g L^{-1} EW to be effective even at the concentration of 2ml l^{-1} and Carbendazim 50% WP at 2gL^{-1} concentration. The fungicide Hexaconazole was less effective against the tested strain of *Lasiodiplodia theobromae* isolated from citrus trees.

Study on suitable guava root stock tolerant to plant parasitic nematodes

Root knot nematode is one of the major problem in guava cultivation. This nematode (*Meloidogyne* spp.) rapidly spread through infested soil and via planting material. Therefore, two studies were carried out to find resistant / tolerant guava root stock against root knot nematode. Five hundred and thirty seedlings were inoculated with *Meloidogyne* spp. and root galling was assessed in four hundred and sixty plants at 8-12 weeks after inoculation. Root galling is higher in all the plants except strawberry guava plants. However, strawberry guava was not compatible with the scion.

Out of 115 guava plants evaluated against root knot nematode in the field, eleven tolerant individuals were selected based on external symptoms of root knot nematode. Air layered plants produced from the selected individuals were inoculated with *Meloidogyne* spp. for confirmation of their tolerance to nematode. The experiment is in progress

Evaluation of different soil amendments against plant parasitic nematode

Guava seedlings of susceptible variety were transplanted in pots filled with soil mixed with different rates of poultry manure (1%, 2%, 3%, 4%) and inoculated with *Meloidogyne* spp. to assess the effect on poultry manure in reducing root knot nematode. The experiment is in progress.

SOIL NUTRIENT MANAGEMENT

Gamboge and Translucent Disorders of Mangosteen

Gamboge and Translucent Disorders are found in mangosteen in most of the areas in the Low Country Wet Zone. Due to yellow, bitter gummy deposits in the flesh (Gamboge) and watery patches (translucent) disorders, quality of fruits reduces drastically.

Boron and Calcium nutrients were tested as soil and foliar applications on the problem. In reducing severity of both these disorders, foliar applications performed efficiently. Soil application of calcium (to adjust pH 5.5 – 6.5) together with foliar sprays of Calcium nitrate and at fruiting, minimized the severity of these disorders. Plant samples are being analysed for further clarifications.

Effect of different organic materials on vermicomposting

Different organic materials to be used with cattle manure were tested on vermicomposting by tank method. Straw: cattle manure at 1:1 ratio was the best when worm population and the weight of vermicompost were considered.

Effect of organic fertilizer application on Dragon fruit

Experiments have been carried out to find out a suitable organic fertilizer package for dragon fruit. Poultry manure at 20 t/ha/yr recorded significantly higher yields than the same rate of cattle manure or vermicompost. Performance of worm wash in addition to these manures are being tested further.

CROP MANAGEMENT

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

Mangosteen (*Garcinia mangostana* L.) is one of the popular fruit crops having a great demand in both local and export market. Low expansion of the crop is primarily due to its slow growth rate, associated with the long uneconomical vegetative period of 8-10 years. Conventional wedge grafting was successful in reduction the long juvenile period by 3-4 years, withacceptable growth rate and fruiting.

The objectives of this study is to enhance the productivity of mangosteen by providing an additional root system for grafts. This study was initiated in 2004 at the Fruit Crops Research and Development Centre (FCRDC), Horana. Evaluation of growth and fruiting performances indicated that double root plants have grown well with densely grown tree canopies when compared to the single root stocked, grafted plants. In the 8th year after planting, grafts produced a mean yield of 106 fruits /plant. Thus, double root stocked grafts promoted productivity of mangosteen by enhancing its canopy development.

Productivity improvement of seed plants of mangosteen through provision of an additional root system

Attempts were also made to study the adoption of double root system technique for seed plants, which is helpful for establishment of medium and large scale cultivations. Therefore, with the objective of reducing the time taken for fruiting and there by increasing productivity of seed plants of mangosteen, studies were initiated at the Fruit Crop Research and Development Centre, Horana during Sep.2006-May 2012.

The methodology adopted for providing an additional root system for seed plants of mangosteen was inarching. Inarched plants kept in 100% shade for 45 days showed 98% success.

Double rooted seed plants of mangosteen initiated fruits at the age of 5.4 years after field planting. A mean yield of 12 fruits per tree was produced by double rooted trees, when compared to seed plants which had taken 7-20 years to come into fruiting giving an initial yield of 4 fruits per plant. Therefore, double rooted seed plants of mangosteen was shown to be promising technology, in promoting early fruiting and productivity.

Performance of Dragonfruit at FCRDC, Horana

2269, 9195, 11895, 2317 and 7338 kg/ha yield were given from 3yr, 4 yr, 5yr, 6yr and 7 yrs old plantation respectively.

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

Number of total branches were increased with the increment of no of cuttings per post. All treatments gave few number of fruits in last seasons. A considerable yield was not recorded from any treatment. Experiment will be continued.

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

The objective of this study was to recommend a profitable tree management system for rambutan for the low country wet zone. Planted 36 plants from 'malwana special' at three different plant densities {10mx10m (recommendation) 10m x 7.5m, 10mx5.0m} and two different branching heights {90cm (recommendation) and 30cm}. Growth characters, leaf characters, flower characters and some fruit characteristics were recorded. Sofar there is no significant difference in plant height, canopy spread and yield. The relevant information is being collected for further analysis.

FRUIT DEVELOPMENT ACTIVITIES

Income earned from planting material production and other activities

During 2012 the centre sold 23,560 budded plants, 1,808 grafted plants and 3,181 seedlings plants of rambutan, mango, durian, jak, avocado, star fruit, sapodilla, garcenia, lime, mangosteen, *jambu, lovi, annona, guava,* orange, *beli, weralu,* mandarin, passion fruit, strawberry guava, sapota etc. and earned Rs. 4,270,020.00 as gross profit and from other activities has earned Rs.2,507,180.90.

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

Micro propagation of Banana

Plant tissue culture is a worldwide accepted technology for quality planting material production of crops such as banana and pineapple. Therefore, tissue culture laboratory was established in this centre to conduct research on micro-propagation of fruit crops and for quality planting material production. Under the project of "quality planting material production of selected crops through tissue culture techniques" the laboratory facilities were enhanced and culture room capacity was increased from 1500 to 4500 cultures. More than 1500 banana plants from different varieties were established in research and farmer fields for evaluation and no somoclonal variations were observed. Therefore, the protocols were optimized for micro-propagation of banana cultivars *Ambul, Seeni, Netrapplam* can be successfully used for multiplication of above varieties.

Embryo rescue of Mango

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

procedure was optimized. Program will be continued.

Establishment of bio diversity garden of tropical fruits

Established grafted plants of rambutan (26), mango (127), guava (100) 38 star fruit, 5 weralu and 29 gaduguda. Seedling plants of naminam (26) woodapple (8), breadfruit(36), damba (5), karamba(15), dan(9), tamarind(2), roseapple(22),Guava(14), anona(46), lovi(12), lavulu(16), gaduguda (17) and mango (70) were also established.

Mother plant cultivations of rambutan, jak, star fruit, wax apple, mango and weralu were pruned.

As a soil conservation method, lemon grass was planted on ridges. Excavated a pond to drain off the excess water. Weeds were controlled regularly and fertilizer was added to all established plantations.

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

A home garden was establishment at FCRDC, Horana in 2005 to demonstrate the usefulness of home gardening and to educating school children etc. In 2012 – 2790 school children 234 teachers and 206 other personal were visited the home garden and improved their knowledge in home gardening.

Training programs

The following training programs were conducted in 2012

- 2460 school children and 172 teachers were visited the centre from 21 schools.
- Eight training programmes were conducted for 288 university students and lectures.
- Nine training programmes on fruit cultivation, home gardening, tissue culture and nursery management were conducted for 213 trainees.
- Under 'bio diversity fruit garden project' 31 training programmes were conducted on compost production and distributed micro organism rich compost packets (1443 packets and 1443 beneficiaries from Horana secretariat division)

Farmer Advisory programs

- 75 disease samples received from farmers and extension officers were examined and cultured in the laboratory to identify the pathogens and recommendations were given for their control.
- 97 field problems submitted by farmers pertaining to pests and diseases of dragon fruit, Rambutan, Vegetable and other ('Naa', 'Bo' tree) cultivation were attended during the year and control measures were given.

Mass Media

Officers from FCRDC participated in 04 TV programme and 05 Radio programs on fruit crop cultivation, pest and diseases control and home garden.

PLAN FOR 2013

Crop Improvement

- Development of good quality high yielding durian, orange, mandarin, pumello, lime and beli varieties through selection
- Development of good quality high yielding durian, orange and mandarin varieties through hybridization
- Development of high yielding good quality orange and mandarin varieties through mutation and introduction
- Study the floral biology of beli
- Selection of rambutan varieties from existing seedling population at farmer fields.
- Clustering the diversity of Rambutan population at FCRDC for superior accessions.
- Adaptability testing of newly recommended Goraka (*Garcinia quaesita)* varieties.
- Selection of promising accessions of Uguressa (*Flacourtia indica).*
- Evaluation of sour sop accession for yield and quality characteristics
- Evaluation of Avocado accession for yield and quality
- Development of high yielding good quality Papaya Ring Spot Virus (PRSV) tolerant papaya inbreds/ hybrids
- Development of high yielding, good quality papaya inbreds/hybrids
- Development of mango hybrids
- Germplasm collection, evaluation and selection of Lovi, Lawalu, Gaduguda and Beli
- Evaluation of mango accession for wet zone
- Evaluation of weralu accession in the station
- Germplasm exploration and collection of underutilized fruits for the establishment of bio diversity fruit garden at the FCRDC, Horana
- Development of high yielding good quality passion fruit varieties
- National Coordinated Varietial Testing Trial (NCVT) of banana.
- Collection and conservation of pineapple germpalsm for future research programme.
- Seed production and purity maintenance of a promising varaniya green chilli variety.
- Germplasm collection and evaluation of root and tuber crops.
- National coordinated varietal testing trial for sweet potato.
- National coordinated varietal testing trial for pumpkin.
- Maintenance of okra hybrid parental lines.

Crop Management

- Development of tree management package for grafted durian
- Artificial flower induction of durian in off seasons
- Developmentof profitable crop management practices for Rambutan
- Maintenance of Goraka and Uguressa accessions for future use.
- Adaptability testing of newly recommended Goraka (*Garcinia quaesita)* varieties.
- Effect of size of cutting and number of cuttings per training post on growth of vines, yield and quality of Dragon fruit

- Evaluation of double root stock grafts for growth and yield performances
- Effect of tree training on yield of seedling soursop
- Evaluation of different trellising systems of passion fruit
- Use of Paclobutazole for flowering induction in recommended mango variety for the region
- Seed germination study in weralu

Soil Science and Plant Nutrition

Development of an efficient nutrient management package to enhance the productivity of pineapple

- Assessment of potassium availability in banana growing soils and potassium management under annual planting system
- Management of fruit cracking of banana
- Management of stem bulging of passion fruit
- Development of an organic fertilizer package for dragon fruit
- Studies on pocket rambutan and partial filling of rambutan

Plant Pathology

- Control of fruit rot diseases of guava (four diseases) through safe compounds
- Control of anthracnose and stem end rot disease in mango through safe compounds
- Control of sigatoka disease in banana through plant extracts
- Control of six fruit rot diseases in papaya through safe compound
- Control of dragon fruit die back disease

Entomology

- Development of nematode resistant Guava rootstock
- Evaluation of the effect of stagnating water in the plants of pineapple, kiriala and banana on the breeding of dengue mosquitoes
- Biology and management of root knot nematode of Guava in Sri Lanka
- Evaluation of granular insecticides in controlling banana weevil

Tissue Culture

- Embryo rescue of Mango
- Field evaluation of tissue cultured Banana
- Field evaluation of tissue cultured Pineapple
- Micro propagation of economically important Grape varieties
- Development of mutants in banana for superior quality

Socio Economics

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

Development Programme

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

STAFF LIST

Designation	No.
Director	01
Additional Director	01
Research Officer	11
Economic Assistant	01
Program Assistant	06
Assistant Director	01
Research Assistant	10
Agriculture Instructor	11
Public Management Assistant	05
Drivers	03
Store man	01
Tractor Operator	02
Watcher	01
Budder	03
Labourer (Permanent)	30
Labourer (Contract)	109
Total	**196**

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

Fruit Crop Research & Development Station, Gannoruwa conduct research onmajor and under- utilized Fruit Crops under the Administration of the Fruit Crop Research & Development Centre, Horana (FCRDC).It is situated at 02 kilometers from the Peradeniya town on the way to Gannoruwa – Katugastota, and in adjacent to the HORDI (Horticultural Crop Research & Development Institute).

This Research station was located in the historical Kandiyan king's recreational and Horticultural Park. After Sri Lanka (Then Ceylon) became under the British Crown, Sir Edward Bans, the governor of Ceylon (1824-1831) opened up this area and established his private garden and paddocks for raring of horses. His cultivation of tea, rubber, spice crops, fruits and grass continued until the year 1916.

Mr. R.L. Lyne, the first Director of Agriculturetook over this farm and converted it to Crop Research Farm under the newly formed Department of Agriculture in 1912. After few restructuring programs took place in following 100 years, this farm was converted to a Research Unit of the HORDI and in 2012 it was renamed as Fruit Crop Research & Development Station (FCRDS)under the Administration of Fruit Crop Research & Development Centre, Horanain July, 2012

Fruit Crop Research & Development Station (FCRDS) possesses about 12.0 hectares of land for research & development. Table 1.3.1.1 shows the land use pattern of this station at present.

Table: 1.3.1.1: Land use pattern of the FCRDS

Crop	Total Extent (ha)	Status
1. Avocado Germplasm (Rehabilitated).	1.0	Used to obtain bud woods and conservation of elite varieties.
2. Banana Cultivation	1.0	Newly established germplasm collection of local cultivars.
3.Durian cultivation	1.0	Varietal evaluation & conservation
4.Mango Germplasm (Rehabilitated)	1.5	Germplasm conservation
5.Nursery	1.0	Production grafts and stem cutting plants of Durian, Rambutan, Avocado, Mango etc.
6.Under-utilized Fruit Crop Orchard /Field Gene Bank	2.5	35 Fruit species, 190 accessions are established and maintained.
7. Mix cropping orchards (Included Rambutan, Mango, Mangosteen, Pineapple, Strawberry etc.	4.0	Crop evaluation and conservation for mother plants.

This Research Station conductsresearch and development activities on major fruit crops such as Rambutan, Durian, Avocado, Mango and many under -utilized fruit crops including beli, masan, jambu, veralu, madan and mora etc. Varietal development,selection and evaluation of local and exotic varieties, propagation techniques, nursery management, orchard establishment, production and productivity enhancement are the major research activities coming under the purview of the FCRDS.

Mandate of the FCRDS is to conduct research and development including extension and training programs on fruit crops with a view to contributing thedevelopment of agriculture of the country.

BUDGET

Table: 1.3.1.2: Annual budget – 2012 (Rs.)

Vote/ Projects	Allocation	Expenditure	Expenditure %
Recurrent Funds	2,896,814	2,701,092	93
Capital Funds	5,471,000	4,413,778	80
Project			
Mango, Durian flowering inducting project	1,116,000	1,106,372	99
Avocado development project	1,000,000	981,195	98
Fruit plant production project	922,500	732,874	79
Farm development project	1,050,000	869,818	82
Tissue culture project	250,000	249,900	83
Total	**12,706,314**	**11,055,029**	**95**

PROGRESS

RESEARCH

Identification of elite germplasm of Underutilized fruit crops

Bale fruit (*Aegle marmelos*) (L) Corr.

Six elite accessions were identified for future crop development. Some accessions are suitable for processing or value addition purposes and others are suitable for fresh fruits.

Ber (*Ziziphus mauritiana* & *Ziziphus jujuba*)

Four accessions were identified for field planting as well as for container planting.

One promising accession was very much comparative for green apple. The other 3 accessions were highly promising for container planting.

Jamun (*Syzygium cumini* (L) skeels)

Two accessions in purple color, one exotic selection and a local cultivar for field planting as well as for container planting were identified.

Jamun (*Syzygium cumini* (L) skeels) (Local name – Eladan)

One accession of light green color was identified, and studies on crop performance are in progress.

Governor's Plum – (*Flacourtia inermis*)

One accession was identified for further evaluation and release as a variety.

Longan(*Euphoria longana* lam)

Two accessions of Longan, having outstanding fruit quality characters were identified from Kurunegala and Kandy.

Manderin (*Citrus reticulata* Blanco)

Five accessions of Manderin with acceptable fruit qualities have been collected from the different parts of the country and studies on crop performance are going on.

Wax apple (*Syzygium samarangense* Merr & Perry)

Two Wax apple accessions with attractive fruit qualities were identified as potential Jambu varieties.

Velvet tamarind (*Dialium ovoideum*)

One Velvet tamarind accession from Panduwasnuwara was identified.

Amla (*Phyllaanthus emblica*)

One local accession of tasty and large fruit size compared to the normal local cultivars was identified from Kandy as a potential local cultivar.

Bignay (*Antidesm bunius* (L) spreng)

A high quality delicious accession was identified for fieldplanting as well as for container planting.

Lansone (Baccaurea*motleyana*)

One sweet accession was collected from Kirindiwela to study the crop performance for field cultivation.

- Following potential native fruit crops from the natural growing places were identified and collected in the Fruit Competition held in line with the CentenaryExhibition of the Department of Agriculture.
    - Pata Bambara
    - Himbutu
    - Kiri koon
    - Seedless mango
    - Sweet jack fruit etc.
- Possibility of many local fruit crops for container planting for limited space home gardens and urban agriculture purposes was identified.

Recommendation of technologies

- The root ball technology was identified and introduced for the local fruit cultivation to transfer or change the location of a matured fruit plant for conservation, cultivation and landscaping purposes etc.
- Cultivation of local fruit plants in large containers was highly promising. It was able to get more recognition on container fruit plants from the political authorities, government officers and general public as well.

DEVELOPMENT

Establishment of underutilized fruit gardens/ field gene banks

Table 1.3.1.3: Underutilized fruit gardens/ field gene banks established during 2012

Fruit garden / field gene bank	No. of fruits	No. of accessions
1. DOA-Head office	12	12
2. No.36, Mahaweli gardens, Pallekele, Kundasale.	10	10
3. GS office - Udunuwara	14	14
4. Wariyapola Sri Sumangala College, Kandy.	08	23
5. Yatihalagala, Kandy.	18	18
6. Mahathenna temple, Yatihalagala.	10	12
7. Deputy Director (Agriculture). Polonnaruwa.	24	89
8. Deputy Director (Agriculture) Galle.	19	108
9. Director, FCRDC. Horana	26	55
10. Deputy Director (Agriculture) Kegalle	13	123
11. Deputy Director (Agriculture) Wawniya	10	28
12. Trinity College, Kandy	16	16
13. University of Peradeniya	20	400
14. Katool Oya Estate	09	09

Planting material production

Table 1.3.1.4: Planting material production

Crop	Plants produced (No.)	Plants sold (No.)	Plants issued (No.)
Budded Plants			
Avocado	2196	1047	110
Bale Fruit	600	-	300
Durian	278	-	-
Guava	03	03	-
Jack	1244	168	58
Rose apple	50	-	25
Mango(Gira)	21	03	-
Mandarin	99	25	17
Sweet orange	96	20	22
Rambutan	1223	122	307

Crop	Plants produced (No.)	Plants sold (No.)	Plants issued (No.)
Sapota	36	10	12
Carambola	400	140	35
Governor's plum*	30	-	15
Garcinia	47	07	10
Mango(Tom EJC)	242	162	50
Pumello	350	11	30
Cherry moya	100	14	30
Calamancy	32	16	-
Mango(High grade)	02	02	-
Ber	50	-	20
Jamun	80	-	35
Bignay	175	-	40
Longan	30	-	10
Sour sop	30	-	15
Lansone	100	-	25
Ceylon olive	30	-	15
Stem Cutting			
Lime	11	05	-
Grapes	02	02	-
Rose apple	1500	42	375
Lemon	19	14	04
Guava	01	01	-
Ceylon olive	20	-	10
Seedling			
Avocado	1284	20	-
Sour orange	125	-	-
Lime	15	05	-
Rambutan	3025	-	-
Mangosteen	107	04	25
Pumello	618	-	-
Chinese Guava	02	02	-
Pomegranate	06	06	-
Passion fruit	01	01	-
Malay Jambu	42	11	-
Durian	169	-	-
Carambola	1600	-	-

Crop	Plants produced (No.)	Plants sold (No.)	Plants issued (No.)
Jamun	23	-	-
Mango	30	30	-
Jack	66	20	-
Velvet tamarind	50	-	10
Sour sop	100	-	20
Himbutu	40	-	15
Nami nam	50	-	20
Suckers			
Ginger pots			

*Cost of production of Governor's plum was Rs. 732,873.57 and the income from sales was Rs. 383,880.00

PROJECTS

Increasing Productivity of Mango & Durian by flowering & tree management

A number of 2,600 trees were identified, 10 awareness programs were conducted, reprinting of two leaflets has been ordered (5000 copies each). Three television programswere telecasted; Four news papers were released andfive radio news were released. A number of 2600 trees of mango and durian were treated. About 1100 trees started flowering as expected.

Agriculture Instructors (Kandy and Matale) were made aware and informed for implementation and preparation for treatments. Beneficiaries were also made aware on the activities and their responsibilities. Treatments were continued to more than 2400 trees enlisted.

Avocado Development Program

Reprinting of 5000 copies of the leaflets has been done. Eight awareness programs were conducted. 800 trees top were worked with "Hass" and "Fuerte" varieties at Gampola, Delpitiya and Teldeniya. A number of 1542 trees were lopped aiming to top work at Udunuwara, Kundasale, Alawatugoda and Yatiwawala. Grafting continued.

A Fruit fly control program was developed and distribution of fruit fly traps among beneficiariesare in progress.

Five and two awareness programmes on production and utilization of quality avocado fruits were conducted in Kandy and Matale districts respectively.

EXTENSION & TRAINING

- Training programs for private sector nursery men and university students on fruit plant nursery management were conducted.
- Six months training programs for Navy soldiers on nursery management, fruit cultivation in collaboration with the Vocational Training Authority were conducted

- Introduction of root ball technology and container fruit plant technology for nursery men.
- Underutilized fruit crops and the promising cultivars and their performance were exhibited at Fruit Crop Research and Development Station, Gannoruwa in the Centenary Exhibition of the DOA, 2012.
- Trainings on crop management with the aspects of pruning, plant protection of Mandarin, Sweet orange and Bale fruit at the Mahaweli Demonstration Farm of the Mahaweli Authority in Moragahakanda.
- Radio &TV programs on Under Utilized fruit crops during the Century exhibition were conducted.

PLAN FOR 2013

Ex-situ evaluation of underutilized fruit species

Study of the diversity and crop performance under cultivated conditions.

Evaluation of outstanding bale fruit species

Study of the species and cultivar performances for small and large scale cultivation and crop improvement.

Evaluation of outstanding ber species

Study of the species and cultivar performance for small and large scale cultivation and crop improvement.

Evaluation of outstanding longan species

Study of the species and cultivar performance for small and large scale cultivation and crop improvement.

Study of the species and cultivar performance for small and large scale cultivation and crop improvement.

Evaluation of outstanding jamun species

Study of the species and cultivar performance for small and large scale cultivation and crop improvement

Evaluation of vegetative propagation methods for wax apple

Find out the most suitable method to propagate true to type planting materials

Evaluation of vegetative propagation methods for Lansone

Find out the most suitable method to propagate true to type planting materials.

Evaluation of vegetative propagation methods for Ceylon olive

Find out the most suitable method to propagate true to type planting materials.

Evaluation of seed bed media for seed germination of Ceylon olive

Find out the most suitable seed bed medium to improve the seed germination of Ceylon olive.

Evaluation of local fruit cultivation in large containers

Find out the possibility of local fruits in large containers.

Collection and evaluation of unidentified potential local fruits

Find out the potential new local fruit cultivars for cultivation urban.

Study the pest and diseases incidences on underutilized fruits species

Find out the potential plant protection problems and their control measure.

Study the effect of root balling on local fruit crops

Find out the possibility of applying root ball technology for construction and landscape purposes of local fruits.

STAFF LIST

Designation	No.
Research Officer In Charge	01
Research officer	01
Farm Manager	01
Agriculture Instructor	05
Program Assistant	01
Graduate Trainee	01
Chief Public Management Assistant	01
Farm Clerk	02
Watcher	05
Welder	01
Tractor Operator	01
Budder	02
Labourer (Permanent)	16
Labourer (Contract)	25
Total	**63**

1.3.2 PLANT VIRUS INDEXING CENTRE(PVIC) - HOMAGAMA

The Plant Virus Indexing Centre, Homagama functions under the administration of Director - Fruit Crop Research & Development. The Director's office was established at the premises of the Plant Virus Indexing Centre, Homagama during Mar – Oct 2012. The mandate of this center is application of currently used advanced technologies for plant virus and virus like organism detection, production of test kits for virus and other organism detection in laboratory and field indexing, quarantine purposes, epidemiological investigations, evaluation of possible disease management methods, development of virus free basic foundation stocks through tissue culture, investigations on virus coat protein mediated resistance, and detection of other pathogenic organisms (Fungal, Bacterial, Nematodes, Viroids and Phytoplasma).

BUDGET

Table 2.2.1.1: Annual budget - 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	3,244,055	2,704,624	83
Capital	2,208,405	2,153,063	98
Projects			
NARPP- Papaya Project	1,400,000	1,439,652	103
Tissue Culture Project	4,500,000	3,672,091.81	81.6
Mahinda Rajapaksha Sport Complex	25,000,000	15,288,001	61
Total	**36,352,460**	**24,212,483**	**67**

PROGRESS

Conventional Plant Virology

- Validation of locally produced antisera for the identification of virus and virus like diseases Study revealed that under proper storage condition together with preservation method antisera can be utilized for indexing for 5 years.
- Production of polyclonal antiserum for Papaya phytoplasma. Locally produced test kit effectively identifies phytoplasma infections.
- Production of polyclonal antiserum for Banana Bunchy Top Virus (BBTV). Protocol optimization has to be done.
- Detection of phytoplasma diseases in agricultural crops using locally produced Weligama Coconut Leaf Wilt (WCLW) antiserum was completed.
- Detection of seed borne viral diseases in imported hybrid seeds of cucurbits by ELISA

  Tested seed samples of pumpkin varieties – Big god 329 & PK 451, Bitter gourd varieties – Pali & Tissa were free of

cucumber green Mottle Mosaic Virus & cucumber mosaic virus.

This study will be continued.

- Routine Indexing Programme by Serological methods

  Total of 1000 samples were indexed.

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

Molecular Virology

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

  Application**:** Use this technology for routine virus indexing and promote virus free planting material production specially in private sector organizations and quarantine purposes.
- Detection of virus & Viroid diseases in Citrus cultivars by Reverse Transcription Polymerase Chain Reaction (RT-PCR) and develop duplex & multiplex RT-PCR

  Two viroids were detected and duplex was performed. Further studies needed
- Host range study of Coconut Leaf Wilt Phytoplasma disease by Polymerase Chain Reaction (PCR) based methodology.

  This study will be continued by using specific primers for Weligama coconut wilt phytoplasma. Moreover gene sequencing will be done for further confirmation.

  Application: Restrict movement of alternative hosts other than diseased coconut to non-infected areas to control the spread of the diseases.
- Confirmation of already detected viruses (by PCR) using gene sequencing Conformation of Coconut Wilt phytoplasma disease

  Studies will be continued.
- Routine Virus Indexing Programme by DNA based technology

  Total number of samples indexed by this method were 500.

  Application: Use this technology for routine virus indexing and promote virus free planting material production especially in private sector organizations and quarantine purposes
- Special Project Funded by Ministry of Agriculture (NARPP)

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

Virus Epidemiology Division

- Management of virus diseases in cucurbits (Cucumber) using non chemical methods. Treatments were not infected by (CMV) virus; therefore this experiment will be continued.
- Prevention of Okra Vein Net Mosaic Virus by soil mulching and herbal sprays.

  Initial viral infection was low in soil mulching with yellow polythene treatment. but the yield data were not significantly different.

  Study on herbal sprays and artificial barriers to control virus diseases in cucurbits (Water melon)

  Garlic spray treatment gave highest and showed low viral infection but the yield data of all treatment were not significantly different.

- Advisory service to small and medium scale growers to delay/ manage virus infection in their fields

  10 Field visits and 10 awareness programmes were conducted for virus disease management to the farmers

Other Pathogenic Organisms

- Control of Anthracnose (*Colletotrichum spp*) in Capsicum by using herbal extracts (Neem, Garlic, Ginger, turmeric)

  Plant extract at 5% concentration of ginger (*Zingiber officinae*) was found to be the most effective herbal spray. It inhibit mycelium growth of the *Colletotrichum* fungus than other treatments tested.

  Application: Promote farmers to reduced copper based fungicides
- Testing of tree injectors for control of pests and diseases on agriculture crops

  Effect of in-vitro test of fungicides on the mycelia growth revealed that the standard concentration of Thiophanate methyl and Propiconazole effectively control *Fomes lignosus* and *Fusarium* spp, respectively.

  Application: Popularizing environmentally friendly method to control pest and diseases
- Routine disease diagnose programme

  More than 200 diseases samples were diagnosed and delivered effective IPM based solution for year 2012.

  Application: Disease identification and provide control measures

Tissue Culture Division

- Protocol development for improved Anthurium cultivars through micro-propagation

  246 in-vitro bottles of Lady Jane, *Kirimatiya* selection and sprit are successfully grown.

  This experiment will be continued.
- Development of suitable protocol for Papaya through micro propagation

  10 in-vitro bottles of papaya callus are successfully grown.

  This experiment will be continued.
- Semi micro grafting of mandarin variety *Indu* and indexing for virus and virus like diseases.

  194 virus free Semi micro grafted mandarin plants were successfully produced. 1mm scions were given successful grafting to obtain virus free plants.

  This experiment will be continued.
- Field evaluation of tissue cultured MG3 pineapple obtained from different tissues (leaves, slips) for growth and yield performances.

  Satisfactory vegetative growth and flowers were initiated without any treatment. No any abnormalities or variations were observed.

  This experiment will be continued.
- Field evaluation of tissue culture propagated banana and pineapple

  Plants growing well, fruits are good quality, high yield and free of viruses were observed.

  This experiment will be continued
- Production of virus free 22,378 tissue cultured banana plantlets (*Amban, Kolikuttu, Seeni, Nethrampalam,*

Angaviyaru, *Ambul*) and 68,760 plants of Pineapple (MG 3 and Mauritius) were obtained.

This eprogramme will be continued

Technology Transfer Division

- To disseminate new technologies, 16 training classes were conducted for farmers, farmer organizations teachers, students of Youth Centre, school children & undergraduate students.
- One radio programme, 02 newspaper articles, 01 leaflet, 05 tissue culture fields observations, 01 workshop, 44 field visits, 14 crop clinics were done during this year.
- In addition advises were given to 86 farmers / growers who have visited the center with different disease problems related to their cultivations.
- 01 post graduate and 04 under graduate projects were handled
- Implant training were offered to 10 trainees
- One Urban agriculture model and 01 home garden model were maintained in the centre.
- One exhibition stall was done for the century exhibition conducted by Department of Agriculture at Gannoruwa.
- Several Extension activities were conducted for environmental friendly Agriculture programme at Diyagama Mahinda Rajapaksha sports complex.
- Through NARP funds, a workshop was conducted on novel disease diagnostic technique for the Department of Agriculture pathologists by the eminent virologist- Dr. Krishna Reddy from the Indian Institute of Horticulture Research.

PLAN FOR 2013

Conventional Plant Virology Division

- Studies on suppressing Papaya Rings Spot Virus disease through induced systemic résistance
- In-situ detection of Papaya Rings Spot Virus through Rapid Immuno filter Paper Assay (RIPA)
- Production of polyclonal antisera for Papaya Rings Spot Virus and Pineapple Wilt Virus
- Use of Freeze drying techniques for preservation of virus infected and non-infected leaf tissues
- Studies on suitable methodology to cross absorbed un wanted antibodies in locally produced Banana Bunchy Top antiserum
- Confirmation of phytoplasma diseases in Agricultural crops except coconut using locally produced WCLW antiserum
- Testing of semi micro-grafted mandarin plants using serological detection technique for Citrus Tristeza virus and Citrus Greening bacteria
- Optimization the protocols for locally produced polyclonal antisera for papaya phytoplasma and BBTV.
- Routine virus indexing Programme

Molecular Virology Division

- Application of developed RT-PCR technique by a survey in potato growing areas for potato virus PVY

- Detection of Potato Leaf Roll Virus (PLRV) & PVX in potato cultivations by RT-PCR with Specific primers.
- Identification of pathogenic diseases in papaya and develop detection techniques.
- Testing of already detected viruses by PCR & conformation by gene sequencing.
- Detection of banana virus by duplex method
- Detection of Potato virus by duplex method
- Routine virus indexing by PCR methodology and issue test reports.

Virus Epidemiology Division

- Development of a methodology to suppress symptoms of Papaya ring spot Virus through foliar application of different micronutrients.
- Evaluation of virus tolerance/ resistance in papaya cultivar MS 100
- Identification of host range of Mung bean viruses
- Testing of Cassava for virus diseases and maintain virus free foundation stock.
- Advisory service to small and medium scale growers to delay/ manage virus infection in their field
- Development of package for managing Cassava Mosaic Virus (CMV) by field level screening of stems
- Assessing abundance of virus transmitting Aphids, whiteflies and their influence to disease development
- Population dynamics study on viral vectors
- Exploration and collection of host plants for viral vectors
- Safer method to control insect pest using Chem jet injectors
- Studies on Mosquito larva in pineapple cultivations

Other Pathogenic Organisms Division

- Testing of Tree Injectors to control diseases in perennials by using suitable chemicals.
- Development of package to manage foliar and soil born fungal diseases in banana
- Identification of other pathogenic organisms and issue of test reports.

Tissue Culture Division

- Perfection of protocol to produced papaya through tissue culture
- Rapid propagation method for MG-3 pineapple through leaf culture
- Novel method for propagation of recommended varieties of orange and Mandarin through modified semi micro grafting
- Multiplication of selected Anthurium cultivars through leaf culture and micro-propagation.
- Disease free planting material production and field evaluation (Production target - 60,000 banana & 110,000 pineapple)

Plant Breeding

- Identification of available virus and virus like diseases of chilli (*Capsicum annuum* L) and other *Capsicum* spp. under field level and laboratory conditions.

- Screening of available germplasm (*Capsicum* spp.) / cultivars and varieties for viruses and selection of resistance or tolerant lines.
- Studies on inter specific hybridization among Capsicum species (*C. annuum, C. chinense* and *C. frutescens*) to incorporate the resistance or tolerant agronomic traits against viruses to cultivating varieties/ land races.
- Investigating studies on narrow leaf disorder in chilli. Collaborative program with Field Crops Research & Development Institute, Mahailluppallama.

Technology Transfer Division

- 36 awareness programs and training classes will be conducted for the officers, farmers, farmer organizations, undergraduates/ school students /other students.
- 10 farmer clinics,
- 150 Field visits to cultivations and home gardens inspection.
- Handling 250 pest & disease problems of the farmers who have visited the center.
- 05 tissue culture banana fields observation
- Publication of 12 newspaper articles
- 01 Urban Agriculture & home garden models
- One special programme (Model protected house demonstration) for school students
- Promotion of vegetable cultivation at PVIC land (1.5 Ac)
- Two Radio and Television programmes
- Maintenance of exhibition unit
- Agriculture programme at Diyagama Mahinda Rajapaksha sports complex
- In addition telephone advisory services will be given to farmers / growers for their problems.

STAFF LIST

Designation	**No.**
Research Officer In-charge	01
Research Officer	05
Agricultural Monitoring Officer	01
Programme Assistant	07
Research Assistant	04
Agricultural Instructor	09
Public Management Assistant	04
Store man	01
Driver	02
Labour (Permanent)	03
Labour (Contract)	12
Labour (Projects)	02
Watchers	02
Total	**53**

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 challenges for maintaining the stability of rice productivity. Therefore, rice breeding programme is targeted to develop rice varieties with high yield and adaptable to different rice growing eco-systems.

BUDGET

Table 1.4.1: Annual Budget – 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	10,505,691	7,452,583	71
Recurrent	32,604,152	29,348,028	90
Special Projects	22,181,558	5,043,606	23
Foreign projects			
Weed science (IRRI)	3,943,513	705,247.31	18
Green Super Rice (GSR)	1,983,671	1,817,956	92
MET Programme	1,023,670	436,027	43
Local projects			
LCWZ Project	5,000,000	1,948,376	39
Farm Development	9,640,000	8,498,469	88
Hybrid seed production	2,000,000	1,555,036	78
NARP (abiotic stress)	2,475,000	1,668,061	67
NARP (fertilizer use)	2,675,000	2,201,146	82
NARP (weedy rice)	1,874,650	1,672454	89
NARP (water use)	1,975,000	878,454	44
Total	**97,881,905**	**63,225,445**	**65**

RICE VARIETAL IMPROVEMENT PROGRAMME

Eventual target of rice varietal development programme is to increase the income of rice farmers while assuring affordable price to consumer. One way to increase national average rice yield is by increasing the genetic yield potential of cultivated varieties. Further, the gap between farmer yield and the realizable yield in marginal rice lands could also be bridged by improving the stress tolerance ability of varieties. Increasing resource use efficiency while

reducing the environmental pollution is another objective of the programme.

The breeding programme at RRDI is focused on improving genetic resistance for pest and diseases to minimize production inputs and environment pollution. Development of tolerance traits against salinity, Iron toxicity and submergence is also concerned in all the rice breeding programmes. Substantial gains have been achieved by developing rice varieties and new elite lines with wide genetic base, resistant to many biotic factors during the year 2012. RRDI and its satellite stations continued its rice variety improvement activities through conventional as well as heterosis breeding to attain these objectives.

Newly Recommended Rice Varieties

Three new rice varieties Bw 367, Ld 368 and Bg 369 were recommended by Varietal Release Committee in 2012. Elite breeding line; Bg 3R was conditionally released verifying its suitability to recommend as a fully fledged variety in the future.

Bw 367, a white samba variety, belongs to 3½ months age category with a recorded yield of 7.9 t/ha. This has a short round grain type which matures within 107 days in the Wet Zone and suitable for general cultivation Islandwide. The variety is moderately resistance to Iron toxicity. This variety is more tolerant for lodging and neck blast than the existing major samba variety Bg 358.

Ld 368, a red, short round grain type variety which matures in 105 days in the Wet Zone was released for island wide cultivation. This variety with a realizable yield of 7 t/ha is resistant to leaf Blast, neck Blast and moderately resistant to Bacterial Leaf Blight, Gall Midge, and Brown Plant Hopper. The variety is less lodging and has no grain discolouration.

Bg 369, a white pericarped variety, belongs to 3½ months age category. This variety has a long grain shape which matures within 104 days in Dry Zone. Bg 369 is recommended for saline affected areas which has a recorded yield of 7.0 t/ha under saline conditions.

Bg 3R is a white short round grain type variety, belongs to 3½ months age class, which is locally developed through hybridization and selection at RRDI. The variety matures in 95 days, with a realizable yield of 7 t/ha. Bg 3R is resistant to major pests and diseases (RGM R/MR, BPH R/MR, BLB MR/MS, Blast MR) as well as for lodging.

Rice breeding programme – 4-4 ½ months age class

Rice varieties belongs to this age class is grown in 8% of the total annual rice crop extent in Sri Lanka. This breeding program was focused to increase yield with improved grain quality characteristics (eating and coking) while incorporating pest and disease resistance traits.

In 2011/12 Maha and 2012 Yala seasons, 16 crosses were made with the objective of improving grain quality. Of them, 08 crosses

were made for drought tolerance, 15 crosses for yield increase, 02 crosses for gall midge resistance and one cross for BLB resistance. In both the seasons, 42 F1 populations were established and of which 23 populations were selected and the rest was discarded as they were deviated from the main objectives. From F2 to F4 generations, 51 bulk populations were established and of them, 31 populations were selected. From F5 generation onwards, 44 advanced populations were established in the field during both the seasons and 40 crosses were selected. In both seasons, eighteen elite lines were evaluated in yield trials for grain yield, major pests and diseases and grain quality characteristics with the standard variety, Bg 379-2. Line numbers Bg 09-606 and Bg 08-301 were selected to nominate for next NCRVT programme from the Major Yield Trial conducted in 2012.

Line numbers Bg 08-1909 and Bg 10-551 were tested in the NCRVT programme and will be tested for a second season in 2013.

Two advanced lines from VAT programme, Bg 06-1350 and Bg 06-997 with high yield were tested and selected for LSVAT programme.

Rice breeding programme – 3 ½ months age class

Rice varieties of 3½ months age class consists 63% of the total rice growing area in Sri Lanka. Interestingly, the yielding abilities of cultivated 3½ month rice varieties are similar or higher than that of 4 months rice varieties. This age class is popular among farmers because of the varieties adaptable to most rice growing ecosystems in Sri Lanka. The objectives of the rice varietal improvement programme is to develop 3½ months aged rice varieties with high yielding, acceptable grain quality and resistant to major biotic and tolerant to abiotic stresses.

In 2012, twenty five crosses were made and seventeen crosses from F1 generation were established. The parents used were IR 07A127, Bw -04-992, Bw -09-983, At – 08-593, Seeraga samba, Jasmin Rice, Bg 360, and H4. Eighteen F2 populations, eleven F3 populations and eight F4 populations were evaluated in 382progenies were selected for advanced generation from 21 crosses. Many of the crosses were made from existing rice varieties targeting new plant architecture with the pest and disease resistance.

In Preliminary Yield Trials (PYT) and Major Yield Trials (MYT), sixteen elite lines were selected and evaluated for their yield potential, pest and disease reaction and grain quality with standard checks Bg 357 and Bg 358. Bg 10 – 1399 (Ld 12-38-1/Bg 358), Bg 08 –1258 (At 307/IR 64) and Bg 10 –1407 (Bg 1420/IR64) were selected for National Coordinated Rice Varietal Testing Programme (NCRVT). A promising line Bg 08-2398 (Ld 12-38-1/Bg 360) which has high adoptability rank in VAT programme was nominated to LSVAT programme. Seed multiplication of Bg -2398, Bg -3171, Bg 10-1407, Bg 10-1399, Bg 10-1258 and Bg -2236 was continued to assure genetically purified quality seeds for experimental purposes.

In 2012 Yala season, INGER- lowland rice observational nursery module II (medium age group) was established at RRDI. Sixty four entries were evaluated with Bg 90-2 as the standard variety. Promising lines were identified and transferred to 4 months breeding programme to be used as parental materials. Bg 3R (IR 555178/9-3r/IR 65515-47-2-1-98/IR 6551-47-2-1-91): a promising line was tested in the LSVAT programme and nominated to Variety Release Committee (VRC) for recommendation.

Rice breeding programme – 3 months age class

Rice cultivation in rainfed and minor irrigation schemes are significantly affected by water shortage. Therefore, development of short maturity (3 months) varieties is of vital importance to withstand water scarcity. Presently, 3 months aged rice varieties occupy approximately 25% of the total annual cultivated extent in Sri Lanka.

Fourty four crosses were done in 2011/12 Maha and 2012 Yala seasons with the objectives of increasing average yield (6.5-7 t/ha), resistance to major pests (BPH and RGM) and diseases (Blast and BLB), having a wider adaptability to adverse environments (drought, salinity) and improved grain quality. The following materials were used as hybridization parents; IR 07A266, IR 07A262, IR 07A252, OM 2717, Bg 04-2236, Bg 94-1, Bg 300, Bg 304 and Bg 305 for high yield potential; Ptb 33 for BPH resistance; MR 1523 and Ob 2552 for GM resistance; IRBB 60, IRBB 59 and IRBB 56 for BLB resistance and Jesmine rice, Seeraga samba and Suwadel for grain quality aspects.

In both 2011/12 Maha and 2012 Yala seasons, 26 F_1 populations were established and 15 populations were selected for further advancement. Nine F_1 populations were discarded due to lags in yield improvement and deviation from the age class (90 days). From F_2 to F_4, 33 bulk populations were established in 2012 and 24 populations were advanced. The rest was discarded due to major deviations from the objectives and age class. From F_5 generation onwards, 663 progenies from 22 advanced populations were established and evaluated in 2012.

From the Preliminary Yield Trials conducted toevaluate yield potential of elite lines using the Bg 300 as the standard check, 4 elite lines (Bg 11-1051, Bg 11-1034, Bg 11-1043 and Bg 11-1119) from 2 different crosses (Bg 300/IR 841//At 307 and Dahanala (03924)/Bg 360 BC^4) were selected to test in Major Yield Trials. From the Major Yield Trials conducted in 2012, 4 elite lines (Bg 10-1166, Bg 10-1083, Bg 10-3375 and Bg 09-1871) from 4 different crosses (IR74052-72-1-3/ Bg 352//IR74052-72-1-3/Bg 2780, Bg 300/Dmuja, IR74052-72-1-3/Bg 3993//Ld 12-38-1/Bw 262///Bw 262/Bg 357, IR54751-2-34-10-6-2/Bg 357//IR65482-4-136-2-2/Bg 357) were identified as promising, compared to the standard check variety Bg 300, and selected for multiplication for channeling in the National Coordinated Rice Variety Testing program (NCRVT). Three promising lines (Bg 06-2270, Bg 07-2828 and Bg 06-2112) were tested in

NCRVT programme were not advanced to VAT programme because of low adaptability ranks.

Rice breeding programme – 2½ months age class

During the past decades rainfall pattern has been changed and frequent dry spells were experienced. As a result of that, number of crop failures experienced. The ultra-short age varieties which mature around 80 days are becoming very important as these varieties can fit in well to rainfed ecosystems, especially in Yala season where 3 months varieties cannot be grown due to water shortage.

The2½ months breeding programme continued to develop varieties at RRDI with objectives of increasing grain yield with multiple resistances to major pests (BPH, GM, Thrips) and diseases (BLB, Blast) and tolerance to drought conditions. Twenty five rice accessions including five traditional rice cultivars (Suduru samba, Hetada wee, Goda heenati, Goda wee, Niyan wee) having desirable grain quality, short duration and drought tolerance traits were used as parental materials. Thirty crosses were made and seventeen F1 populations were established from above crosses in 2012. Of them, twelve bulk populations including nine F2 and three F3 populations were established. Based on yield potential, agronomic traits, pest and disease resistance, 70 progenies were selected and 215 progenies were advanced.

Preliminary Yield Trial(PYT) was conducted to evaluate yield potential of selected 5 advanced lines (Bg 11-2531, Bg 11-2537, Bg 11-2519, Bg 11-2556, Bg 11-2508) with short round grains (3 white pericarped and 2 red pericarped) with Bg 250 as the standard. Major Yield Trial (MYT) was conducted using 5 advanced lines (Bg 10-2891,Bg 10-2902, Bg 10-2881, Bg 10-2884, Bg10-2913) selected from Preliminary Yield Trial conducted in 2011. Elite line; Bg 10-2907 (Red pericarped, short round grain type) multiplication was continued to supply purified seeds to conduct NCRVT, VAT and LSVAT programmes.

Traditional rice improvement programme

950 rice accessions were established in 2012 which include traditional cultivars, introductions and improved lines, and dried seed samples were conserved at RRDI short term germplasm conservation unit. Seed samples were distributed among farmers, school children, universities, NGOs and other interested groups upon their request.

Traditional cultivars; *Suduru Samba* and *Suwanda Samba* have been mutated using Gamma irradiation with the objective of improving their lodging resistance with good grain quality. Then further selection was done using modified bulk method and 3 lines (SW 25-Suwada Samba, SSR 8-Suduru Samba Red, SSR 26 –Suduru Samba Red) were selected. Seed multiplication was done in 2012 for these 3 lines and SW 25 was selected to Preliminary Yield Trial (PYT).

Wide hybridization technique was used with the objective of transferring BPH resistant gene from

wild rice species (*Oryza nivara*) to *O. sativa* (Bg 380). Of which, two lines (WH 20, WH 48) having higher yield potential and BPH resistance were selected and established for seed multiplication.

Purification and multiplication of selected traditional rice cultivars

There is an increasing demand for traditional rice cultivars due to taste, nutritional value and quality. Absence of quality seed material for cultivation hinders their availability. Hence there was a need to purifyand multiply traditional rice cultivars which were of high demand. Accordingly, 11 traditional cultivars including Sudu heenati, Kalu heenati, Dosthara heenati, Herath banda and Suwandal were multiplied and purified in 2012.

Screening of different rice cultivars for drought tolerance

Some traditional rice cultivars inherit drought tolerance traits and this would help overcoming adverse environmental conditions in the context of climate change. Therefore this study was conducted to screen for the ability of different rice cultivars in withstanding drought. 31 accessions including Niyan wee, El wee, Rathal, Suwadal, Goda al wee, Kolanathi wee, Podi niyan wee, Mada el, Magoda el and Pachchaperumal were screened using leaf folding score. Niyan wee, Podi niyan wee, Kolanathi wee, El wee, Mada el and Magoda al cultivars showed drought tolerant ability.

Aromatic rice observational trial (INGER)

An observational trial was conducted to identify breeding lines with desirable grain type and aroma. Of which, 43 test entries were checked with At 306 and 13 aromatic breeding lines were selected using KOH test with screening panel consist 5 persons.

Biotechnology

Back cross breeding programme to incorporate submergence and salinity tolerance characters into popular varieties was continued to obtain breeding populations. Tolerant plants for those two traits identified morphologically and molecularly and advanced by back crossing and selfing. As the initial steps of studying Phosphorous deficiency tolerance in rice, F2 populations were generated in several cross combinations. Crosses were affected to incorporate Bacterial Leaf Blight resistance in Bg 352 and Bg 359 through marker assisted selection and relevant back crosses are in progress. Mutation induction programme was initiated to induce dwarfism in traditional varieties such as Suwandel, Inginimitiya, Dular and Suduru samba and salinity and drought tolerance in popular varieties such as Bg 90-2, Bg 94-1, H4, Bg357 and Bg358 using seed culture technique and those mutated plants were regenerated. Favourable mutants of Bg 250 seed cultured plants having better plant architecture were selected.

Anther culture protocol for indica rice varieties was developed with the attempt of accelerating conventional breeding programme. Wide

hybridization was continued to transfer desirable characters in wild species to popular varieties.

Hybrid rice production programme

In addition to conventional breeding programme, use of hybrid vigour (Heterosis) of rice is a key technology aimed at bridging the yield gap and raising the yield potential. Hybrid research thrust includes research on rice genetics and breeding, rice general management and formulate production practices for specific inbred parents and hybrid combinations. RRDI maintains several research programs on hybrid heterosis to develop promising hybrid rice varieties and to improve hybrid seed production.

Aligned to this programme, 353 new F1 combinations were tested in test cross nursery in 2012. Of them, 139 were selected for back cross programme in order to develop new CMS and maintainer lines. In addition, 40 combinations were selected as new parental lines for further testing in test cross nursery and high fertile combinations were used for F1 seed production in small scale level to be tested in PYT.

Germplasm maintenances of CMS (50 lines), restorers (186 lines) and maintainers were continued and new crosses were made with selected parental lines. 27 hybrids combinations were tested in PYT in order to select high yielding hybrid varieties. Bg407H, IR68897A/R160 and IR78354A/R147 showed high yield performance; 6.3 t/ha, 5.7 t/ha and 5.9 t/ha in 2011/2012 *Maha* season and 5.49 t/ha and 6.78 t/ha in 2012 *Yala* season respectively. Moreover, BgCMS4A/R147 yielded 5.5 t/ha and 6.66 t/ha in the two seasons respectively. These promising lines will be further tested to confirm the data.

Nuclear seed production of promising hybrids was continued for 2012. According to that, Bg CMS 1A/B, Bg CMS 4A/B and Bg CMS 4A/SN50 combinations were produced.

Limited amount of F1 seed production of Bg 407 H was done in order to popularize this variety among farmers and then to disseminate the seed production technology to progressive farmers (Bg407H F1 seeds – 120kg, Parental line -HRSP 668- 168kg and Bg CMS1A- 175kg). Under this programme, F1 seeds were distributed in *Mullaitivu* (20kg), *Mannar* (20kg) , *Vavuniya* (12 kg) and Jaffna (2 kg). Characterization of restorer lines was done in order to identify their morphological characteristics which are favorable to use as better restorer lines.

Different establishment methods have been tested for hybrids rice and the seedling broadcasting method has proven as the best method to obtain high yield. The different pollination methods were tested for hybrid rice in order to reduce the labour usage and to identify the effective method. Three days pollination method was shown high seed setting of CMS than other method.

Seedling broadcasting (Parachute) method was introduced as a new establishment method for hybrid rice to minimize the seed paddy requirement (8 kg/ha). Direct seeding at low seed rate (50-75kg/ha) could be possible in hybrid rice

cultivation compared to 100kg/ha in direct seeding as of inbreds. In addition, several CMS, maintainer lines and restorer lines were developed. Using these lines, Bg 407H, Bg HR8, Bg HR10 and new hybrid combinations under 3-3 ½ months age group were developed.

Grain quality

Research activities conducted by grain quality division were mainly focused on evaluation of grain quality of NCRVT entries and advanced breeding material, evaluation of nutritional quality of traditional and improved rice varieties, post-harvest handling and storage of paddy and developing rice-based value added food products.

All the lines under PYT, MYT and NCRVT were evaluated for their grain quality in raw and parboiled rice and lines were screened for desirable grain quality as well before release. In 2011/2012 Maha season, 36 breeding lines of PYT , 36 breeding lines of MYT and 39 breeding lines in CRVT entries were tested for grain quality before recommending for VAT.

Studies were in progress to develop high nutritional instant food formula using rice bran and to develop food products using pre-gelatinized rice to cater increasing demand for fast foods.

Market samples of traditional rice varieties were analyzed for their nutritional qualities such as protein, fat and ash contents to verify the nutritional qualities highlighted in market promotions. Data were compared with previously evaluated nutritional values of the same variety, and deviations observed. Major causes for the deviation were intensive polishing and varietal impurity of the market samples.

Quality characters of Basmati rice samples imported to Sri Lanka under Pakistan Sri Lanka Free Trade Agreement (PSFTA) were analyzed to verify for genuine Basmati. Under this programme 82 samples belong to 24 batches were tested. According to the results, original Basmati grains were mixed with long slender grained rice at varying ratios. And none of the samples were proven as genuine Basmati type rice.

DISEASE MANAGEMENT

Screening for Bacterial Leaf Blight

Bacterial Leaf Blight (BLB) is the most common bacterial disease of rice in Sri Lanka. Lines comprising all yield trials and NCRVT were screened against BLB disease. In 2011/2012 Maha, 152 lines and in 2012 Yala, 181 lines were screened for BLB. Among them, 25 lines in 2011/2012 Maha season and 7 lines (Bg 11-2380, At 07-695, Bg 10-9028, Bg 08- 1258, Bg 08-1909, Bg 7RBS 15-1-2) in 2012 Yala season were identified as resistant or moderately resistant to BLB. Many of crosses were basically focused on increasing grain yield with less emphasis on BLB resistance. Therefore, resistant lines for BLB were comparatively less.

Screening for rice blast

Rice blast is a common fungal disease in rice caused by *Magnarporthe grisea*. It attacks all

aerial parts at every stage of the crop resulting a considerable yield loss. During 2011/2012 Maha season, 1997 entries and in 2012 Yala season, 2187 entries comprising advanced progenies, all yield trials NCVRT and VAT entries were screened against blast disease. Among the lines screened 2011/2012 Maha season, 1549 entries and 2012 Yala season, 1622 entries were identified as resistant or moderately resistant to rice blast. Many ofparents used for crosses inherit blast resistance traits. Hence, considerable resistant lines were recorded.

Investigation for presence of *Aspergillus flavus* on raw rice in Sri Lankan market

Aflatoxin is a group of toxic chemical compound produced by two molds, *Aspergillus flavus* and *Aspergillus parasiticus* which is a major problem encountered in rice affecting its quality. The toxin is produced when rice is contaminated with these molds. At the export market, presence of this toxin reduces the export quality standards. Thus, for food safety and economic reasons the growth of *Aspergillus flavus*, their sprouting and *aflatoxin* production need to control. Twenty rice samples collected from different areas of local market were tested for the presence of *Aspergillus sp.* and found seventeen samples contaminated with *Aspergillus sp.*, but the contaminated samples were not proven as toxic. Therefore, in order to quantify specific toxic levels further studies are sought.

PEST MANAGEMENT

Screening for pest resistance

Greenhouse and field screening were done to develop resistant varieties against Gall midge and Brown plant hopper, during Mahaseason in 2011/2012. Of the 1988 lines checked, 1808 and 940 entries were identified as resistant or moderately resistant to rice gall midge and BPH respectively. In Yala 2012 season, 1861 entries were checked against same pests, of which 806 and 1540 entries were identified as resistant or moderately resistant to GM and BPH respectively.

Screening for thrips using biological products

The effectiveness of *Oligochitosan*; a bio elicitor to control rice Thrips was tested in field conditions. The study is conducted using *Oligochitosan* as an insecticide with different modes of action to control thrips.Oligochitosan at the rate of 300 ppm and Imidachlorpid 70 % WS (recommended rate) were applied as seed treatments. Results revealed that, Oligochitosan was not effective in controlling rice thrips compared to control by Imidachlorpid.

Parasitoids diversity in rice fields at IL_{1a} agro-ecological zone

A field survey was conducted in *Yala* 2012 at 6 locations of agro-ecological zone IL1a to identify parasitoids of paddy pests. Nine species of parasitoids were identified belonging to order Hymenoptera and Diptera. Of them, 3 species, *Stenobracon nicevillei*, *Amauromorpha accepta*

schoenobii and *Charops bicolour* were recorded as larval parasitoids of Yellow Stem Borer (*Schirpophaga incertulas)*. Further identification of parasitoids will be continued for the next season.

Population dynamics of rice pests attracted to light trap

Temporal variation of paddy insect pests was studied using light trap collection in Batalagoda. Insects that attracted to the light trap were daily monitored and changes of their population with the climatic factors (temperature, relative humidity and rainfall) were recorded. Results indicated that the population levels of Brown plant hopper and Green hopper increased when temperature and Relative Humidity were raised. Whereas, the pest population decreased with the increased rain fall. In addition, Stem borer, Black bug and Paddy bugpopulations were reduced with the elevated temperature.

Diversity of Arthropod fauna in rice-agro ecosystems

This study was conducted at RRDI research field in 2011-12 *maha* season to compare insect fauna in organic and conventional rice ecosystem. Seventy eight insect species belong to 19 Orders and 60 families were identified. Species diversity was higher in organically grown field than that of conventional fields. In terms of spatial distribution of arthropods, aquatic organisms (81%) were higher in organic fields and terrestrial organisms (54%) were higher in conventional fields.

WEED MANAGEMENT

Effect of weedy rice competition on cultivated rice (*Oryza sativa* L.)

The study was conducted to investigate the effect of weedy rice competition on cultivated rice at different levels of K fertilizer. Cultivated rice variety (Bg-352) and weedy rice *Kurunegala* (KWR) bio type were assessed for growth and yield components and a significant reduction of tiller numbers, leaf chlorophyll content, flag leaf area and total biomass of cultivated rice has been observed due to weedy rice competition, irrespective of K fertilizer application. The number of panicles per plant, filled grain percentage and 1000 grain weight significantly decreased due to competition of weedy rice. The reduction was not significantly affected by different K levels. In mono-culture condition, potassium use efficiency of Bg-352 was higher whereas the K use efficiency was low under weedy rice infestation.

Interaction between major grass species and cultivated rice grown under different Nitrogen levels

Grasses are highly responsive for Nitrogen fertilizer. Three common grass weeds; *Echinochola crusgalli, Ischeamum rugosum, Leptochloa chinensis* and *Oryza sativa* (weedy-rice) were observed in three nitrogen fertilizer levels. The highest yield reduction was observed by the competition due to *E. crusgalli* followed by *O. sativa* (weedy-rice), *I. rugosum* and lowest by *L. chinensis.* The rice dry matter

biomass was reduced by the competition of *E. crusgalli* in all three Nitrogen levels.

SOIL FERTILITY MANAGEMENT

One of the major constraints that limits the expansion of cultivated extent and diminish productivity of rice lands in Sri Lanka is salinity. Saline soils occur mostly in major irrigated soils in the inland areas of Dry Zone and in the coastal areas throughout the island. In the Dry Zone of Sri Lanka, salinity mainly occurs due to insufficient drainage facilities. The source of salt in the area is weathered rocks and irrigation water. In the coastal areas, rice lands receive tidal waves ranging between 45 cm and 60 cm during spring tide and between 10 cm and 25 cm during neap. During dry weather, salt water intrudes into the lands up to 50 cm above mean sea level. As a result, rice growing soils in the coastal belt of Sri Lanka are salinized every year and converted them into conditions in which rice growing is difficult. The area affected by coastal salinity was estimated to be around 0.112 million ha. Electrical conductivity values of saturated soil paste exceeding 4 dS m^{-1} are not uncommon in these areas. In addition, approximately 4000 ha of costal rice soils in Sri Lanka were flooded with salt water during Tsunami incident in 2004 causing the lands unsuitable for rice cultivation. Extreme environmental conditions and rising of sea water level expected due to climate changes might bring more and more rice lands into saline in the future.

Saline soils vary widely in their chemical and physical properties and hydrology. The variables include content and nature of salts, distribution of salts in the surface horizon, soil pH, nature and content of clay, organic matter content, nutrient content, water regime relief and temperature. As such, measures identified to reclaim paddy lands affected with salinity in one place are difficult to be put into practice in another place.

Development of salt tolerant rice varieties is the best alternative to increase the productivity of saline paddy soils. Studies in this regards were commenced in 2003 and 17 salt tolerant rice lines were identified. Salt tolerant rice lines, Bg 11-139 and Bg 5-110 developed under this programme with higher yield (7 t/ha) under salinity conditions. Bg 11-139 was recommended to release in 2012 as Bg 369 for commercial seed production which is suitable for saline affected areas.

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Development of rice varieties which thrive under low P condition is one of the options to reduce P fertilizer use in rice cultivation. Experiments conducted in 2012 to screen 20 rice varieties including traditional, improved and new improved rice varieties under low P conditions. Traditional rice varieties, Murungakayan, Suduheenati, Mass, and improved rice varies H4, H7 and H10 and new improved rice variety Bg 358 were identified as suitable for low phosphorus conditions. Using above rice varieties as male parents, 65 crosses were made with high yielding varieties Bg 352, Bg 357 and Bg 300 to develop high yielding rice varieties with tolerance to P deficiency. F1 seeds were planted at the station to get F2 seeds to be grown in Maha 2012/13.

Response of rice to potassium fertilizer application is not visible under farmer field conditions. Third and fourth seasons results obtained in 2012 from the long term experiment conducted at RRDI revealed that, with straw back to fields, application of half the DOA recommendation of potassium at Panicle Initiation (PI) gave comparable grain yield compared to full DOA recommendation of potassium applied in basal and in PI stages. Non exchangeable soil K levels are highly related to plant K contents and maintenance of soil non exchangeable K contents at 5 -6 weeks after planting is necessary to maintain the required K contents in plants. Studies are in progress to ascertain long term effects.

A long term field experiment has been set up at the RRDI to observe long term effect of application of phosphorous fertilizer in different methods. 5^{th} and 6^{th} seasons samples collected in 2012 reveled that; significant yield difference between no phosphorous treated plots and phosphorous treated plots. Even after 6^{th} season, a significant yield difference was not observed between plots treated with alternative season phosphorous application and seasonal phosphorous application.

Introduction of slow release fertilizer is one of the alternatives to reduce fertilizer wastage in rice cultivation. Different nano-formulations of N and K fertilizers were tested under field conditions at RRDI in 2012. There was a possibility to reduce N and K fertilizer use when nano-formulations of N and K fertilizer were added. Therefore, experiments are in progress to study the suitability of N and K nano-fertilizers as N and K sources for rice production.

Integrated Plant Nutrient System (IPNS) programme

Combination of organic and inorganic fertilizers use is the best alternative to increase soil fertility and fertilizer use efficiency and to reduce inorganic fertilizer use and environmental pollution in rice production. An experiment with 100% and 75% of current NPK fertilizer recommendation with and without organic manure at the rates of 4t/ha straw and 1 & 2 t/ha compost was conducted for 4 seasons starting from 2010/11 Maha to evaluate the possibility of the reduction of NPK inorganic fertilizer use by 25% without affecting to the rice grain yield. Results of all four seasons indicated that, reduction of present inorganic fertilizer recommendation (265 kg urea, 87.5 kg TSP and 75 kg MOP/ha) by 25% without any organic fertilizer addition reduced the grain yield significantly. Three seasons results revealed that addition of 4t/ha of rice straw alone could not replace the inorganic fertilizer by 25%. However, addition of rice straw at the rate of 4t/ha and compost 1.0t/ha can be used to replace present inorganic fertilizer recommendation by 25% without affecting to the grain yield. Addition of 2t/ha of compost to the treatment of 4.0t/ha of rice straw and 75% inorganic fertilizer further increased the grain yield but it was significantly different with the grain yield given by 1.0t/ha . Highest grain yield (6.1t/ha) was recorded by combination of 4t/ha rice straw & 2t/ha compost and 100% inorganic fertilizers but this yield was not significantly different with the

yield given by these organic manure levels and 75% inorganic fertilizer. Therefore, inorganic fertilizer use can be reduced by 25% at this yield level when integration of inorganic fertilizer with organic manures (4t/ha straw and 1.0-2.0t/ha compost). These results were further confirmed by large scale field experiment conducted for 5 seasons with inorganic and organic fertilizer by gradually reducing inorganic fertilizer from 5% to 25%.

A green house experiment was conducted to test the possibility of using bio fertilizer made up of local rhizosphrere microorganism to increase the fertilizer use efficiency by rice and subsequently reduce the inorganic fertilizer use in rice crop growth and grain yield revealed that ¾ or 2/3 of present recommended NPK fertilizers levels for rice with 4t/ha of rice straw and bio-fertilizer gave comparable yield, yield components and other growth parameters of rice when compared them with treatment with present recommended levels of NPK fertilizers. This indicates that inorganic fertilizer use in rice cultivation can be reduced by incorporating organic manure with natural bio fertilizers. Long term field experiments with bio-fertilizer will be conducted to assess the influence of bio-fertilizer on rice crop growth and yield.

Organic rice field of one hectare is being maintained for long run and soil samples were analyzed for determining soil fertility status. Soil pH, electrical conductivity, organic matter content, available Phosphorous and exchangeable Potassium respectively were 5.0, 0.27 dS/m, 2.56%, 16mg/kg and ~70 mg/kg indicating improvement of soil fertility in the field. This improvement would be mainly due to the addition of organic manure such as rice straw, composts, gliricedia, sesbania, wild sunflower etc. to the rice crop cultivated in the organic field as well as low removal of nutrients by traditional varieties.

Eleven traditional varieties (Sudu heenati, Kalu heenati, Pachchaperumal, Rathdel, Suwadel, Herath banda, Suduru samba,Dostara heenati ,Sulai , Kuruluthuda) were genetically purified for future use in organic rice farming.

Adaptability of improved (At 362, Bg 300) and traditional (Basmathie, Sudu heenati, and Suwadel) varieties under organic farming condition were tested. Yields received were ranged from 2.9 to 4.5t/ha and yield differences among traditional and improved varieties were 1.0-1.5t/ha. Two kg samples of seed paddy of traditional varieties were distributed among farmers who interested in organic rice farming.

Effect of different levels (0.0,2.0,4.0,6.0, 8.0 and 10.0t/ha) of compost application on grain yield of rice variety At 362 under organic farming condition were tested for 2 seasons. Increased levels of compost dramatically increased the grain yield and application of compost in two splits as basal and at 4 weeks after planting was more effective at all levels of compost application. Addition of 10t/ha compost in two equal splits gave the highest yield of 4.4 t/ha. This yield is significantly higher than the yield given by 8t/ha of compost in both split and no split condition.

Compost (30 tons) and compost inoculants (2.5 tons) were produced and distributed among farmers during 2011/12 Maha and 2012 Yala seasons. Green manure seeds; Sesbania (50kg) and Sunhemp (10 kg) seeds were produced for multiplication purposes. Fifty grams samples of sesbania seeds were distributed among farmers as a preliminary introduction of green manure to farmers.

Training of 520 personals (farmers, students, officers) were completed on compost production, use of green manure and other organic materials in rice production during 2011/12 maha and 2012 yala seasons.

WATER MANAGEMENT AND GIS

Determination of Irrigation interval in Alternate Wetting and Drying (AWD)

Water wastage is high when flooded condition is maintained. Therefore, Alternate Wetting and Drying Technique (AWD) has been tested to utilize water more efficiently. Success of the AWD depends on better identification of interval between wetting and drying because irrigation interval varies with the soil type. This study was conducted to determine the suitable irrigation interval for paddy grown in Kurunegala soil series. Field trials were established at RRDI during 2012 Yala season with rice variety Bg 359. Six irrigation treatments; T_1 (at saturate condition) T_2 (at 3 days interval), T_3 (at 7 days interval) and T_4 (at 10 days interval) T_5 (at 14 days interval) T_6 (at mid day wilting) were evaluated and irrigation done at 10 days interval is suitable for Kurunegala soil series and the yield level obtained is 5.0 t/ha.

Evaluation of rice varieties under rainfed and minimum irrigated conditions

This experiment was conducted to identify suitable rice varieties under rainfed farming system for the Intermediate Zone of Sri Lanka. Twenty seven rice varieties; Bg 94-1, Bg 352, Bg 357, Bg 358, Bg 359, Bg 360, Bg 366, Bg 369, Bg 5-110, Bw 351, Bw 361, Bw 364, Bw 363, Ld 365, Ld 356, At 353, At 354, At 362 (3 ½ months), Bg 300, Bg 304, Bg 305, Bg 306, At 303, At 307, At 308 (3 months), Bg 250, CNR 24 (2½ months) were evaluated. under rainfed condition and the plants were dried up due to severe drought during the 2012 yala season, but Bg 250, Bg 300, Bg 94-1, Bg 369 and At 307 were recovered with slight rain and given around 1.0 t/ha yield. Under minimum irrigation (4 times for 3 ½ month varieties and 3 times for 3 – 2 ½ month varieties throughout the growing period), Bg 369 gave the highest yield of 4.4 t/ha, and followed by Bg 94-1 (3.7 t/ha) and Bg 359 (3.6 t/ha). Bg 306, Bg 304, Bg 300, At 307 (3 months) gave yield in between 2.0 – 2.5 t/ha and Bg 250 gave 1.8 t/ha yield.

AGRONOMY

National Coordinated Rice Variety Testing (NCRVT)

During Maha 2011/12, NCRVT programme continued with 2½, 3, 3½ and 4½ maturity classes. Twenty six new rice lines were tested with standard check varieties in 12 locations under complete researcher managed conditions.

Following lines were selected based on respective special features for further testing in farmers' fields under the VAT programme.

At 08-593, 3 months red pericarped basmathi type line – higher yield than At 306

At 09-861, 3 months white samba

At 08-617, 3½ months white nadu line with higher head grain yield and yield.

At 08-1078, 3½ months red nadu line with higher yield than At 362.

Ld 8-6-7, 3½ months red pericarped samba line with higher yield than Bg 358.

Thirteen new rice lines were tested under 2½, 3½ and 4½ maturity classes in Yala 2012. None of the new rice lines tested in 2½ maturity class gave higher yield than standard variety Bg 250. Bg 08-1258 gave higher yield than Bg 358 and Bg 366 in 3½ maturity class. Bg 10-551 gave higher yield than Bg 403 and Bg 379-2 in 4½ maturity class.

Variety Adaptability Testing (VAT)

Nine new elite lines namely At 7-800, At 6-631, At 07-695, Bg 08-2398, Bg 05-110, Bg 11-139, Bw 5-1621, Bg 7-997 and Bg 6-1350 were tested for their adaptability in Maha 2011/12. Among the lines tested, At 7-800 (3 months line), Bg 07-997 (4½ months line) and Bg 07-1350 (4½ months line) given higher yields and more adaptable than that of the standard check varieties, and nominated to LSVAT. At 06-631 (3½ months line) though did not give higher yield than Bg 360 was nominated to LSVAT because of its high grain quality. Bw 05-1621 (3½ months line) was nominated to LSVAT for testing in the Wet Zone to be replaced to Bw 364 which is not popular at present in the Wet Zone.

Large Scale Variety Adaptability Testing (LSVAT)

Five new elite lines, At 4-486 (3 months white nadu), At 05-1382 (3 months white basmathi type), At 6-650 (3½ months red samba), Bg 3R (3½ months white samba), Ld 3-6-12 (3½ months white samba) were tested in farmers' fields to evaluate the adaptability in Maha 2011/12. Based on the responses given by the farmers on various characteristics of each line, all five lines were confirmed as adaptable.

Evaluation of rice lines for irrigated lowland eco system

Thirty two lines received in 2012 (GSR–Irrigated Lowland Yield Trial; GSR-IRLL – 2012) consisting of 32 test entries developed by CAAS and IRRI, were tested in irrigated lowland condition with 4 local check varieties (Bg 300, Bg 352, Bg 366, and Bg 94-1). Lines PSB RC18, ZHONGHUA 1 and IR 84678-25-5-B gave comparable yields to that of highest yielding local variety Bg 94-1.

Evaluation of *Oligochitosan* on growth, pest and disease resistant and grain yield of rice

Experiments conducted in farmer fields at Bakmeewewa, Kurunegala (IL_3) in Maha 2011/12 and Yala 2012 to identify the effectiveness and appropriate application rates of *Oligochitosan* (3%) on rice cultivation. Results of Maha 2011/12 shows that *Oligochitosan* application as a seed treatment (150 ppm) and as foliar sprays (50 & 600ppm) had no significant effect on growth and yield of rice in farmer managed field conditions. In Yala 2012, concentrations of *Oligochitosan* were increased and applied as a seed treatment (300 ppm) and as foliar sprays (600ppm). The result showed that elevated concentrations of *Oligochitosan* have no significant effect on growth and yield of rice and thrips controlling in rice in the same farmer fields.

The results of the studies conducted in previous seasons also revealed that there was no positive effect of *Oligochitosan* on growth parameters even though some concentrations significantly improved number of tillers and panicle number per unit area in one season. Similarly there wasn't a significant effect of *Oligochitosan* on crop yield. Therefore, no effect of *Oligochitosan* formulations reported at tested concentrations on growth and yield of rice, and pest and disease incidences.

Effect of *Oligochitosan* in seedling growth and yield of rice in parachute nurseries

A field trial conducted at RRDI, Batalagoda in Yala 2012 to identify the effectiveness of *Oligochitosan* on seedling vigor of rice in parachute nurseries and crop yield. *Oligochitosan* was applied as a seed treatment (300 ppm) and potting mixture (600 ppm) of parachute nurseries. Number of leaves, number of tillers and seedling height per hill were measured at weekly intervals from two weeks to eight weeks after establishment. Yield and yield components were recorded at physiological maturity. Results indicated that there was no significant effect ($p=0.05$) on number of leaves, number of tillers and seedling height at the vegetative stage in parachute nurseries than that of the control (seedlings of normal parachute nursery). Significant differences were not observed among the treatments with respect to yield and yield components indicating that *Oligochitosan* has no effect on seedling growth and yield of rice in parachute nurseries.

BREEDER SEED PRODUCTION

Table 1.4.2: Amount of breeder seeds produced in 2012

	Breeder Seed Quantity (kg)		
	Maha 2011/12	**Yala 2012**	**Total**
150-180 days			
Bg 3-5	41		41
Bg 745	41		41
Bg 38	41		41
Bg 407	41		41
4 months			
Bg 379-2	164	184.5	348.5
Bg 450	82	102.5	184.5
Bg 403	41	123	164
Bg 454	41	20.5	61.5
Bg 406	164	102.5	266.5
3.5 months			
Bg 94-1	164	164	328
Bg 352	143.5	184.5	328
Bg 357	61.5	82	143.5
Bg 358	184.5	225.5	410
Bg 359	164	225.5	389.5
Bg 360	184.5	123	307.5
Bg 366	246	328	574
Bg 369		100	100
3 months			
Bg 300	143.5	164	307.5
80 Days			
Bg 250	61.5	61.5	123
Total	**2009**	**2191**	**4200**

SPECIAL PROJECTS

Multi-Environment Testing (MET) Project

Multi-Environment Testing (MET) programme, is a project funded by International Rice Research Institute (IRRI) under GRISP. The main objective of the research study is to develop harmonized procedure for nominating, advancing and discarding breeding lines and to facilitate exchange of germplasm between the participating countries. Experiment on first multi-environment testing for irrigated lowland rice was initiated to evaluate elite and local varieties to identify the better adopted varieties for local condition in collaboration with IRRI, Philippines. Under this progremme, 180 new rice lines were evaluated for local condition and this experiment included elite lines transferred from IRRI. This Multi Environment Testing programme is helpful to identify the superior breeding materials well adopted one or more specific rice growing environments and the studies are continued till 2014 for further validation.

Optimizing technology package for dry seeded rice cultivation (DOA - IRRI Weed Science Project)

The Project was conducted in collaboration with International Rice Research Institute (IRRI), Philippines. The objective of this study series is to develop a suitable technology package for irrigated dry direct-seeding (IDDS) in upland condition where dry seeds are sown in dry field. Field was irrigated soon after sowing of seeds to

facilitate germination. A separate technology measure is discussed as follows.

a) Effect of herbicides in dry seeded rice

Performance of different herbicides on weed growth in IDDS was evaluated and Bg 357 was sown in rows with seed rate of 100 kg/ha. DOA recommended cultural management practices for pest and disease management and fertilizer applications were applied for this trial. There were five herbicide treatments which were Pretilachlor 300 g/L + pyribenoxim 20 g/L (8 DAS) followed by MCPA 400g/l (20DAS),Cyhalofop-butyll00 g/L (8DAS) followed by MCPA 400 g/L (20DAS),Thiobencarb 400 g/L + propanil 200 g/L (8DAS) followed by MCPA 400g/L (20DAS), Propanil (8DAS) followed by MCPA 400g/L (20DAS), Bispyribac sodium + metamifop (8DAS) followed by MCPA 400 g/L (20DAS) and no weeding as the control. The highest yield (7.04 t/ha) obtained from the treatment Pretilachlor 300 g/L + pyribenoxim 20 g/L (8 DAS) followed by MCPA 400 g/L (20 DAS), but all herbicides had given more than 80% weed control efficacy. Therefore, all the above herbicides can be recommended for IDDS establishment method in rice fields.

b) Weed competitive ability and suitability of rice varieties under dry seeding

The experiment was conducted to evaluate the growth, development and yield of different rice varieties on weed growth in IDDS. Rice varieties; At 362, Bg 352, Ld 365, Bg 357, Bg 358, Bg 366 were sown in rows with the seed rate of 100 kg/ha. DOA recommended cultural management practices, pest and disease management and fertilizer applications applied for this trial, by maintaining no weedy and weedy conditions. At 362 gave the highest yield of 6.38 t/ha in 2011-12 Yala season in no weedy plots while Bg 357 gave the highest yield of 1.77 t/ha in weedy plots.

c) Optimum Nitrogen fertilizer levels and splits on dry seeded rice

Evaluation of the optimum N rate and timings and effect of rice growth development and yield in IDDS was studied. Bg 357 was sown in rows (seed rate 100kg/ha) with 5 different nitrogen rates; which are 0 kg/ha, 60kg/ha, 90kg/ha, 120kg/ha, 150kg/ha. DOA recommended cultural management practices, pest and disease management practices were applied except fertilizer management. Application of N in 3 splits which are 33% at 10DAS, 33% at active tillering 28DAS, and 33% at panicle initiation (PI) treatment of 50DAS is better than 4 splits of 25% at 10DAS, 25% at active tillering 28DAS, 25% at panicle initiation 50DAS, and 25% at anthesis-check 85-90DAS. Yield increases with the increase rate of N split applications. Zero application of N reduced the grain yield. Application of 3 splits with 150Kg/ha gave the highest yield (6.62 t/ha) while 120, 90, 60, 0 Kg/ha gave 6.27, 5.81, 5.98, 5.74 t/ha respectively. According to the results, 150 and 120 Kg/ha rates of Nitrogen fertilizer can be recommended for IDDS establishment method.

d) Effect of different seed rates under dry seeding

The effect of seeding rate on weed and crop growth in IDDS was evaluated. Bg-357 was sown in rows manually with 5 different seed rates; 20kg/ha, 40kg/ha, 60kg/ha, 80kg/ha, 100kg/ha. Split plot design was used with plot size of 4m x 3.06m. DOA recommended cultural management practices pest and disease management and fertilizer applications applied for this trial, by maintaining no weedy and weedy conditions. The highest yield (7.06 t/ha) was obtained from the seed rate of 80kg/ha while 100, 60, 40, 20 Kg/ha seed rates gave 6.84, 6.84, 6.55, 5.88 t/ha respectively. Weed competitive ability increases with the seed rate. Therefore, for dry seeded establishment in upland conditions 40- 60 Kg/ha seed rate can be recommended.

e) Herbicide screening in dry seeded rice

Reevaluated the weed control efficacy and find the phytotoxicity on growth and yield of rice with already DOA recommended herbicides on weed growth in IDDS evaluated along with no weeding and hand weeding conditions. Tested herbicides were Propanil followed by MCPA, Pendimethalin 3 l/ha (1-2 DAS, Not in Standing Water), Oxidiazon 1.8 l/ha (1-2 DAS, Not in Standing Water), Oxyflurfen (1-2 DAS, Not in Standing Water), Pendimethalin 3l/ha (1-2DAS, Not in standing Water) followed by fenoxaprop + ethoxysulfuron (20DAS), Oxidiazon 1.8 l/ha (1-2 DAS, Not in Standing Water) followed by fenoxaprop+ethoxysulfuron(20DAS), Oxyflurfen (1-2 DAS, Not in Standing Water) Followed by fenoxaprop+ethoxysulfuron (20DAS), Pendimethalin 3 l/ha (1-2 DAS, Not in Standing Water) followed by penoxsulam (20DAS), Oxidiazon 1.8 l/ha (1-2 DAS, Not in Standing Water) followed by penoxsulam (20DAS), Oxyflurfen (1-2 DAS, Not in Standing Water) Followed by followed by penoxsulam (20DAS). Bg-300 was random broadcasted at the seed rate of 100kg/ha. DOA recommended cultural management practices pest and disease management and fertilizer applications applied for this trial, The highest yield (4.52 t/ha) and the highest weed control (80%) efficacy was obtained from the treatment Oxidiazon 1.8 l/ha (1-2 DAS, Not in Standing Water) followed by Penoxsulam (20DAS). but it wasn't significantly differ from hand weeding plots. except oxflurofen other herbicides don't show any phytotoxicity to rice plants.

Evaluation of rice lines for irrigated lowland eco system (Green Super Rice Project)

Testing of 32 rice lines was done under the Green Super Rice (GSR) Project funded by International Rice Research Institute (IRRI) and implemented with the objective of development and cultivation of rice cultivars with high nutrient efficiency and stress resistance. Lines received in 2012 (GSR–Irrigated Lowland Yield Trial; GSR-IRLL - 2012) consisting of 32 test entries developed by CAAS (Chinese Academy of Agricultural Sciences) and IRRI, were tested for irrigated lowland condition with 4 local check varieties (Bg 300, Bg 352, Bg 366, and Bg 94-1). The lines PSB RC18, ZHONGHUA 1 and IR 84678-25-5-B gave comparable yields to that

of highest yielding local variety Bg 94-1 and therefore need further testing.

Crop simulation and modeling approach with APSIM *ORYZA* (SAARC-Australia Project)

The Project is funded by SAARC Australia with the aim of developing capacity in cropping systems modeling to promote food security and the sustainable use of water resources in South Asia. The objective of this Project conducted in Sri Lanka is todetermine optimum sowing dates for rainfed rice cultivation in the IL1a agro-ecological region. Rice yields are highly varied in rainfed areas (less than 3 t/ha) compared to irrigated areas (5 t/ha), because water becomes a critical factor for rice cultivation in rainfed ecosystems. Time of sowing determines the rice yield as it is associated with the amount of rainfall and its distribution for application of fertilizer, weed management and other agronomic practices. Therefore, this study was conducted to determine the best dates of sowing of three varieties, Bg 366 (3 ½ months), Bg 300 (3 months) and Bg 250 (2 ½ months) under rainfed systems during Maha season to be validated by APSIM-Oryza model. Crop data (two seasons), soil data and climate data (30 years) were collected at RRDI (IL1a region) where the field trials were established. The model was calibrated and validated with the collected data and then used to determine the optimum sowing dates with the scenarios of 18 sowing dates from 01st September to 15th January with 7 days interval. Simulation results based on the yield confirmed that the best period of sowing paddy during Maha season in the IL1a region of Sri Lanka is 1st week of October for Bg 366 (average is 2.8 t/ha and maximum is 4.5 t/ha), 2nd week of October for Bg 300 (average is 1.6 t/ha and maximum is 2.4 t/ha) and 3rd week of October for Bg 250 (average is 0.8 t/ha and maximum is 1.3 t/ha).

Development of rice production technologies for increasing self sufficiency staple food in Sri Lanka (AFACI – Korean Project)

Development of rice production technologies to increase rice production in Saline areas was identified as a programme under this project. The Project is funded by Peoples Republic of Korea. Principal investigators meeting was held in September 2012 and technical plan was presented. Memorandum of Understating was signed. Puttalam district was identified as locations to conduct the field work and preliminary meetings were held in October and field officers were informed about the field activities. Soil sample collection to identify the saline areas was commenced.

Productivity enhancement of Low Country Wet Zone paddies (LCWZ Project)

The Project is funded by the Ministry of Agriculture to enhance the productivity in Low Country Wet Zone of Sri Lanka. The paddy productivity in the Low Country Wet Zone (LCWZ) paddies remained low (2-2.5 t/ha) for decades mainly due to abiotic and biotic stresses like salinity, iron toxicity, submergence, bog soils, weed infestation, etc. Further, the seed

paddy availability of recommended varieties for the region is very minimal and as a result farmers use low potential varieties. Therefore, the paddy farming in the area operates at a subsistence state. Hence the motive of this Project aimed at enhancing the productivity of LCWZ paddies in order to uplift the living standards of the farmers in the area.

The Project was launched in seven districts in LCWZ (Matara, Galle, Kalutara, Gampaha, Colombo, Rathnapura and Kegalle). A baseline survey was conducted and land characterization and classification study was done to identify problematic land systems. The results reveled that the rice production in the region operated at subsistence level and more than 50% of farmers are part time farmers. The productivity of the area varied between 2.5-3.0 t/ha. The low productivity was mainly due problems such as excess water, iron toxicity, salinity, boggy soils, sandy soils and lack of quality seed paddy of recommended varieties. The Project introduced effective and combined technical package to overcome the problems encountered by the farmers. The technical package included 15 different varieties, 10,500 parachute trays, 700 leaf colour charts, 35 pocket microscopes (to monitor sheath mites) and improved management practices. The productivity levels of the demonstrated fields resulted an average of 3 t/ha. The field programme is continued for 2012/13 Maha season to harness productivity improvement and to reduce the cost of production of paddy. The Project was implemented in collaboration with Provincial Department of Agriculture and the line institutes of the Department of Agriculture.

Research Farm Development programme (RFD Project)

Productivity and income of research farms are stagnated due to various problems such as limited infra-structural facilities, limited human resources and lack of farm machineries. Therefore, quality seed production at research farm is limited. Therefore, a project proposal for productivity improvement of research farms at RRDI system was submitted to Ministry of Agriculture through Department of Agriculture and Rs 9.46 Mn was allocated for development works and seed production programme in RRDI system. RRDI, Batalagoda, RRRDC, Bombuwela, RRS Bentota, RRS, Labuduwa, RRS, Ambalatota, RRS, Sammanturai, RRS, Paranthan and RRS, Murunkan respectively received Rs 2.46, 2.0, 0.25,0.31,0.25,1.37, 2.0, 1.0 Mn for improvement of infra- structural facilities and seed paddy production programme.

Five main activities proposed were, improvement of irrigation facilities for seed production (Rs 2.67 Mn), land development (Rs. 0.65 Mn), infra-structure development (Rs 1.40 Rs), seed production (Rs. 4.34 Mn), purchasing of equipment and machinery (Rs. 0.43 Mn) and administration (Rs 0.25mn). Construction of 325 m irrigation channels and two pump houses for installation of water pumps and purchasing three diesel pumps has been proposed under first activity and two pump houses and these targets were able to accomplish. Under Land development, leveling of 17 ac of land,

construction of 60m long concrete bunds and 350m long fence were proposed. However, some activities delayed due to technical problems.

Under basic seed production activity, cultivation of 29.5 ac area of lands had been proposed but only 21.5ac of land area was harvested due to damage of part of the cultivated area by dry weather spells and water shortage during the cropping season. In 2012 Yala season, 33.6 tons of foundation and commercial seed paddy were produced. Certain percentage of seed paddy produced were issued to the farm division for distribution among seed producing farmers for seed production and the balance were sold to seed paddy producing farmers through the outlets of the research stations.

Development of rice varieties for abiotic stress; submergence, salinity, drought escape/tolerance and iron toxicity. (NARP – abiotic stresses)

The objective of the project is to incorporate the abiotic stress tolerance to popular rice varieties grown in the country. RRDI is working on submergence, Salinity and drought while RRRDC, Bombuwala is working on iron toxicity and RRS; Ambalanthota is focused on salinity tolerance. In 2012, institutional capacity was upgraded by developing screening facilities at Bathalagoda (for submergence) and Bombuwala (for iron toxicity) and purchasing essential equipments with the financial assistance received from NARP. In addition, screening protocols for submergence, salinity drought, iron toxicity and salinity were standardized. Parental donor lines identified for submergence, salinity, drought and iron toxicity and several crosses were effected with popular varieties Bg358, Bg360, Bg379/2, Bg96-741, Bg250, Bw363 to obtain F1s and back cross populations. Simultaneously, molecular biology laboratory was upgraded to conduct DNA extractions, high throughput PCR and gel electrophoresis to increase the efficiency and precision of the back cross breeding programmes. Using the molecular marker technology, it was able to it was bled to identify submergence tolerant plants by morphologically using the submergence tank and molecularly by SSR markers for the first time in the history at RRDI. This programme is continued to obtain abiotic stress tolerance varieties to be deployed in abiotic stresses prone areas in Sri Lanka.

Adaptability testing of fertilizer use efficient technologies in farmers' fields (NARP- Fertilizer)

Objective of this project is to test the adaptability of technologies which were developed at the RRDI to increase N, P and K use efficiency under farmer conditions. Demonstrations were commenced in Yala 2011 and conducted three consecutive seasons in 21 locations in 4 districts (Kalutara, Polonnaruwa, Kurunegala and Hambanthota) with the financial assistance received under NARP. Results of demonstrations related to nitrogen fertilizer revealed that application of nitrogen fertilizer based on Leaf Colour Charts (LCC) increase fertilizer use efficiency and as such present yield level of rice can be obtained with 30% less nitrogen. In additions, it was observed in Polonnaruwa district that additional 5 % yield increment based

on LCC nitrogen application can be obtained in comparison to DOA present recommendation. Therefore, new LCCs suitable for wet and dry zone conditions were developed and distributed among extension officers to get their views. Demonstration conducted in 21 locations with the rice varieties grown by farmers revealed that application of P fertilizer at alternative seasons maintains the present yield level of 5-6 t/ha in Polonnaruwa and Hambanthota districts and 4-5 t/ha in Kurunegala district and 3-4 t/ha in Kalutara district. As such application of P fertilizer in alternative seasons can be used to save P fertilizer use in farmer fields. Demonstration related to K fertilizer conducted above 21 locations in four districts have shown that, with straw back to fields, application of half the DOA recommendation of potassium at Panicle Initiation (PI) alone gave similar grain yield compared to full DOA recommendation of potassium applied in basal and in PI stages. This method helps to increase K use efficiency and to reduce K application by 50% in farmers fields.

All these studies are conducted during Maha 2012/13 in all locations to ascertain long term effects.

Weedy rice management in wet seeded rice in Sri Lanka (NARP – Weedy rice)

The objective of this study is to develop integrated technology package to control weedy rice in farmer fields in Sri Lanka. It includes selection of effective seed establishment methods; seedling broadcasting, row seeding, wet direct seeding and transplanting for the specific rice environment with proper land preparation, proper cultural management practice, use of clean seed paddy, and manual/mechanical removal of weedy rice plants. Twenty one field experiments were conducted in highly infested weedy rice fields; Aluthwewa, Girithale, Matara, Ambalanthota, Mawathagama, Rathnapura and Galle in 2011-2012 Maha and 2012 Yala seasons. Twelve field trials were successfully completed and other trials failed due to drought. Results indicated that use of clean seed paddy with row seeding establishment method highly reduced the emergence and growth of weedy rice and reduced the yield losses due to weedy rice compared with farmer practice. 40 awareness programs were carried out to educate, extension officers and progressive farmers. Awareness programs expanded to Northern Province of the country mainly *Paranthan* and *Vavuniya*. All the farmer demonstration trials revealed that integrated technology package is more effective to reduce the weedy rice infestation in rice fields.

Assessment of water availability in rainfed paddy fields in *Kurunegala* district for optimum utilization of water in rice production (NARP – rainfed water availability)

Availability of water in rainfed paddy fields is important to use suitable rice varieties with a suitable cropping calendar to reduce the yield losses and to optimize rice production in rainfed paddy farming. Therefore, to assess the water availability in rainfed paddy fields in *Kurunegala* district and to demarcate rainfed and

irrigated paddy fields in *Kurunegala* district successfully completed. Climatic water availability using the rainfall and potential evapo-transpiration data was calculated monthly basis but planned to obtain weekly basis for more accuracy. To evaluate the soil water availability in three selected Agrarian Service Centers (ASC) (*Mahananeriya, Ibbagamuwa and Alawwa*) representing Dry, Intermediate and Wet Zones during the Yala and Maha seasons, soil samples were collected. Analysis of above samples for soil texture is in progress. Field surveys for rice varieties use, yield and crop management practices will be completed during 2012-13 Maha and 2013 Yala seasons.

TECHNOLOGY DISSEMINATION

The objective of establishing the Rice Production Technology Training Center was to enhance the technical competence of extension officers, seed producers, farmers and students of different institutes such as University, Schools of Agriculture, schools etc, of the new technologies generated at RRDI and to expedite the technology transfer process with the aim of increasing rice productivity and production in Sri Lanka. In order to strengthen residential training facilities, a new hostel complex was set up in the close vicinity having full accommodation facilities. In addition, the centre provided facilities for conferences and seminars conducted at RRDI in varying disciplines of rice production technology.

Other than scheduled trainings, three day capacity building training workshop was conducted for newly recruited research officers to RRDI.

Table 1.4.3: Summary of training programmes conducted in 2012

Type of Programme	No. of Programmes	No. of Participants
One day farmers training	27	1494
Residential farmers trainings (2 or 3 days)	02	54
One day officer trainings	11	376
Residential officer training (2 or 3 days)	10	324
Private sector training	03	92
Season long training	02	60
School children, Diploma student and university student visits	13	567
In plant training (1-4 month)	05	14
Other workshops	08	210

Income received through sale of publications (2148 No.) was Rs. 122,030.

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 grainquality attributes. Besides the production of breeder seeds of recommended "At" varieties, researches were conducted on grainquality attributes, pest and disease screening, soil fertility management and agronomic aspect of rice cultivation.

VARIETAL IMPROVEMENT PROGRAMME

Hybridization and selection programme

The breeding programme was not performed well at the station due to the drought impact prevailed in Yala 2012 season. However, the VAT programme and seed production programme were conducted at farmer fields and Agricultural Park at "*Bata Atha"*. Eighty crosses were made. Sixty two bulk populations were evaluated and 46 were selected for further evaluation. Out of 1510 progenies, 275 progenies were selected for further evaluation as advanced progenies in the yield trials.

Yield evaluation

Twenty six lines were evaluated in Preliminary Yield Trials and Major Yield Trials to test their yielding ability.

Adaptability Trials

Six newly developed lines: At 08-593, At 08-617, At 08-617, At 08-648, At 09-854, At 09-861 and At 09-1078 were further tested.d in National Co-ordinated Rice Varietal Trials (NCRVT). In addition, Varietal Adaptability Trials (VAT) were conducted at 13 different locations in Matara and Hambantota districts in both seasons. At 07-800, At 07-695 and At 06-631 were further evaluated for their adaptability in VAT programme. Three rice lines selected from VAT programme, At 05-1382, At 06-650 and At 06-486 were further evaluated in Large Scale Varietal adaptability Trials (LSVAT).

Grain quality aspects

Nine varieties comprising three groups of Gelatinization Temperature (GT), high (At 307, At 303 and At 593), intermediate (Bg 379-2, Bg 94-1 and At 306) and low (Bg 403, At 362 and At 405) were studied for cocking qualities. In each group former, middle and latter variety comprised of an Intermediate Bold (IB), Long Medium (LM) and Long Slender (LS) grain type respectively. Thousand grain mass had no influence on cooked rice weight or volume but, GT influenced cooked weight, volume and cooking time of rice by the added water. However, the grain type with a good packing ability offered a higher raw rice weight, resulting a greater cooked rice weight within its GT group. Elongations observed in grain dimensions did not follow any pattern with its GT and further study with number of varieties representing each GT and grain type is suggested.

Unpolished or brown rice is rich in fiber, iron, vitamins and minerals because of the

remaining outer bran layer, but less palatable compared to milled rice. Sprouted brown rice improves the palatability. Experiment was carried to evaluate the sensory qualities of sprouted rice in comparison to brown rice and milled rice of two red varieties (At 362 /At 353) and two white varieties (At 354 /At 307). Appearance of sprouted brown rice of red rice varieites received higher ranks than milled rice. However sprouted brown rice of all four varieties were ranked higher in taste attribute than brown rice.

TECHNOLOGY DISSEMINATION

- Supervising undergraduate students on their final year research project (2 students)
- Training of students of Agriculture Schools as a partial fulfillment of the Diploma course
- Attending monthly crop clinics as resource persons arranged by the DOA extension staff Dissemination of information for university students, technical staff of DOA, school children, and farmers, who visit the institute.
- At 05-1382 was recognized as the best variety for biscuit production in Ceylon Biscuits Limited (CBL) and seed paddy of the variety was supplied on the request of CBL.

Breeder seed production programme

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

Table 1.4.4: Breeder seed production during 2012

Variety	Breeder seed quantity (kg)		Total
	Maha 2011/12	Yala 2012	
3 months			
At 307	100	160	260
At 308	40	100	140
3 ½ months			
At 353	20	40	60
At 362	180	320	500
Total	**340**	**620**	**960**

RICE RESEARCH STATION-SAMMANTHUREI

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 breeder seeds of recommended varieties, conducting National Coordinated trials and finding solution to field problems of rice farmers in the region.

Rice varietal improvement programme

Breeding Programme 3½ months age group

Research efforts continued to improve and develop specialty rice with short maturity and drought tolerance. Major emphasis were on improving grain quality, grain yield and disease resistance. Fourteen parental lines were

used for this programme and maintained their progenies according to their performances.

Hybrid rice production programme

Tested newly developed hybrid rice (Bg 407 H) in two locations and obtained the average yield of 8.5 t/ha which is 28% higher than the normal high yielding rice varieties.

Weed Management

Different kinds of weedicides {08 Treatments: T1 – Bisphyribac – Sodium 100g/L SC , T2 3,4-DPA(Proponil 360 g/L EC) & MCPA 60-3000 ml/ac + 800 ml/ac, T3 – Pretilachlor 300 g/L EC, T4 - Fenoxaprop-p-ethyl 69 g/L OD , T5 - Cyhalofop-butyl 100 g/L, T6 - Hand Weeding, T7 – Control} were tested for their effectiveness in farmer fields at four locations. The highest yield (5.8 t/ha) obtained from hand weeding (T3) and chemical control with Pretilachlor 300 g/L EC (T6).

Agronomy

National Coordinated Rice Varietal Trials (NCRVT), Varietal Adaptability Trial (VAT) and Large Scale Varietal Adaptability Trial (LSVAT) were conducted both at research station and at farmer fields. Large scale Hybrid Rice adaptability studies were also conducted in ten locations.

National Coordinated Rice Variety Trials (NCRVT)

During Yala 2012 season, NCRVT programme conducted with 2½, 3½ and 4½ maturity age classes. Seven new rice lines of 2½ months, four new lines of 3½ months and three new lines of 4 - 4½ months age class were tested with standard check varieties under researcher managed conditions.

Variety Adaptability Testing Program (VAT)

Varietal adaptability trials (3½ months age class) were conducted at eight locations in Ampara district in Yala 2012 season and trials of 3 months and 3½ months age classes were conducted in six locations at Ampara district. .

Large Scale Variety Adaptability Testing Program (LSVAT)

One promising elite line (At 07-800) was tested with Bg 300 check variety in two locations during 2011/2012 Maha season at Ampara district.

Technology Dissemination

Four special training programmes were conducted on optimal seed rate use, sheath and leaf mite control, soil fertility management and post harvest handling with the objective of disseminating improved rice technologies to the farmers.

Basic Seed Production

The commercial seed production programme on recommended rice varieties that are in short supply was also continued. There was also a new programme on seed production of ultra short rice variety (Bg-250) and high yielding variety (Bg 357) having export potential. Approximately, 500 bushels of quality seeds from Bg 357 were produced. Pertaining to Research Farm Development Project, basic seed production programme conducted in nine acres during *Yala* 2012 season.

Management of weedy rice in the coastal area of Ampara district (NARP project)

Knowledge on weedy rice in coastal areas of Ampara district has been a severe problem. An integrated approach for weedy rice management aiming at sustainable and profitable rice farming in the area was carried out by demonstrations, trainings and field practices in six locations in Ampara coastal area with the participation of 140 farmers.

STAFF LIST

RRDI – Batalagoda

Designation	No.
Director	01
Additional Director	01
Assistant Director	01
Research Officer	20
Agricultural Economist	01
Agricultural Monitoring Officer	01
Programme Assistant	07
Agricultural Instructor	19
Research Assistant	19
Research Sub Assistant	06
Public Management Assistant	13
Office Assistant	01
Machine Operator	03
Carpenter	01
Lorry Cleaner	01
Circuit Bungalow Keeper	01
Driver	08
Watcher	07
Labourer (Permanent)	47
Labourer (Contract)	90
Total	**248**

RRDI – Ambalanthota

Designation	No.
Research Officer in Charge	01
Research Officer	04
Agricultural Instructor	02
Research Assistant	05
Sub Lab Assistants	02
Public Management Assistant	01
Driver	01
Watcher	02
Tractor Operator	01
Labourer (Permanent)	16
Labourer (Contract)	21
Total	**54**

RRS - Sammanthurai

Designation	No.
Research Officer in Charge	01
Research Officer	01
Agricultural Officer	01
Agricultural Instructor	01
Research Assistant	01
Public Management Assistant	02
Watcher	02
Labourer (Permanent)	03
Labourer (Contract)	22
Total	**33**

1.4.1 REGIONAL RICE RESEARCH AND DEVELOPMENT CENTRE (RARDC) – BOMBUWELA

The Regional Rice Research and Development Centre (RRRDC), Bombuwela and its satellite research stations at Labuduwa and Bentota are located in the Low Country Wet Zone (LCWZ) and cater to the needs of Low Country Wet Zone region. The RRRDC Bombuwela has the mandate to develop high yielding both red and white rice varieties suitable for problem soil conditions particularly tolerant to iron toxicity.

BUDGET

Table 1.4.1.1: Annual Budget – 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	1,175,816	1,175,816	100
Recurrent	11,569,228	10,528,288	91
Foreign projects			
ANSOFT	75,000	75,000	100
Total	**12,820,043**	**11,779,104**	**92**

PROGRESS

RICE VARIETAL IMPROVEMENT PROGRAMME

Newly Recommended rice varieties

- A white samba variety in 3 ½ months maturity group was released as Bw 367 in 2012 for general cultivation in Sri Lanka. Average yield of Bw 367 was estimated as 5 t/ha
- A new promising line namely Bw 03-1198 was nominated to the National Coordinated Rice Varietal programme(NCRVT) in 2012/13 Maha. This is a 3 ½ month maturity rice line with intermediate bold grain type.
- Bw 05-1621, another promising line was nominated for Large Scale Variety Adaptability Trail (LSVAT) in 2012/13 Maha to evaluate the farmers' acceptability. It is a red pericarped intermediate bold type rice line.

Breeding programme

Three lines from 4-4 ½ months maturity group were selected for Major Yield Trial (MYT). Eighteen lines were selected from 3 ½ months maturity group for Preliminary Yield Trial (PYT) and MYT. Three lines and 5 lines were selected respectively from 3 months and 85 day maturity groups for MYTs.

The NCRVT and Variety Adaptability Trial (VAT) programmes were also continued for Wet Zone areas and a total of 30 lines were evaluated under NCRVT programme. Under VAT programme, 5 promising lines including Bw 05- 1621 were evaluated in Kalutara, Colombo and Ratnapura Districts.

DISEASE MANAGEMENT

A total of 160 rice lines developed by the rice improvement programmes of Bombuwela, Ambalantota and Labuduwa were screened at Bombuwala for rice Blast and 28 lines were identified as resistance to rice Blast.

PEST MANAGEMENT

Sixty nine rice lines nominated for NCRVT programme were screened at Bombuwela for Brown Plant Hopper (*Nilaparvata lugens*) (BPH) and rice Galle Midge (*Oreseolia oryzae*) (GM).Two lines were identified as moderately resistant to BPH.

Research conducted at RARDC Bombuwela revealed a new biotype of BPH and further studies will be continued to confirm this.

Thirty breeding lines from Bombuwela were screened for BPH and rice GMunder green house condition. Of them, 8 lines were moderately resistant. Very low level of GM infestation in the field was observed in the last two seasons at Bombuwela, and therefore conclusions cannot be drawn from the field screening experiment conducted for rice GM.

Rice Sheath Mite (*Steneotarsonemus spinkii* Smiley) (RSM) is a recently identified rice pest and it can causes up to 90 percent yield loss. Different acaricides have been tested on RSM so far and only Profenophos 50EC have shown good effect in controlling RSM. However, considering the hazardous effects of Profenophos 50EC on the environment and non-target organisms, it is tentatively recommended to control RSM. Therefore, varying doses of different eco-friendly acaricides were evaluated under field conditions against RSM. Of them, one promising fungal derivative was found and further evaluation is needed for confirmation of the results.

WEED MANAGEMENT

Three mulching materialswere tested along with hand weeding, chemical control and non-weeded control in raw seeded rice crop to determine the weed controlling ability**.** Rice straw and wood shavings was identified asvery effective mulches to suppress all types of seed born weeds at early stage (2WAS) of the rice crop.

Recommended herbicides were re-evaluated and revealed that, Bensulfuron- Methyl + Metsulfuron – Methyl, Carfentrazone – Ethyl and MCPA were still effective in controlling broad leaves and sedges. Azimesulfuron and Bispyribac- sodium WP performed better in controlling two weed species namely; Leptochloa *chinensis* and *Cyperus difformis.*

SOIL FERTILITY MANAGEMENT

Different combinations of Eppawala Rock Phosphate (ERP) and *Gliricidia*were tested to determine their effect on increasing solubility of P in rice lands in LCWZ, was conducted at RARDC, Bombuwala. Experiments are continuing to get more information.

Soil testing programme at RARDC Bombuwala was conducted with the objective of reducing over fertilization to minimize the cost of fertilizer in rice cultivation while preserving the natural balance of the environment. Total of 774 soil samples were received for analysis as follows; 114 soil samples under LCWZ project from 5 districts (Galle, Matara, Kalutara, Rathnapura and Colombo), 240 soil samples from different Agrarian Service Centers under soil mapping project, 392 soil samples from different division of the station and 28 samples of soil test based fertilizer recommendation. Of them, 557 samples were analyzed for pH, EC, P, K, Organic matter content and texture. The results of the soil analysis for different Agrarian Service Centers will be used to develop database for spatial variability of soil fertility.

AGRONOMY

Study on Integrated Plant Nutrient Management Practices for rice confirmed that, application of 4 t/ha of straw and 2 t/ha of compost can be used to reduce the application of chemical fertilizer by 25%.

Results of 'Need Based Nitrogen Management in Rice by using Leaf Colour Chart' revealed that application of compost at 8 t/ha and application of N based on LCC helps to reduce the nitrogen fertilizer use by 25%.

A total of 6000 kg of compost and 840 kg of compost inoculum were prepared under the Organic Manure Production and Promotion Programme.

TECHNOLOGY DISSEMINATION

- A total of 565 stakeholders including seven students at tertiary level were trained on various aspects of paddy cultivation.
- A total of 600 soil samples collected from farmers fields were analyzed bythe Division of Soil Fertility Management and recommendations were given.
- Two television programmes, five radio programmes and two field days were conducted on various aspects of paddy cultivation
- 52 presentations were made by the staff on different subject areas under Seminar Programme of the Centre.

BREEDER SEED PRODUCTION

Table1.4.1.2: Amount of breeder seeds produced in 2012

Variety	Breeder seed quantity (kg)		
	Maha 2011/12	Yala 2012	Total
3.5 months			
Bw 364	41	41	82
Bw 361	21	21	42
Bw 367	62	82	144
Bw 363		21	21
Bw 267/3		21	21
3 months			
Bw272-6b		21	21
Total	**124**	**207**	**331**

DETAILS OF SPECIAL PROJECTS

NARP project on Development of rice varieties tolerant to submergence and iron toxicity

Six crosses were made and progenies will be screened further for iron toxicity and submergence.

ANSOFT Project on Characterization and purification of traditional rice varieties

Thirty two local varieties were characterized, purified and multiplication of those varieties will be done in the next season.

Research Farm Development project

Two field days were conducted with 248 participants

Productivity enhancement pf LCWZ

A total of 4520 kg of seeds (foundation, registered, certified and commercial seeds) were produced to meet the seed paddy requirement and were handed over to government seed farms and among stakeholders in the LCWZ for multiplication.

NARP project on Adaptability testing of fertilizer use efficient technology under farmer field. N, P, K levels were tested in 9 locations in Kalutara district

Need based management of chemical; fertilizer increase the fertilizer use efficiency of N, P, K fertilizer and can be used to reduce the level of NP and K fertilizer application. Under this project Leaf Colour Chart suitable for LCWZ condition was developed.

PLAN FOR 2013

Rice Breeding

Varietal impact and breeder seed production programmes will be continued. In addition, a survey will be conducted on traditional rice varieties. Anther culture studies will be conducted with local *Oryza sativa* sub sp. indica (rice) germplasm for production of doubled haploid plants. Anther culture studies will also be conducted to develop iron toxicity tolerant rice lines. Development of rice varieties for submergence tolerance and iron toxicity under the NARP project will be continued for another season.

Agronomy

Integrated Plant Nutrient Management Practices for Rice, VAT and NCRVT will be continued. Studies on LCC and Zero Tillage will also be continued to get more information. Hybrid Rice combination will be evaluated under LCWZ conditions.

Pathology

Recommended fungicides will be evaluated against Leaf Blast.Screening rice varieties for Bacterial Leaf Blight and Leaf Blast will be continued.

Entomology

Evaluation of different acaricides against rice sheath mite *Steneotarsonemus spinkii* Smiley and screening of rice varieties for Gall Midge (*Orseolia oryzae*) and BPH (*Nilaparvata lugens*) will be continued. Development of

Forecasting System for Ricesheath mite for LCWZ will be commenced.

Weed Science

Recommended herbicidesfor rice will be reevaluated.

Soil Fertility Management

Effect of split and late application of fertilizer on rice grown in LCWZ will be studied. Identification of heavy metals in different types of rice varieties will also be commenced. Studies will be commenced to identify the replacement of MOP, Urea and TSP by using rice straw. Microbial studies on rice will be conducted with microbial inoculants of N and P. Studies will also be continued on chemical control of Iron toxicity, optimum rate of ERP x *Gliricidia* for rice cultivation and Effect of long term zero application of N, P, K on grain yield and soil fertility.

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.

VARIETAL IMPROVEMENT PROGRAMME

Newly recommended rice varieties

Ld 368, a red-pericarped rice variety having short round grain type matures in 105 days was released by the Department of Agriculture in 2012for island wide cultivation. This new variety has a realizable yield potential of over 7 t/ha. It is resistant to Leaf Blast, Neck Blast and moderately resistant to Bacterial Leaf Blight, Gall Midge, and Brown Plant Hopper. The variety is none lodging and has no grain discoloration.

Varietal testing programme

Five new high yielding advance rice lines were developed during the past 6 years. 2 ½ month lines, Ld 8-15-6, Ld 8-15-15, and Ld 8-15-30 were tested in NCVRT programme. 3 ½ month red samba line (Ld 8-6-7) was nominated to the VAT programme. 3.5 Months white samba line (Ld 3-6-12) was tested in LSVAT. Seven new rice lines of 3 ½ months age and 5 new lines of 4 ½ months age were tested under researcher manage conditions at ARS Labuduwa in 2012 Yala season with standard check varieties.

WEED MANAGEMENT

Weedy rice management

Weedy rice is a serious problem in rice fields in the Wet Zone of Sri Lanka. Therefore, a study was conducted to identity better management practices to eradicate this menace from rice fields. This study was funded by the NARP.

Several technology packages were tested in two locations in Galle district with the participation of extension officers and farmers. Two trials were conducted at two farmer fields in Galle district during Maha 2011/12 and Yala 2012 seasons. Following packages were found to be more effective than the farmer

practice (control) in controlling weedy rice in low country wet zone.

- Transplanting + Clean seeds + Pre-emergent Herbicide
- Seedling broadcasting + Clean seeds + Pre-emergent Herbicide
- Raw seeding + Clean seeds + Pre-emergent Herbicide
- Random broadcasting + Clean seeds + Pre emergent Herbicide

During the year concerned two field days were conducted with the participation of 200 farmers and extension officers to make aware disadvantages of having weedy rice in paddy fields.

DISEASE MANAGEMNT

Screening for BLB resistance

New rice lines received in 2012 from IRRI under the INGER programme were screened at the RRS Labuduwa for BLB andten rice lines were highly resistant.

Rice lines received under IRBB Nursery 2011 were multiplied and given to breeders to use in their breeding programmes, and PGRC for conservation.

PEST MANAGEMENT

New Panicle Moth which is causing grain discoloration was identified in rice in Galle district. It was identical to Angoumois grain moth [*Sitotroga cerealella*(Olivier)]. Discoloration of adjacent grains around the pupal case could be seen. This insect was mounted and is to be sent to United Kingdom for further identification.

During the 2012 39 NCRVT entries were screened for thrips resistance at RAS Labuduwa. Out of them 20 were highly susceptible, 14 were susceptible and 5 were moderately susceptible.

BREEDER SEED PRODUCTION PROGRAMME

In 2012, 200 kg breeder seeds of Ld 365 and Ld 408 were issued to government farms to produce foundation seeds for national seed production programme (Table 1.4.1.3).In addition, registered and certified seeds were issued to DD (Extension), Galle to strengthen the regional seed production programmes.

Table1.4.1.3: Amount of breeder seeds produced in 2012

Variety	Breeder Seed Quantity (kg)		
	2011-12 Maha	2012 Yala	Total
3 ½ months			
Ld 365	60	60	120
4 months			
Ld 408	40	40	80
Total	**100**	**100**	**200**

RICE RESEARCH STATION – BENTOTA

The major emphasize of the Rice Research Station (RRS), Bentota are to develop rice varieties for the flood prone and saline areas.

VARIETAL IMPROVEMENT PROGRAMME

Varietal screening for flood tolerance was continued in 2012 and Bg 96-741 was identified as a flood tolerant rice line.

Multiplication of this line was carried under research farm development project.

AGRONOMY

Research was continued for identification of appropriate method of crop establishment under submerged conditions for rice.

National Coordinated Rice Varital Testing (NCRVT) programme

NCRVT programme was continued with 3 ½ and 4 ½ months age groups. Ten new rice lines belongs to 3 ½ months and 5 new lines belongs to 4 ½ months were tested during the year

Varietal Adaptability Testing (VAT) programme

Variety Adaptability Testing (VAT) programme was conducted in 2011/2012 maha season with 3 ½ and 3 months age classes in two locations. Rice lines of 3 ½ age class were tested under farmer managed condition in 2012 yala season.

PLAN FOR 2013

- Screening of rice lines for submerged condition.
- Identification of appropriate method of rice establishment under submerged condition.
- Testing for the effect of zero tillage on nutrient uptake by rice plant in half bog soil.
- Evaluation of traditional rice varieties for halfbogsoil.
- Continuation of NCRVT and VAT programme.

STAFF LIST

RRRDC – Bombuwela

Designation	No.
Deputy Director (Research)	01
Research Officer	08
Farm Manager (Acting)	01
Agriculture Monitoring Officer	02
Programme Assistant	06
Development Assistant	01
Research Assistant	12
Agricultural Instructor	07
Administrative Officer	01
Public Management Assistant	06
Store Keeper	01
Driver	02
Watcher	01
Circuit Bungalow Keeper	01
Labourer	16
Sanitary Labourer	01
Labourer (Contract)	33
Labourer (Projects)	11
Total	**111**

RRS – Labuduwa

Designation	No.
Research Officer In-charge	01
Research Officer	02
Agricultural Instructor	03
Research Assistant	05
Public Management Assistant	02
Driver	01
Watcher	02
Tractor Operator	01
Labourer	10
Labourer (Contract)	12
Total	**39**

RRS – Bentota

Designation	**No.**
Research Officer In- Charge	01
Agricultural Instructor	03
Watcher	01
Store Keeper	01
Labourer	08
Labourer (Contract)	06
Labourer (Projects)	02
Total	**22**

1.5 NATURAL RESOURCES MANAGEMENT CENTER (NRMC) - PERADENIYA

The Natural Resources Management Center (NRMC) strives to optimize use of land and water resources on a scientific basis to improve national agricultural productivity in a sustainable manner. Activities of this centre include research on soil conservation and watershed management, land suitability evaluation, crop monitoring and forecasting, agro-meteorological and climate change, productivity enhancement, soil and water quality and on - farm irrigation management. Other responsibilities of the centre are maintenance of the agro-meteorological observation network of the country, implementation of the Soil Conservation Act, technology dissemination, and provision of technical assistance to clients on related subjects and environmental impact assessment of various development projects.

BUDGET

Table 1.5.1: Annual budget – 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure%
Capital	1,772,148	167,071	94
Recurrent	2,959,000	2,628,005	89
Projects			
NARP	10,000,000	6,642,657	66
Implementation of Soil Conservation Act	2,500,000	1,770,556	71
Programme on enhancing the productivity of paddy lands in the low Country Wet zone	300,000	139,872	47
Regional scale crop Suitability assesment and mapping ,Uva Province	1,700,000	475,000	28
Total	**19,231,148**	**13,326,802**	**69**

PROGRESS

RESEARCH

Vulnerability of Sri Lanka to Climate Change

This study examined the vulnerability of 25 administrative districts of Sri Lanka to climate change and climate variability. For the purpose of this study, a vulnerability index was developed using 22 environmental and socio-economic indicators to define the three

components of vulnerability: exposure, sensitivity, and adaptive capacity.

Analysis reveals that vulnerability varies according to socio-economic conditions, environmental factors and institutional development among districts, in ways that do not correspond directly to exposure or geography. The results show that urban and semi-urban districts in the Low Country Wet Zone (except Ratnapura) are by far the least vulnerable due to their greater wealth, improved infrastructure facilities and access to resources. This is despite their exposure to climate induced disasters such as flood, occasional drought and landslides. Mountainous districts of the western and eastern flanks of the Central Hills of Sri Lanka, namely Kandy, Matale, Nuwara Eliya and Badulla along with Trincomalee and Ampara districts in the eastern province show a moderate degree of vulnerability to climate change. Meanwhile, major rice producing districts of the island located in Dry and Intermediate Zones except Trincomalee and Ampara, viz. Anuradhapura, Polonnaruwa, Batticaloa, Hambantota, Monaragala and Kurunegala posses high degree of vulnerability to climate change. Communities in the Northern Province (excluding Jaffna peninsula), Puttlam and Ratnapura districts face a very high degree of vulnerability due to high exposure, high sensitivity of livelihoods and lower socio economic development

There are considerable differences in the degree of vulnerability among districts in Sri Lanka. Even in the same agro-ecological and/ or topographical region suggest that policy makers and planners should develop area-specific policies and programmes to manage climate risks. It is recommended that impacts of the climate change are addressed at local, sub-district level by mainstreaming climate change into development agenda of each district. It is also recommended that a similar methodology of vulnerability and capacity assessment is conducted within districts in order to target the 'most vulnerable' divisions and villages to target climate risk reduction interventions in a more meaningful way.

Development of Drought Hazard Profile of Sri Lanka

This study has attempted to construct and present an index of drought hazard in Sri Lanka using 14 indices derived from daily and monthly time series of rainfall and potential evaporation data. The results indicate that all 11 AERs in the Dry zone of Sri Lanka posses very high degree of drought hazard while all 20 AERs in the Intermediate zone of Sri Lanka posses either moderate or high degree of drought hazard. The 15 AERs found in the Wet zone of Sri Lanka posses either very low or low degree of drought hazard.

As demand for water resources increases as a result of population growth and economic development, future droughts can be expected to make greater impacts, with or without any increase in the frequency and intensity of meteorological drought. General policy recommendations can be drawn from this study are as follows.

- Existing systematic spatial differences of drought hazard across three major climatic zones of Sri Lanka enables policy makers to formulate their broader drought management strategies on climatic zone

wise while sub-activities at village level to be tailored assuring sustainable use of land and water resources of respective villages.

- Secondly, due to the fact of the entire Dry zone of Sri Lanka is prone to Very high to High degree of drought hazard, priority should be given to the area with drought impacts mitigation plans within the broader developmental context or in other word it should be mainstreamed in to the national development agenda. An effective way to do this would be to integrate adaptation measures into sustainable development strategies, thereby reducing the pressure on natural resources, improving environmental risk management, and increasing the social well being of the poor.
- Finally, policy makers and scientist should join hand together to develop of more accurate drought early warning system as well as appropriate relief programs and agricultural insurance scheme.

Development of land specific recommendations towards enhancing productivity of rice in the Low Country Wet Zone of Sri Lanka

Wet zone rice lands are important to buffer national rice production particularly during dry seasons of Sri Lanka, and soil fertility is an important parameter to enhance production of this crop. Soil fertility improvement of low country wet zone plays an important role in this regards as the zone has considerable extents of lands with soil problems. An experiment was conducted to characterize soil fertility in relation to land types. Soil samples were collected from surface (0 – 20 cm) depth of rice soils from four land types viz. first order valleys, higher order valleys, flood plains and filled lagoons. Soils were analyzed for pH, electrical conductivity (EC), available phosphorus (P), exchangeable potassium (K) and organic matter. Results showed that pH ranged from 3.9 to 4.3 in all land types showing presence of acidic soils in low country wet zone. Liming material application is not economic in this region. Therefore, it shows the need of breeding rice varieties for this situation. The EC was 0.07, 0.06, 0.10 and 0.85 dS/m. in first order valleys, higher order valleys, flood plains and filled lagoons, respectively. It shows marginal salinity in flood plain areas and severe salinity in filled lagoons. Available P ranged from 7.8 to 9.7 ppm in all land types showing soils in all land types have low levels of plant available P. It encourages correct use of P fertilizer in this region. The exchangeable K was 69, 80, 94 and 119 ppm in first order valleys, higher order valleys, flood plains and filled lagoons, respectively. It shows the low levels of K in first order valleys and the need of tailoring fertilizer K requirement for this land type. The soil OM content ranged from 5 to 11.1 % in all land types showing more than adequate levels of organic matter in soils in this region. Hence, organic matter application is not necessary for rice soils for the purpose of soil organic matter maintenance in this region.

Spatial characteristics of soil fertility parameters of rice soils in the mid country wet zone of Sri Lanka

Wet zone rice lands are important to buffer national rice production particularly during dry

seasons of Sri Lanka and soil fertility is an important parameter to enhance production of this crop. Mid country wet zone plays an important role in this regards. A study was carried out to identify soil fertility and its spatial variability in the wet zone of the country. For this purpose, a soil survey was conducted in July 2012 in a representative paddy land of 3.5 ha in Wattapola village in Kandy district. Low humic gley soils predominate in the land. Fifty two samples were collected from surface (0-20 cm) soil with 50 m grid interval and the samples were analyzed for pH, electrical conductivity, organic matter, sulfate-S, exchangeable fractions of K, Mg and Ca, available fractions of P, Zn, Cu, and Fe at the laboratory of Department of Water Resources Management, Faculty of Agriculture, University of Rajarata, Anuradhapura. Results showed that pH ranged from 5.0 to 6.6 showing acidic nature of soil. Electrical conductivity was very low (0.01 to 0.04 dS/m) but Fe content was very high showing toxic situations. Majority of the land had optimum levels of P (81%), sufficient levels of Mg (69%) and high levels of Cu (85%). Whole soil had inadequate levels of sulphate-S, available Zn and available Ca but optimum levels of organic matter and high contents of K. This study reveals that soil fertility in the study area shows significant spatial variability, limitations with respect to Sulfate-S, Zn and Ca and iron toxicity. Adoption of suitable measures to correct above limitations will ensure enhanced rice production.

Forecasting paddy extent and yield based on high resolution satellite imageries

Possibility of deriving reliable statistics on extent, production and the spatial distribution of paddy in a season, well before the harvesting time permits making vital decision on maintaining continuous supply of rice by timely interventions for providing storage facilities and synchronizing imports with production when it appropriate. This National Agriculture Research Program (NARP) funded research project was initiated aiming at real time national forecasting system for rice cultivation extent and production in Sri Lanka. High and moderate resolution satellite imageries were tested in Geographic Information System (GIS) for this purpose taking Ampara district as pilot study area. IKONOS and GEOEYE (1-2m resolution) satellite imageries were used for paddy land mapping with on screen digitising using visual interpretation to up date the paddy lands distribution map extracted from the Land use map of the department of survey. Map of paddy cultivated lands of Padiyathalawa Divisional Secretary's division were updated with additional 15 Km^2. Paddy land maps for other DS divisions of Ampara district are needed to be finalized.

As rapid method for identifying paddy cultivated lands, automated and supervised classification approaches were evaluated with green-red-infrared (1-2-3) bands for moderate resolution IRS LISS III (23.5m) and high resolution GEO EYE (4m). Classification approaches evaluated were; (1). Slicing of NDVI (Normalized Differenced Vegetation

Index); (2). Supervised classification under Maximum Livelihood algorithm; and (3). Minimum Distance algorithm. The estimated paddy area by different classification approaches in Padiyathalawa DS division were 30.7km^2, 17.9km^2, 24.5km^2 respectively while actual paddy area estimated through on-screen digitizing was 19.8km^2. The classification approaches will further be evaluated using same methodology for other DS divisions.

Application of GIS and Remote Sensing for watershed based conservation planning

Establishment of effective conservation strategies for soil conservation is imperative with the current trend of frequent extreme rainstorms prevailing in Sri Lanka. However, in large reservoirs, it becomes impractical to treat the entire watershed as a single unit for conservation due to limitation of resources. Prioritizing sub watersheds based on erosion susceptibility ranking allow to rational allocation of limited resources targeting most urgent areas. Capabilities of GIS and remote sensing approaches were evaluated for this purpose, using LandSat (30m resolution) satellite imageries and other available thematic information for Victoria catchment . Impact of land cover on erosion was evaluated using land cover map derived by supervised classification of satellite data. Terrain parameters including slope, drainage lines, sub watersheds and catchment boundaries were extracted using spatial modelling techniques with Digital Elevation Model (DEM) derived from elevation contours (1:50,000 topographic map sheet). Soil erosion was evaluated using four erosion causative factors (Land cover, soil erodibility, rainfall erosivity and slope). Erosion prone areas were identified using cumulative erosion index which was computed from the rating given to four erosion causative factors. Priority sub watershed map was derived considering the extent subjected to very high and high erosion ranks. The study demonstrated a rapid method for generating information on erosion risk and prioritizing sub watersheds based on potential erosion hazard.

Land Degradation Assessment (LADA) for Sustainable Land Management

Regional project on "Land Degradation Assessment and Monitoring for Sustainable Land Management and Climate Change Adaptation in South Asia" was initiated in 2012 to develop tools and methods to assess and quantify the nature, extent, severity and impacts of land degradation on dryland ecosystems, watersheds and river basins, carbon storage and biological diversity at a range of spatial and temporal scales. This builds the national, regional and international capacity to analyze, design, plan and implement interventions to mitigate land degradation and establish sustainable land use and management practices. The project is funded by FAO and consisted with technical groups of the four project countries namely, Bangladesh, Bhutan, Nepal and Sri Lanka. The project duration is 3 years. The data inventory availability and their relevance to both land degradation assessment and climate change was examined and gaps of data were identified. The project will be continued during 2013.

Regional scale crop suitability assessment and mapping, Uva province

The degradation of land resource due to overexploitation & misuse and consequent economic, social and environmental impacts has intensified the pressure on the land resources in the country. Cultivation and settlements in unsuitable land is a grave problem in major upper watershed areas. This has been identified as a significant threat to the productivity of land and also to the downstream reservoirs constructed for hydropower generation and irrigation purposes. The Uva Provinces which is the largest province of country is also not satisfactory at all. This province covers a significant land mass in the central highlands where lot of water resources originates and flows into lowlands. Therefore, sustainable management of land and water resources of the area is important not only in terms of the land and water resources in the central highland itself, but also to ensure the availability of the water for lowland users.

Therefore, identifying the present status of the province in order to suitable land and water resource management approach for the area, and implement those in regional and local level to ensure the long-term sustainability. Hence, district level maps indicating land degradation status, prioritization and mapping areas within districts for soil & water resource conservation and management, preparation of district level crop suitability maps and identification and mapping of areas where significant land use changes are required, are the main expected outcomes of this study. This study is conducting with the funding of Disaster Management Center.

Digital compilation of Grama Niladari Division based crop recommendations

Selection of suitable crops for different areas in the country are made by crop recommendations pertained on agro-ecological regions. Crop yield is varying from place to place due to conditions of agro-ecological variation. Optimum conditions are needed for better crops growth and obtain highest yield. A user guide for crop recommendations at Grama Niladari division level has developed by the Department of Agriculture in 1990 in order to fulfill this requirement. The user guide was basically developed for cash crops which mostly benefited for commercial scale farmers, researchers, extension officers and the policy makers. However, this guide has not been updated in a longer period and information is not available in a user friendly manner for quick reference. Hence, this project is mainly focused to design and develop user friendly digital Management Information System (MIS) and digitally compilation of updated information on crop recommendation, cropping calendar, agro-ecological information to address the above issue. MIS will help to provide the easy and timely access to reliable information for all users and it will help to address this issue an efficient and effective manner.

Development of Multifunctional Soil Conservation Bund System for Rainfed Uplands in the Dry Zone

Soil erosion has been a major problem of rainfed uplands in the dry zone. Some conservation measures such as soil bunds, tree hedgerows and grass of Vetiver strips have

been recommended to mitigate this problem but such measures have not been adopted by majority of farmers due to various reasons. Lack of an economic return from such measures is the main reason and thereby they are reluctant to accommodate such a zero return conservation measures on farming lands. Difficulties of machinery use in land preparation at closely established conservation measures have become another significant reason for poor adoptability of such measures in farmer fields. Hence aim of this research is to develop multifunctional soil conservation bunds in place of conventional conservation measures. The proposed soil conservation bunds will provide functions such as soil conservation, storm water management, rain water harvesting, economic returns from seasonal and permanent crops. The proposed conservation bunds will have a 90 cm width and 60 cm height. Crops is being tested for growing on bunds are Kathurumurunga, Miti Murunga, Thibbatu, Pomogranate, Sera and Cinnamon. This research was commenced at Mahailluppallama in Maha 2012/13 and will be continued for another five consecutive seasons for obtaining long term effects of treatments.

TECHNOLOGY DISSEMINATION

Training on soil and water conservation, Land development and related subject areas

- Two 5- day training programs were conducted on Soil Conservation and Land Development for the newly recruited officers of Sri LankaAgriculture Service. (Research officers, Agriculture officers and Lecturers). Sixty eight officers were trained.
- One 3- day training program on Land Development was conducted for Commercial Scale Farmers. Nineteen commercial farmers were trained.
- One 2 -day training programs on Soil Conservation and Watershed Management were conducted for 35 tecnical officers of the HADABIMA authority.
- Twelve 1 day training programs on Soil and Water Conservation were conducted for university students (Jayawardanepura, Rajarata, and Kelaniya Universities), Diploma students of Karapincha School of agriculture, students of Nawayalatenna District Training Center and also students and teachers of several schools. Altogether two hundred and forty (240) participants were trained.

Soil and water conservation demonstrations

- A demonstration plot of five acre (5) land was prepared with necessary Soil and water conservation structure at Nilambe Samurdhi Training Center. Technical guidance was emphasis on establishment of on-farm and off -farm soil and water conservationmeasures.
- Adjoining one acre land plot of the existing demonstration site at In-service Training Institute,Bindunuwewa,was demarcated for demonstrating other type of soil and water conservation measures. such as individual terraces, SALT, and contour drains.

- Improvement and maintenance of conservation structures at demonstration site at Sita Eliya Research Station.
- Improvement and maintenance of soil & water conservation structures at demonstration site at HORDI, Peradeniya.

Radio programs

- Seven Radio programs (Kandurata and Wayamba Seveya) were conducted on soil and water conservation, watershed management, agro climatology& climate change, water management and soil conservation act.

Television programs

- Officers of NRMC were participated for six TV programs conducted on soil & water conservation, agro climatology & climate change and soil conservation act.

Workshops

A regional workshop was conducted for world water day- 2012, topic on "Water and food security". Eighty three officers of the Department of Agriculture, Provincial Agriculture Departmentsand teachers of the Central province were participated.

Exhibitions

Officers of NRMC were engaged in various activities at the exhibition of *"Siyawas Semaruma"*, 100 year celebration of the Department of Agriculture.

- Permanent model soil map was prepared at exhibition park, Gannoruwa, representing real soil types in Sri Lanka.
- 21000 packets of soil samples representing 14 soil types of Sri Lanka were distributed among schools and agriculture centers for use of educational purposes.
- Establishment of rain water harvesting tank at soil conservation demonstration site of exhibition park, Gannoruwa.
- Improving existing soil conservation measures demonstrating at conservation site with establishing and renewing appropriate techniques of mechanical and agronomic soil conservation measures including gully conservation structure.

Technical Assistance

One of the main activities of the center is to provide technical assistance and expertise. Following technical assistances were provided during the year, 2013.

- Providing guidance to complete BSc student research project titled "*Evaluation of Remote Sensing Image Classification Approaches for Paddy Cultivation Area Mapping in Padiyatalawa DS Division; Ampara District*" Faculty of Agriculture, University of Ruhuna.
- Providing guidance to complete BSc student research project titled "*Prioritization of sub watersheds for soil conservation using GIS and Remote Sensing in Victoria catchment*" Faculty of Agriculture, Rajarata University of Sri Lanka.
- Preparation of Crop suitability map of Horana Agriculture Research Farm.
- Preparation of Soil conservation and storm water management plan for the Mahinda Rajapaksha International Sport Complex at Diyagama.
- Preparation of Base map, Contour map, Soil conservation and Storm Water

Management plan at the site for developing field gene bank in Field Crop Research and Development Institute MahaIlluppallama.

- Preparation of drainage layout plan for 10 hectares (Talagolla Division) of Ambepussa Farm.
- Preparation of base maps for establishing a minor tank in Ambepussa farm and provided technical guidance for construction to the tank
- Preparation of interprovincial area maps for following in interprovincial areas.
    - Anuradhapura
    - Moneragala
    - Kandy
    - Polonnaruwa
- Preparation of contour map of Open Prison Camp, Balagolla, Pallekele for establishment proper irrigation system.
- Preparation of Soil Conservation and storm water management plans for Central Environmental Authority
- Preparation of map of Sri Lanka indicating the Main Agricultural Institute and Centers of the Department of Agriculture.
- Preparation of updated booklet of soil and water conservation specifications and payments for soil conservation structures.
- Preparation of soil conservation and land development plan for Mahailluppallama farm.
- Preparation of soil conservation and land development site plan for "DeyataKirula" exhibition.
- Technical assistancefor 100 year celebration exhibition (*Siyawassemaruma*) of the Department of Agriculture.
- Demarcation of soil and water conservation measures on 5 Ac land of research farm, Regional Agricultural Research Center, Bandarawela.
- Soil conservation and land development activities on 4.5 Ac land of Home of adults at Rideepana, Badulla.
- Soil conservation and land development activities on 12 Ac land Madawela at Ulpotha, 2 Ac land at Deltota, and 3 Ac land at Kithulella.
- Preparation of land development site plan for Kachchericomplex, Gampaha.
- Technical assistance for soil conservation activities at land slips site, Peradeniya.

Representation in Technical Committees

- Committees for granting Environmental Clearance for various National and Regional development Projects; ie. Land blocking out &hotel projects (20), Metal quarries (50), Mini hydro power projects (42) and Tree felling project (40).
- Committee for Technical Evaluation of proposed "Uma Oya Multipurpose Development" project.
- Committee for Technical Evaluation of proposed "Morana reservoir project in Badulla district.

Printed materials

- Printing of awareness posters displaying soil and water conservation measures adopted in Sri Lanka.12000posters were printed and 8850posters were distributed among schools, agrarian service centers, agriculture schools and provincial agriculture stations.
- Printing of Soil Conservation Act awareness leaflets. 10000 leaflets were

printed and distributed among those who participated for training programs.

- Printing of Soil and Water conservation technology book (Thakshanasangrahaya). This book includes collection of articles from technical officers ofNatural Resources Management Center.

Soil conservation Act

- Thirty four (34) awareness programs on Soil Conservation Act were conducted for officers and planters of plantation sectors (tea and rubber), Agriculture officers of the provincial sector and for school teachers and students.
- Four (04) hoarding were erected to make the general public aware of the Soil Conservation Act and those were erected at road sides near Ramboda, Kanda junction, Keerthibandarapura and Welimada.
- Maintenance of earlier established soil conservation act awareness board. (Six boards)
- Printing of (6ft x 4ft) Soil Conservation Act awareness boards (15) for display at railway stations.

OTHER ACTIVITIES UNDERTAKEN BY THE OFFICERS

Other activities at national level

- Serving as a Technical Advisor to the project on Community Based Adaptation to Climate Change in Sri Lanka. United Nation's Development Programme (UNDP), Sri Lanka
- Serving as a Member of the National Expert Committee on Climate Change Adaptation. Ministry of Environment, Sri Lanka
- Serving as a Member of the Expert Committee on the Assessment of the impact of land use patterns in the Up-country under the direction of H.E. the President of Sri Lanka
- Served as a Member of the Committee to make recommendations to the Cabinet, Government of Sri Lanka on controlling import, export and production of HCFCs under the Montreal Protocol
- Workshop Inception Workshop on Greenhouse Gas Emissions. September 5 - 6, 2012, Dalas, Vietnam. Organized by the FAO.
- Workshop on "Knowledge sharing for effective risk management of the hydro-meteorological hazards in the Hindu-Kush-Himalayan region". Kathmandu, Nepal. March 21-23, 2012. Organized by the UNDP and World Bank.
- Workshop on Climate Change and its Impact on agriculture, December 13-16, 2011, Seoul, Republic of Korea organized by the Asian Development Bank.
- Workshop on South-South cooperation on Science & Technology to address Climate Change – Beijing, China, October 18-20, 2011 organized by the Ministry of Science & Technology, Peoples Republic of China.

Maintenance of Agro-meteorological observation network

Agro meteorological observation network consisting of 28 agro-meteorological

observation stations along with 70 rain gauging stations was maintained according to the WHO standards.

Maintenance of database

The database on agro-climate, land and water resources was collected, computerized and maintained for providing information to various clients.

PLAN FOR 2013

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
- Study on impact of climate change on rice production in Sri Lanka through crop growth modeling
- Modeling of future climate of Sri Lanka using Climate models
- Forecasting paddy extent and yield based on high resolution satellite imageries in Ampara, Polonnaruwa, Hambantota and Kurunegala districts (.NARP funded project).
- Land Degradation Assessment (LADA) for sustainable Land Management (funded by FAO)
- Development, evaluation and application of a toolkit for regional crop yield forecasting and climate change impact assessment(funded by CGIAR Climate Change Agriculture and Food Security (CCAFS) Program)
- Increasing cropping intensities under selected minor tanks in dry zone through crop diversification and irrigation water management (Long term experiment)
- Digital compilation of crop recommendations for adoption Grama Niladhari Division in Sri Lanka
- Development of multifunctional soil conservation bund systems for rainfed uplands in the Dry zone
- Study of shallow Ground water quality in Vavunia District.Study of spatial distribution of salinity in minor tanks in Vavunia district

TECHNICAL ASSISTANCE

- Preparation of soil conservation and storm water drainage management plans for development projects
- Provision of technical assistance on soil and water conservation to various agencies

Other

- Implementation of Soil Conservation Act
- Maintenance of database on agro climate, land and water resources
- Maintenance of agro meteorological observation network
- Representation in Technical Committees such as Technical Evaluation Committees for granting Environmental Clearance for Development Projects and Environmental Monitoring Committees

STAFF LIST

Designation	No.
Director	01
Additional Director	01
Research Officer	07
Agricultural Officer	02
Subject Matter Specialist	01
Research Assistant	01
Agricultural Instructor	07
Soil Surveyor	04
Programme Assistant	02
Graduate Assistant	02
Research Sub Assistant	02
Admintrative Officer	01
Public Management Assistant	05
KKS	01
Driver	05
Watcher	02
Labourer	02
Labouer(Contract)	02
Total	**48**

2.1 SEED CERTIFICATION AND PLANT PROTECTION CENTRE (SCPPC) - GANNORUWA

The vision of SCPPC is to promote seed industry development and assure the quality of seeds, limit access only to quality pesticides and ensure their safe use and protect germplasm, plant health and environment and its mission is achieving excellence in agriculture through quality assurance of seeds and planting materials, proper pest management including safe and effective use of pesticides for national prosperity.

SCPPC serves for ensuring the food security of the nation through quality control of seed and planting material, conservation of genetic resources and enforcement of regulatory enactments for sustainable agriculture. It is the core management institution for Seed Certification Service (SCS), Plant Protection Service (PPS), Registrar of Pesticides (ROP) and Plant Genetic Resources Center (PGRC) and is responsible for providing vital services to farmers such as ensuring availability of quality assured seeds and planting materials, plant protection and control of agricultural pesticides.

SCPPC has regulatory functions pertaining to the following acts.

1. Plant Protection Act. No 35 of 1999
2. Control of Pesticide Act No.33 of 1980
3. Seed Act. No. 22 of 2003.

It also serves as the National Plant Protection Organization (NPPO), national inquiry point for phytosanitary information and plant pest or disease outbreaks.

There was an administrative change since October 2012. The National Plant Quarantine Service and the two Plant Quarantine Units at the seaport and airport which were formerly under the administration of SCPPC were brought under the direct purview of DGA.

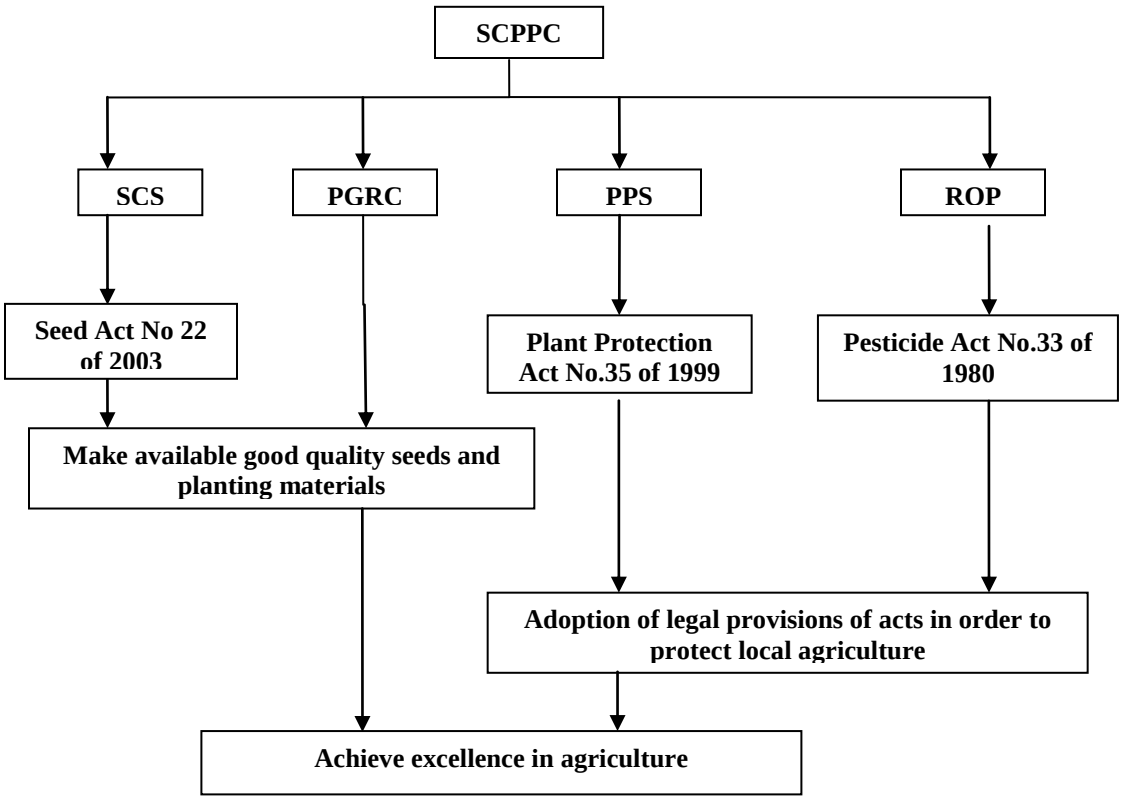
BUDGET

Allocations received and expenditure incurred during 2012 are given in Table 2.1.1.

Table 2.1.1: Annual budget – 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	30,861,629	18,284,427	59
Recurrent	44,576,000	43,165,997	97
Total	**75,437,629**	**61,450,424**	**82**

ORGANOGRAM



PROGRESS

Import Permits

Import permits with entry conditions were issued from 1st January to 24th September of the year 2012 under the following categories. After September onwards, the import permits were issued by the National Plant Quarantine Service.

Table 2.1.2: Import permits issued during 2012

Permit type	Number
Vegetable seeds	695
Fresh fruits	596
Plant and Planting materials	660
Plant Products	187
Seed Potato	13
Animal feed	99
Cut flowers for religious purposes	19
Products for human consumption	32
Biological agents	02
Other regulated articles	01
Total	**2304**

Seed Potato Imports (From January to August, 2012)

Table 2.1.3: Import permits issued

Country	Imported quantity (Mt)	Released quantity (Mt)	Rejected quantity (Mt)	Reasons for rejection
Netherlands	400	400	Nil	-
USA	100	100	Nil	-
France	-	-	Nil	-
Germany	75	75	Nil	
Total	575	575	Nil	-

Importation of Vegetable and Fruit Seeds

The following table indicates the quantities of vegetable and fruit seeds imported in 2012. A national database is being developed on vegetable seed imports for easier retrieval of vital information. This would facilitate to provide all the information relevant to permits issued and the details of actual seed imports through Plant Quarantine Units of Seaport and Airport since 2004.

Table 2.1.4: Vegetable and fruit seeds imported through Seaport and Airport (From January to December 2012)

	Crop	Seaport / seeds (kg)	Airport / seeds (kg)	Total seeds imported (kg)
1	Basil	0	2	2
2	Beans	534,108	6	534,114
3	Beet	22,187	1,051	23,238
4	Bell pepper	0	9	9
5	Bitter gourd	2,229	2,123	4,352
6	Bottle gourd	0	25	25
7	Broccoli	3	0	3
8	Cabbage	5,033	769	5,803
9	Capcicum	0	130	130
10	Carrot	75,912	100	76,012
11	Cauliflower	149	65	214
12	Celery	10	2	12
13	Chilli	0	98	98
14	Chinese cabbage	10	0	10
15	Chinese Kale	545	50	595

	Crop	Seaport / seeds (kg)	Airport / seeds (kg)	Total seeds imported (kg)
16	Chinese raddish	1,770	36	1,806
17	Cucumber	2,456	828	3,284
18	Egg plant	287	270	557
19	Hot pepper	459	806	1,265
20	Kang kong	734	0	734
21	Kholrabi	1,253	815	2,068
22	Leek	11,560	252	11,813
23	Lettuce	212	370	582
24	Lillium bulb	11,300	0	11,300
25	Long Bean	6,109	350	6,459
26	Luffa	4,331	1,980	6,312
27	Maize	1,687,108	25	1,687,133
28	Okra	649	6,493	7,142
29	Onion	23,112	0.5	23,113
30	Parsely	378	0	378
31	Pepper	6,192	15	6,207
32	Potato	525,000	0	525,000
33	Pumpkin	9,089	187	9,277
34	Raddish	11,271	348	11,619
35	Ridge gourd	0	800	800
36	Snake gourd	5	0	5
37	Squash	6,155	0.04	6,155
38	Sweet corn	500	202	702
39	Sweet pepper	0	3	3
40	Tomato	1,114	2,322	3,437
41	Water Melon	426,751	335	427,086
42	Wax gourd	0.5	0	0.5
Total		**3,377,983**	**20,068**	**3,398,051**

New Regulations of Plant Protection Act No. 35 of 1999

Department of Agriculture has faced many difficulties in implementing the existing regulations made under the Plant Protection Ordinance No. 10 of 1924 (Gazette extra ordinary of the Democratic Socialist Republic of Sri Lanka No. 165 / 2 of November 2nd 1981). The purpose of amending the above regulations is to address issues that have not been identified by existing regulations. Therefore, Department of Agriculture has drafted the new regulations and it was submitted to the Legal Draftsman Department.

Post Entry Inspections

The following post entry inspections were carried out to monitor the fulfillment of permit conditions.

Location	No. of sites	Type
Puttalam	2	Plantations of imported teak.
Minuwangoda	4	Imported cashew for value addition.
Nuwara Eliya	22	Potato fields where imported seed potatoes were grown.

Export Certification

Two production sites of cocopeat for export were inspected to facilitate the export certification at Dangaspitiya and Pannala area.

Field Inspections

Field inspections were carried out to detect regulated pests in potato fields at Nuwara Eliya area. Based on this data pest surveillance program will be initiated in future. Nursery inspections were carried out prior to field planting at Puttalam area for imported teak ex-vitro plants.

Export Interceptions

Only five interceptions which did not meet mandatory phytosanitary measures were reported from countries to which the commodities were exported in 2012. The exporters were duly informed to act in conformity with quarantine regulations when exporting consignments in the future.

Seminars / Awareness Programs / Trainings

Training programs on Plant Protection Act were conducted for 358 officers, university students and agriculture school students. Awareness programs on plant quarantine for public at the Centenary Exhibition of DOA were conducted from 20th to 25th July 2012. Eight posters and one handbill were prepared.

A workshop was organized to repeal the Seed Act with the participation of 130 officers including Directors of DOA, Provincial Directors, District Directors, Deputy Directorsand Authorized officers.Themain framework has been completed and it will be subjected to revisions with the objective of fine-tuning it further.

PLAN FOR 2013

- 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).
- Formulating appropriate plans and policy decisions related to the production of high quality seeds and planting materials.
    - Developing seed enterprise in the country

- Development of good quality planting material production in the country
- Strengthening national phytosanitary capabilities
- Harmonization of regulatory measures
- Promoting the most effective and safe pest control strategies in agriculture

STAFF LIST

Designation	No.
Director	01
Research Officer	01
Agriculture Officer	01
Program Assistant (Agric.)	03
Agricultural Instructor	01
Administrative Officer	01
Management Assistant	10
Store Keeper	01
KKS	02
Driver	03
Laborer (Casual)	02
Laborer (Contract)	03
Total	**29**

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
- Certification of the quality of basic seeds and planting material before multiplication.
- Certification of the quality of commercial seeds and planting materials of Rice, Vegetables, Other Field Crops (OFC) and Potatoes.
- Fruit plant certification and fruit nursery registration
- Selection and registration of suitable Mother plants 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. .
- Training and awareness for Seed growers, Nurserymen, Seed men and Officers on quality seeds and planting material production in relation to Seed Act.
- Find 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 - 2012 (Rs. Mn.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	24.62	21.10	86
Capital	18.22	8.25	45
Projects	5.58	0.19	3
Farm Development	3.01	1.07	36
Seed Industry Development	100	19.79	20
Seed Strengthening	100	11.7	12
Seed Act	17.0	3.75	22
Total	**268.43**	**65.85**	**25**

PROGRESS

- Inspection of 6116 ha of rice, 831 ha of OFC, 136 ha of vegetables and fruits and 83 ha of potato fields cultivated for seed production.
- Testing of 14252 seed samples representing 11336 MT of seed paddy, 330MT of OFC seeds 43.5 MT of vegetable seeds and 636MT of seed potato.
- The registered extent of OFC, Vegetables and Potato were increased by 41%, 7%, and 14% respectively in 2012 when compared to 2011.
- Production of OFC,Vegetables and Potatoes were also relatively increased by 51%, 50%, and 105% respectively in comparison with the increase of extent. Although when compared to 2011 registered extent, of Rice extent was decreased slightly. But production was increased by 41% which represents 13% of the national seed paddy requirement of Sri Lanka.
- Registration and inspection of 291 horticulture nurseries producing certified planting materials and quality certified by labeling 621861 grafted fruit plants. When compared to 2011, certifying fruit plants were increased by 139%.
- Evaluation of 11 rice, 25 OFC, 19 vegetable varieties under DUS testing program.
- Testing of 785 post control samples of rice, OFC, vegetable and potato in PC 1- PC 4 situated at Gannoruwa, Seetha Eliya and Mahailuppallama.
- Establishment of the first Seed Health Testing laboratory of DOA in March 2012
- Registration of 1926 and 554 renewals of seed handlers under the seed Act.
- Granting approval for 46 labels used by different seed and planting material producers under the Seed Act.
- Training of 1867 Government and private sector officers, Nurserymen, and Seed handlers on Seed Act activities.
- Linked regional SCS offices and four seed testing laboratories with head quarters by providing internet facilities.
- Holding a successful International training program on "Quality Seed Production, Processing, Testing and Certification of Rice and Vegetables" which was funded by the SAARC and organized by SCS and SCPPC during 03rd -12th December. Twenty members from the SAARC countries were participated.
- A five year JICA Project on "Enhancement of Production system of Certified Vegetable Seed" commenced since May 2012. Four SCS regional offices and 3 seed testing laboratories are contributing as main counterparts.
- Making magnifying contribution to the historical centenary exhibition of the DOA via arranging meaningful exhibition site which included the site of post control testing varieties, DUS trails, a seed show and the development of seed testing in Sir Lanka, a model of fruit plant nursery and information stall of Seed Act and street dramas on four seed handler types.
- Newly appointed 22 Agriculture Instructors and 29 Seed Men were attached to the SCS during 2012.

- Construction work of Karadianaru, Kundasale, Labuduwa regional offices, Post control field of Bataatha,Germination room of Aluththarama STL, twin quarters of Gannoruwa have been commenced under the projects on SCS Strengthening and Seed Industry Development.
- Essential repairs on vehicles and buildings of all units of SCS were completed.
- Mother plant orchards situated at Pelwehera, Palmadulla, Hingurakgoda and Gannoruwa were well equipped under the Farm Development Project.
- New regional offices at Matara for southern province, Murunkan and Paranthan for Northern Province were commenced to proceed the certification program.
- Completion and printing of the seed production guidelines book for paddy.

Seed Paddy Certification

During the year 2012, 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, NGOs were registered for certified seed paddy production programs.

Total extent registered to produce seed paddy was 6116 ha of which the share of private sector was 69% percent. Extents registered for certified seed paddy production under different sources and seed classes are given in Table 2.1.1.2. A small decrease was observed in extent of registered for seed production of rice in the year 2012 when compared to the year 2011 due to the unexpected weather conditions such as drought and flood.

Table 2.1.1.2: Extents under Seed Paddy production in 2011 and 2012

Source	Seed class	2011		2012		
		Extent registered (ha)	Extent inspected (ha)	Extent registered (ha)	Extent inspected (ha)	Accepted %
Research stations	Breeder's	4.5	4.5	2.5	2.5	100
Govt. farms	Foundation	65	47	67	62	100
	Registered I	618	369	770	653	99
	Certified I	299	212	145	63	100
	Certified II	53	43	7	6	100
Contract growers	Foundation	31	25	4.6	3.5	100
	Registered I			81	52	90
	Certified I	759	543	736.6	548	97
	Certified II	120	75	22	20	91
Private growers	Registered I	420	138	137	75	99
	RegisreredII			13	8	100
	Certified I	3459	2131	3734	3156	98
	Certified II	540	307	397	297	95
Total		**6368.5**	**3894.5**	**6116.7**	**4946**	

During the year 2012, a total of 11336 mt of seed paddy was sampled of which the quality standards of 9038 mt of seed paddy were accepted by laboratory tests (Table 2.1.1.3). DOA farms with contract grower programme produced 3897 mt (35%), and private growers 7433 mt (65%).

Table 2.1.1.3: Quantities of seed paddy tested and % accepted in 2011 and 2012

Source	2011		2012	
	Quantity tested (mt)	Accepted %	Quantity tested (mt)	Accepted %
Research stations	4.70	87	6.2	95
Govt. farms	2480	90	2792	90
Contract growers	661	85	1105	87
Private growers	4858	23	7433	75
Total	**8003.7**		**11336.2**	

Certification of Other Field Crops (OFC) seeds

The total registered extent under OFC seed production was 831 ha of which contract growers accounted for 78%. Maize, Mung bean, ground nut, sesame, cowpea, finger millet, black gram, soybean and pigeon pea were included in the OFC seed production programme. Extents registered for seed production under different sources and classes are given in Table 2.1.1.4. There was a 41% increase in registered extent for OFC seed production when compared to 2011.

Table 2.1.1.4: Extents under OFC seed production 2011and 2012

Source	Seed class	2011		2012		
		Extent registered (ha)	Extent inspected (ha)	Extent registered (ha)	Extent inspected (ha)	Accepted %
Research stations	Breeders	4.89	4.89	3.9	3.9	94
Govt. farms	Foundation	12	9.3	26	19	97
	Registered I	32.5	16.3	58	24	96
	RegisteredII			3	3	100
	Certified I	35.7	13.2	12	9.5	100
	Certified II			1	0.8	75
	Hybrid	0.75	0.75	3.03	0.2	100
Contract growers	Foundation	1.0	1.0	5.3	3.5	100
	Registered I	75.0	56.5	97.2	74.7	97
	Registered II			6.2	6.2	100
	Certified I	355.9	178.8	463	358	100
	Certified II	36.6	18.0	77.6	71.4	93
Private growers	Foundation	10.5	7.8	2.1	1.2	100
	Registered I	12.7	3.8	33.2	8.7	98
	Certified I	8.7	4.9	38.2	24.8	100
	Certified II	0.4	0.4	2	1.4	100
Total		**586.64**	**315.64**	**831.73**	**610.3**	

In the year 2012, total OFC seed production was 330 mt and 94% of the productions were certified. Quantities tested and percentages accepted from different sources are given in Table 2.1.1.5.

Table 2.1.1.5: Quantities of OFC seed tested in 2011 and 2012

Source	2011		2012	
	Quantity tested (mt)	Accepted (%)	Quantity tested (mt)	Accepted (%)
Research stations	1.60	91	0.2	100
Govt. farms	27.4	88	35.5	88
Contract growers	168.1	90	289.6	95
Private growers	20.8	93	4.8	77
Total	**217.9**		**330.1**	

Certification of vegetable seeds production

Registered extent for vegetable seed production was 136 ha of which private and contract growers accounted for 65%. Registered land extents under different sources and seed classes are given in Table 2.1.1.6. Tomato, Okra, Chillie Snake gourd, Bean, Brinjal, Bitter gourd, Radish, Luffa, Capsicum, Yard long bean, Cucumber, Pumpkin, Amaranthus, Vegetable cowpea, Winged bean 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 2011& 2012

Source	Seed class	2011		2012		
		Extent registered (ha)	Extent inspected (ha)	Extent registered (ha)	Extent inspected (ha)	Accepted (%)
Research stations	Breeders	1.0	1.0	1.5	1.5	72
Govt. farms	Basic	6.7	5.1	17	12	98
	Standard	26.0	23.0	26.7	20.5	96
	Hybrid	0.24	0.24	1.5	1.5	100
Contract growers	Basic	0.2	0.2	3.8	2.7	70
	Standard I	21.5	14.0	43.7	35.4	100
	StandardII			1.6	0.9	100
Private growers	Standard I	71.4	51.5	40.3	33.8	99
Total		**127.04**	**95.04**	**136.1**	**108.3**	

During the year, total vegetable production was 43.5 mt of which 41 mt were certified. Quantities tested and percent accepted from different sources are given in table 2.1.1.7.

Table 2.1.1.7: Quantities of Vegetable seed production in 2011and 2012

Source	2011		2012	
	Quantity tested (mt)	Accepted (%)	Quantity tested (mt)	Accepted (%)
Research stations	0.4	100	.02	99
Govt. farms	5.6	95	8.4	92
Contract growers	7.05	91	26.4	98
Private growers	15.86	96	8.7	84
Total	**28.91**		**43.52**	

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 86 ha and a total amount of 640 Mt of seed potato of 1 popular potato variety (Granola) was certified.

Table 2.1.1.8: Extents under seed potato production in 2011 and 2012

Source	Class	2011		2012	
		Extent registered (ha)	Extent accepted (ha)	Extent registered (ha)	Extent accepted (ha)
Govt. farms	Pre-basic	0.14	0.11	0.25	0.21
	Basic	45.10	39.09	52.46	48.0
	Certified	11.22	6.16	11.51	11.42
Private growers	Certified	19.25	18.83	22.06	22.06
	Total	**75.71**	**64.19**	**86.28**	**81.69**

Seed Testing

An amount of 14252 seed samples were tested for quality certification at the DOA seed testing laboratories at Peradeniya, Mahailluppallama, Aluttarama and Batata.

Seed Health Testing

of Seed The first seed health testing laboratory Sri was established in Certification Service The aim of .at Gannoruwa 12March 20 nka inLa seed health testing laboratory is to evaluate the view of planting value of seeds from the point of Many of the most .disease potentialities important diseases in cultivated crops are seed nding market conditions borne. In today's dema and with pressure to reduce pesticide usage a clean start is essential for farmers. It is essential to ensure appropriate standards. the seeds to test For some seed borne diseases testing is the only .disaese management option

For the purpose of seed health testing it is important to generate information on seed borne pathogens affecting locally cultivated crops, ascertain their pathogenic importance in the crop production systems, the conditions which favour erance levels accepted with the the pathogens, tol

ection tinfected seed lots and seed health de .techniques

Alternariapadwickii, Drechsleraoryzae ,are identified as major seed *Pyriculariaoryzae* .borne fungal diseases in rice seeds causing seedling blight in *Penicilliumoxalicum* maize is important seed borne disease in locally produced seeds. Seed health detection techniques and protocols were developed to detect anthracnose disease in vegetable, legume seeds eaf and Alternaria leaf spot, Helminthosporium l .spot diseases in rice

At present seed importation increased considerably accompanied by incresaed risk of introducing diseases into the country. Already established seed borne diseases in the country also may perpetuate and cause depreciation of ield or they may initiate devastating y epidemics.Therefore, seed borne infection should be prevented as much as possible. In pursuance of these objectives seed health testing will be carried out on seed samples originating from a tify seed borne variety of sources to iden pathogens affecting crops grown in Sri Lanka .during 2013

Certification of Planting Material

A total of 62186 fruit plants produced in government nurseries and private nurseries were certified and labeled (Table 2.1.1.9) which is a 139% increase when compared to the year 2011.

Table 2.1.1.9: Number of grafted fruit plants certified in 2011 and 2012

Species	No. of plants certified	
	2011	**2012**
Mango-grafted	146,979	263,745
Rambutan-grafted	27,116	105,640
Orange-grafted	82,162	236,014
Avacado	918	7,233
Durian	282	1,716
Jak	2,591	7,513
Total	**260,048**	**621,861**

Registration of nurseries

Total number of nurseries registered in the year 2012 was 291.

Mother plant certification

Also during the year 2012, a total number of 386 Mango, Rambutan, Citrrus, and Jak mother plants were selected and registered.

Table 2.1.1.10: Number of mother plants registered in 2010 and 2011

Species	No.of Plants Registered	
	2011	**2012**
Mango-grafted	450	242
Rambutan-grafted	357	43
Citrus	415	75
Pears	77	
Durian	1	
Jak	12	26
Total	**1307**	**386**

Post Control Testing

Post control tests were conducted to evaluate 785 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	128
OFC	340
Vegetables	272
Potato	32
Fruit	13
Total	**785**

Distinctness, Uniformity, and Stability (DUS) Testing

Eleventh rice varieties, (Bg-3R,At-06-631,Bg 465,Pokuru Samba, Ld 1-5-15,CIC 3-1,Bg 5-15-31,Bg 4 2236, Bg 11-139, Bg 5-110, At 4-186) were tested for DUS at post control field at Gannoruwa and 19 vegetable varieties, 24 OFC varieties were also tested. DUS testing of 5 rice varieties, 8vegetables, 7 OFC were completed during the year concerned.

Table 2.1.1.12: Number of DUS Tests Conducted

Crop Group	No.of Test Conducted	No.of Test Completed
Rice	11	5
OFC	24	7
Vegetables	19	8
Total	**54**	**20**

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. A number of 1926 seed handlers have been registered and 554 renewals have been done under the Seed Act during the year. Sixteen complains were inquired and necessary actions were taken. Thirty random inspections were made and necessary instructions were given and actions were taken to regulate the quality of seed and planting materials.

Research and Development

Research studies were conducted in following areas;

1. To find out expiry date for vegetable seed packaging.
2. To find out scientific solution for day to day field problems of fruit plant certification program.
3. To study the risk associated with imported seed lots.
4. To study in moisture vapour transmission of different packaging materials.

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.

Table 2.1.1.12: Number of trainers trained

Training Programs	No. of Trainers
Seed farmers/Nursery men	27
Govt. Sector Officers	780
Private Sector Officers	20
Seed Handelers	1040
Total	**1867**

SCS Information System

Development of the database on Seed Certification was continued by linking 22 Seed Certification Service regional stations, 4 seed testing laboratories and 4 post control stations, through out the country for easy and efficient data retrieval and analysis on information management. Furthermore, designing a new database system on personal data of all the staff members of all categories serving in the headquarters, regional units, laboratories and post control stations were completed.

Foreign Training

Three officers had trained in Japan for Seed Testing in collaboration with JICA

PLAN FOR 2013

- Empowering seed certification service to achieve the 30% of the national seed paddy requirement by certified seeds.
- Establishment of seed research unit to conduct seed research pertaining to the post harvest problems encountered by seed handlers specially on seed packaging, storing and expiring dates.
- Initiation of a weed identification unit in the seed testing laboratory to identify weed seed contaminants, for risk assessment of new plant invasions and studying the invasive and noxious weeds specially to prevent entry of the invasive weed species through imported seeds.
- Designing SCS website for public awareness, to improve information dissemination on seed certification program and to efficient and easy access of our service.
- Seed Act implementation to regulate the seed production process among state and private sector seed handlers to make available high quality seeds and planting materials in the country while avoiding malpractices in the seed industry.
- Preparing guidelines on quality seed and planting material production to distribute among the all seed handlers.
- Preparation and distribution of seed producer's directory and planting material producer's directory in each growing season.
- Publishing crop guide lines for seed handlers.
- Finalizing and making public the newly amended Seed Act and regulations.
- Complete the constructions of SCS regional office buildings in Kundasale, Labuduwa, Karadiyanaru and PC Field in and Bataatha.
- Consrtuction of new seed testing laboratory and office complex in Paranthan,SCS regional office buildings in Matara, and Jaffna.
- Strengthening all SCS units with staff and equipments is essential.

- Establishment of a Biotechnology unit for Seed Research and Seed Health Testing Unit.
- SCS has complex administrative structure consisting 23 regional offices, four seed testing laboratories and four post control fields scattered in islandwide and launch three main national programs named by seed certification, fruit plant certification and seed act. It should be restructured so as to be administrated by a Director/Additional director under the direct supervision of the DGA.

STAFF LIST

Designation	**No.**
Deputy Director	01
Research Officer	03
Agricultural Officer	09
Agricultural Monitoring Officer	04
Programme Assistant	03
Agricultural Instructor	120
Research Assistant	01
Research Sub Assistant	04
Public Management Assistant	10
Driver	16
Electrician	01
Watcher	17
Labourer	50
Seed Technician	10
Seedman	30
Sanitary Labourer	01
Total	**280**

2.1.2 PLANT PROTECTION SERVICE (PPS) - GANNORUWA

Plant Protection Service is principally, entrusted to promote economically viable practically feasible and environmentally acceptable pests management systems to ensure plant health of Agricultural pests.

These broad objectives are expected to reached through implementation, monitoring and evaluation of field level Integrated Pest Management (IPM) programs while upgrading the existing pest management techniques, control of pest and disease outbreaks, managing pests in bulk seed storage through fumigation. Minimizing the impact of undesirable vegetation including aquatic weeds and other invasive flora on agricultural habitats are also important mandatory functions assigned to Plant Protection Service.

Above objectives encompass all regulatory functions with respect to plant protection within the country as declared by the Plant Protection Act No: 35 of 1999. In parallel with these activities, evaluation of new pesticides including botanicals at pilot scale and assessment of recommended pesticides for their consistent efficiency to ensure plant health are also among the core activities of PPS. These activities are further supported in implementing certain provisions of pesticides Act of 1981 through evaluation of new herbicides at pilot scale in farmer fields.

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 of effective pests control strategies which causes least harm to the environment ensuring protection of local Agriculture.

BUDGET

The annual budget for the year 2012 is given in table 2.1. 2.1.

Table 2.1.2.1: Annual Budget – 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	2,029,000	1,888,197	93
Capital	1,705,000	1,578,045	93
Total	**3,734,000**	**3,466,242**	**93**

PROGRESS

Implementation of regulatory provisions of Plant Protection Act No 35 of 1999

Appointment of authorized officers is one of the main responsibilities assigned to PPS. In this context, 20 authorized officers were appointed to cover the Northern and Eastern provinces this year to implement the Plant protection act effectively. One day training program was conducted for the newly appointed officers on the following topics:

01. Legislative background of the Plant Protection act No 35 of 1999
02. Implementation of Plant Protection act at field level
03. New pest with quarantine significant in Sri Lanka

In addition, 36 Authorized officers already appointed were trained under the above program.

Integrated Pests Management Program in Paddy, Vegetables and Leafy Vegetables

The broad objective of this program is to develop the knowledge of farming communities in IPM strategies and make them less dependent on pesticides while adopting of low cost and environmentally sound pest management systems. Under this PPS implemented IPM program on three major categories namely paddy, vegetable and leafy vegetables.

- **Integrated Pest Management in Rice**

  This program is based on the season long training which comprises 14 training days during the season. The target groups were Agriculture Instructors in the Provincial and Interprovincial Department of Agriculture and the other relevant officers who are engaged in agriculture extension activities. This year PPS completed season long IPM training program for Agriculture Instructors in Polonnaruwa and Anuradhapura districts. The said program was aimed to identify pest species at each growth stages and manage their population by applying different practical strategies which can be applicable under farmer field conditions. In addition the program also focused on conserving of natural enemies in the agro-eco system and managing the pest population below injury level.

- **Integrated Pest Management for Vegetables**

  This program was implemented to develop low cost & environmental friendly IPM packages for vegetables and to promote them among extension officers & farmers as a better alternative strategy to manage vegetable pests. The program consisted of farmer field trial demonstrations, officer training, and farmer training, establishment of model

IPM farms, farmer field days and mass media programs.

Some of the highlights are given below.

- Eight officer training programs were conducted (390 man days) at ISTI-Gannoruwa, ISTI-Angunakolapelessa & DATC Trincomalee.
- Two hundred and eleven farmer field trial demonstrations were conducted.
- Twelve farmer training programs were conducted (475 man days) at Siripura, Wilgamuwa, Ambanpola, Gokarella, Kolongoda & Wariyapola areas.
- Two IPM model farms were established at District Agriculture Training Center, Trincomalee and Agro technology park, Gannoruwa. A season long IPM training program for 40 extension officers in Trincomalee district was also conducted parallel to the above program.
- Three farmer field day programs were conducted at DATC- Trincomalee, Gokarella farmer fields and Kolongoda farmer fields with the participation of higher officials of the DOA & a number of farmers.
- One TV program telecasted on the Rupavahini channel.

- **Integrated Pest Management on leafy vegetables**

  Promotion of IPM techniques for leafy vegetable cultivation in Western province was continued further. In this year 70 farmers were trained who were involved in leafy vegetable cultivation in Mattegoda, Madapatha, Arawwala, Batuwandara, Batagoda, Keselhenawa and Ballapitya in the Kalutara District. IPM Practices included nematode control in Mukunuwenna (*Alternanthera sessilis*), mite control in Gotukola(*Centella asiatica*) and environmentally friendly pest control methods.

Pilot scale testing of pesticides

Following new herbicides from different commodities were evaluated under farmer field conditions for bio-efficacy. These herbicides have the added advantages over recommended herbicides as they are more target specific and applied at relatively low rates.

- **Herbicides for rice**
  - Bispyribac sodium 10% SC supplied from two new sources were tested and recommended as an alternative to the already recommended Bispyribac sodium(Nominee) to control all three types of annual weeds in rice culture.
  - Pretilachlor 30% EC supplied from a new source also tested and recommended as an alternative to already recommended Pretilachlor (Sofit) as a pre-emergent herbicide to control all three types of annual weeds in rice culture.
  - Propyrisulfuron 10% SCwas further tested under framer field conditions after preliminary testing in regional research stations and

recommended as a broad-spectrum herbicide for the control of all three types of annual weeds in rice culture.

- Bispyribac sodium 40 g/l + Metamifop 100 g/l SE has been reported as promising from preliminary trials conducted at regional research stations were also further evaluated and recommended for effective control of all three types of annual weeds in rice culture.

- **Herbicides for B-onion**
  - Oxyfluorenfen 24% EC supplied from a new source was evaluated and recommended as an alternative to already recommended Oxyfluorenfen formulation as a pre emergent herbicide for control of annual weeds in B-onion cultivation.

- **Herbicides for Pineapple**
  - Diuron 80% WP supplied from a new source was evaluated under farmer field conditions and recommended as an alternative to already recommended Diuron 80% WP as a pre-emergent herbicide for weed control in pineapple cultivation.
  - Diuron 500 g/l SC – A new formulation which was tested at RARDC, Makandura was further evaluated under farmer field conditions and recommended as a pre and early post emergent herbicide for effective control of major weeds in pineapple cultivation.

Biological control program for Aquatic weeds

PPS maintains cultures of bio-control agents *Cyrtobagous salviniae* for Salvinia (*Salvinia molesta*), *Neochetina bruichi* and *Neochetina eichhorniae* for Water hyacinth (*Eichhornia crassipes*). Introduction and releasing of samples was conducted as per requests made by government, private or non government organizations. In each of these occasions awareness programs were conducted at the sites for stakeholders about the life cycle of released bio control agents and the interaction with the targeted weed.

Many activities were conducted in collaboration with the department of Wild life and the Department of Irrigation with the special attention on controlling weeds in the National parks and reservoirs. PPS was involved in controlling of invasive weed species in following tanks and reservoirs (Table 2.1.2.2).

Table.2.1.2.2: Name of tanks and reservoirs

Name of tank/reservoir	District	Biological control agent released	Weed species
3 tanks in Weherabeddagala	Anuradhapura	*Cyrtobagous salviniae*	Salvinia
Mahamegassegamawewa		*Neoachetina spp*	Water hyacinth
Kelesiyabalawawewa		*Neoachetina spp*	Water hyacinth
Nabadawewa		*Neochetina spp and Cyrtobagous salviniae*	Water hyacinth and Salvinia
Kiriangunakolawewa		*Neochetina spp*	Water hyacinth
Gammirigaswewa		*Cyrtobagous salviniae*	Salvinia
Konakumbugollawa		*Cyrtobagous salviniae*	Salvinia
Mahawewalkadawewa Kirigallawewa		*Cyrtobagous salviniae*	Salvinia
Konakumbugollawa		*Neochetina spp*	Water hyacinth
Tanks in Lahugalanational park , Kadahedagamawewa and Yalpothawewa	Ampara	*Cyrtobagous salviniae*	Salvinia
Tanks in the Irrigation department- Mavilaru and Neelapura	Trincomalee	*Neochetina spp*	Water hyacinth
Tanks in 'Kumana Sanctuary' of the Department of the Wild life conservation	Monaragala	*Neochetina spp*	Water hyacinth
Tanks in 'Wasgamuwa Sanctuary' of the Department of Wild life conservation	Matale	*Neochetina spp*	Water hyacinth

In addition 10000 leaflets on biological control on the above weeds were distributed at exhibitions of 'Deyatakirula exhibition' and centenary celebration exhibition of the Department of Agriculture.

Seed Fumigation

The following quantities of seed materials in Palwehara, Polonnaruwa, Kantale, Murrukkan, Karadianaru, Kilinochchi, Mahailuppallama, Nikawaratiya, Aluttarama, Rahangala, Seetha Elya and Piduruthalagala were fumigated to control and minimize the damage of store products from the stored pests.

Seed paddy	2,599Mt
OFC	409Mt
Seed potato	262Mt

In order to enhance the effectiveness of fumigation, special training program titled "Preparation of seed stores for fumigation and techniques of fumigation" was held for officers in farms of the Seed & Planting Material Development Center at Mahailuppallama.

As per the requests of Ayurvedic drug corporation 4Mt of Thippili was fumigated. In addition on the request of Department of Archives, important documents that were needed to be conserved were fumigated.

Resource personal from PPS was provided for the training program on control of stored product pests conducted by the Provincial Department of Agriculture, Western Province.

Termite control

PPS undertook termite control in several buildings and construction sites. Control activities were carried out at Fruit Research Institute, Horana, Faculty of Agriculture, Peradeniya and Veterinary Research Institute, Gannoruwa.

Training program on control of termite damage in buildings was conducted for extension officers of the Provincial Department of Agriculture, Western Province where 35 officers participated.

Rodent control

Season long rodent control program in rice cultivation was conducted to 280 which included farmers and extension offices mainly in Kegalle and Matale districts. Three demonstrations were also carried out under this program.

In addition Integrated rodent management program was conducted in Ilimba in the Kalutara District to make the farmers aware on correct strategies of minimizing the damage in wetland paddy cultivations.

As per the requests of the Department of Agrarian Services, measures were taken to control rodent damage in seed packet stores of Divinaguma program.

Surveillance program of plant pests

Under this program PPS collected island-wide pest infestations in paddy cultivation which was utilized to prepare a summary with graphical description and it was distributed to all districts

via e-mail and by post. In addition, short messages on current incidences of pest situation were frequently broadcasted through the Sri Lanka broadcasting cooperation under the agricultural programs to alert the farmers on present pest problems. It is being expanded to report pest incidences in big and red onion cultivation due to high risk of pest attacks (especially onion bulb rot disease) in some areas.

Other activities

- **Control of *Parthenium hysterophorus***

  Control activities of the alien invasive weed Parthenium were continued. PPS Officers participated at the program which was organized by the Vauniya Deputy Director office where it was named as "Parthenium Control Day". Measures were initiated to control the weed in an area of 10 ha. 500 posters and 2000 leaflets were distributed**.**

- **Control of spotted locust (*Aularches miliaris*)**

  This year, the pest was reported from few locations including heavily affected areas such as the adjacent areas of Parape mountain region in Rambukkana and Uda-wadiya area in Monaragala. Special training programs were conducted for farmers and officers in these affected areas to combat with the pest problem. A leaflet was prepared on the control of yellow spotted locust and distributed to all affected districts and fact sheets were also disseminated through the online pest diagnostic program which has been implemented by PPS.

- **Crop clinics**

  Officers of the PPS participated at the crop clinics in Dewahuwa, Galenbindunuwewa, Padaviya and Rambawa which were coordinated by the Inter-provincial Department of Agriculture, Anuradhapura where 1500farmers were benefitted.

- **Natural Pesticides for controlling pests in home-gardens**

  Special focus was made to promote natural pesticides in homegardens. This program is aimed to train of extension officers and encourage the farmers to use plant extracts which have insecticidal properties in their fields. 75 officers and 117 farmers were trained under this component.

- **Disease management in Rambutan**

  Training programs on the control measures to manage the diseases in rambutan were conducted in 8 locations in Kahawa, Ingiriya and Hadapangoda areas in Kalutara District.

- **Root knot nematode control in Guvava**

  Monitoring of root knot nematode infection in Guvava fields which was reported in 2008 Anuradhapura district was continued further. PPS subunit,

Mahailluppallama was played a major role in controlling the above infection.

In addition, training programs on control of nematode damage were conducted to Guvava cultivating farmers in Anuradhapura district.

- **Pests and diseases on sacred "Bo" trees**

  Actions were taken to treat a number of "Bo" trees belonging to several historic temples.

- **Exhibitions**

An exhibition stall depicting PPS activities was constructed at Deyatakirula exhibition, Oyamaduwa in 2012 and Govisathiya program.

A permanent exhibition site was established at the Agro parks in Gannoruwa in parallel to the centenary celebration activities of the Department of Agriculture 2012**.**

- **Student training**

Two students of Agriculture School, Kundasale were trained in plant protection activities for 03 months.

- **Government coordinated program**

PPS, Subunit Bombuwala played a major advisory role in developing home gardens in Ilimba, Poruwagasdanda and Millawa in Kalutara district.

- **New program**

PPS launched a new program called "Online pests diagnostic service" to facilitate the activities of extension field staff who require quick identification of different types of pest attacks and their remedial measures. The e mail of address for this program is "ppsepest@gmail.com". The program has gained a good response by registering around 100 officers. This program was initiated in November 2012 which is aimed to identify and transmit suitable suggestions based on photographs and videos sent by the registered officers. It is implemented in collaboration with the relevant stakeholders of the Department of Agriculture. This program is also used to disseminate leaflets, fact sheets and other important messages.

PLAN FOR 2013

- Implementation of the Plant Protection Act
- Promotion of IPM in rice
- Promotion of IPM in vegetables
- Promotion of IPM for leafy vegetables
- Control of pests outbreaks
- Rodent control in rice fields
- Biological control of invasive Aquatic weeds
- Control of Alien invasive weeds in Agricultural habitats

- Pilot scale testing of weedicides
- Seed fumigations
- Special activities
    - Establishment of Data bank on rice pests incidences
    - Preparation of facts sheets on vegetables diseases with color pictures
    - Termite control activities in Government building buildings
    - Training of DOA officers on termite control
- Permanent crop clinic programs
- Production of training materials

STAFF LIST

Designation	**No.**
Deputy Director	01
Research Officer	02
Agricultural Officer	03
Programme Assistant	01
Agricultural Instructor	08
Public Management Assistant	04
Driver	04
Labourer	05
Store Labourer	01
Lorry Cleaner	01
Total	**30**

2.1.3 NATIONAL PLANT QUARANTINE SERVICE (NPQS) - KATUNAYAKE

The mandate of the National Plant Quarantine Service of Sri Lanka is to facilitate the import and export of pest free plants and plant products, for the development of agriculture and related industries in the country. To achieve this, emphasis was given to both research and service oriented quarantine activities.

Phytosanitary certification, inspection and treatment of import and export plants and plant products, testing of detained samples, dissemination of knowledge on all aspects of plant quarantine via training and awareness programmes for interested groups are the main activities of NPQS. From 01st of March 2012, the National Ozone Unit collaborated with the NPQS for regulation of Methyl Bromide fumigation for quarantine purposes. The Director General of Agriculture has identified the importance of carrying out all the Plant Quarantine and related activities in a single place. Hence the NPQS was recognized as a separate institute from 24th of September 2012 and at present it is administered directly under the Director General of agriculture. Therefore, from 25th of September 2012 The NPQS has initiated the issuance of import permits for plant and plant products. Later an Additional Director post was established for the NPQS.

Furthermore, NPQS collaborates frequently in its activities with national research institutes, universities and institutes and centers of DOA. This report gives the achievements made on financial, technical and service oriented activities carried out during 2012.

BUDGET

Allocation given and expenditure incurred under recurrent, capital and projects are given in Table 2.1.3.1.

Table 2.1.3.1: Annual budget – 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	6,278,000	3,130,839	50
Recurrent	7,502,000	6,846,096	91
NARP project	2,868,700	1,591,087	55
Total	**16,648,700**	**11,568,022**	**69**

PROGRESS

PLANT QUARANTINE OPERATIONS

Activities carried out by the Plant Quarantine Operations division within the year 2012 are listed in the Table 2.1.3.2.

Table 2.1.3.2: Activities carried out in 2012

	Activity	Achievements
01	Registration of interceptions	239
02	Number of interception reports sent	1095
03	Registration of inspections	1123
04	Number of inspection reports sent to entry points	1116
05	Registration of coir products for testing	206
06	Reports for tested coir products	195
07	Registration of submitted samples for testing	53
08	Issue of phytosanitory certificates	05
09	Number of questionable consignments destroyed	768
10	Number of import permits issued (from 25th of September to 31st of December2012)	862

Except for these activities which are related to the plant quarantine operations, the division has coordinated and carried out 14 comprehensive training programmes on plant quarantine activities and procedures.

ENTOMOLOGY

Testing for pathogens in export and import consignments

Exports

- 16924 export foliage plant samples collected from 15 export foliage nurseries and tested for plant parasitic nematodes. 936 samples were contaminated with plant parasitic nematodes.
- 6284 export foliage plant samples tested for insect pests and mites. No contaminations were recorded.
- 91 export coir samples collected from 13 coir factories were tested for insect pests, mites, soil contaminants and plant parasitic nematodes. Six contaminations were recorded.
- 112 other special samples submitted by the foliage exporting nurseries were tested for plant parasitic nematodes and insect pests for the facilitation of their pest monitoring program.

Imports

- 56 imported seed potato consignments were inspected at the sea port. These samples were collected and tested for insect pests and plant parasitic nematodes. No contaminations were recorded.
- 340 imported plant materials including hybrid maize, ground nut, beetle nut, cashew nut, *Sphagnum* peat moss, *Lilium* bulbs, fermented cocoa beans etc. were

tested for insect pests, mites and plant parasitic nematodes and 08 samples were found to be contaminated with common stored pests. Further an imported beetle nut sample from Indonesia was found to be infected with *Cryptolestess* spp.

Trainings

A large number of students belong to the universities, technical colleges and schools were trained under the Entomology division. Many awareness programs were conducted for the export foliage nurseries staff.

PATHOLOGY

Testing for pathogens in export and import consignments

Export consignments

- **Foliage**

5645 export foliage plant samples were tested and following pathogens were found; *Mucor* sp.,*Aspergillus* sp., *Fusarium* sp., *Colletotrichum* sp., *Macrophomina* sp., *Penicillium* sp., *Rhizopus* sp., *Xanthomonas sp*. and *Erwinia* sp.

- **Coir**

30 export coir samples collected from coir factories were tested for plant pathogens. *Mucor sp., Aspergillus sp., Penicillium sp., Rhizopus sp.Thalaviopsis paradoxa*were found on the collected coir samples.

Out of these pathogens *Thalaviopsis paradoxa* is considered as a quarantine important pest

- **Tissue culture plants**

1618904 plants were examined during 115 inspections. Contaminated containers with samples were rejected during inspections and necessary instructions were given to improve the quality of products.

Import Consignments

- **Seed potatoes**

80 seed potato samples were tested and following diseases were found,Silver scurf, Common scab, Soft rot, Black scurf, Netted scab and Dry rot. No quarantine pathogens were found.

- **Seeds and other plant materials**

419 samples were tested and no quarantine pathogens were found.

Testing of submitted samples

65 samples were checked and suggestions/findings were given to the responsible parties.

Trainings

Three training programs and five awareness programs were conducted.

23 undergraduates and diploma students were supervised.

Research programs

Research programmes were carried out on Molecular Identification of *Ralstonia solanacearum* (E. F. Smith) in Seed Potato and Detecting the causal Agent of Infected Draceana sandreana Leaves by Using Molecular Technology and Finding a Suitable Control Method.

WEED SCIENCE

Testing for pathogens in export and import consignments

Exports

180 export coco peat products were tested and out of that 51 were found to be contaminated with viable seeds.

Imports

77 import consignments were tested and 16 of them were found to be contaminated with weed seeds. Amomg them *Cerastium glomeratum*, *Lactuca scariola*, *Euphorbia dentata* quarantine significant and they werefound in onion seed lots.

Trainings

A large number of students belong to the universities, technical colleges and schools were trained under the weed science division.

Research programs

Nearly one month period is required to complete the grow-out test (The universal standard testing procedure) which is carried out to test the presence of viable seeds in coco peat products. Several treatments were tested to break the dormancy of weed seeds found in coco peat products. The research is in progress.

Maintenance of reference collection

- 05 new weed species were collected, preserved and mounted.
- 16 new weed seed species were collected and preserved.

TREATMENTTECHNOLOGY

Commercial fumigations

- 78 consignments of plant & plant products exported by different companies were fumigated at NPQS using Methyl Bromide.
- 06 consignments of assorted flowers and a sandal wood consignment intercepted by the plant quarantine unit at the airport were fumigated before releasing to the importer.

Table 2.1.3.2: Commercial fumigations done at NPQS Katunayake during 2012

Commodity type	No. of fumigations
Coir & coir products	43
Wood & wooden items	19
Cerbera	07
Flowers	21
Dried herbs	07
Seeds	02
Spices	01
Other	01
Total	**78**

Supervision of quarantine treatments

169 fumigations for wood packaging materials and other plant and plant products were conducted by private fumigators upon request by exporters were supervised by the officers of treatment technology division for certification purpose.

PLAN FOR 2013

- **Promotion of export of quality plants ant plant products**
  - Export nursery inspections
  - Factory inspections of export plants and plant products
  - Other agriculture related export inspections (individual tissue culture plant Inspections)
  - Samplings
  - Document check
  - Laboratory testing plant pathogens
  - Laboratory testing plant insects
  - Laboratory testing nematodes
  - Laboratory testing weeds
  - Submission of final test reports

- **Ascertaining the quality of imported seed potato**
  - Entry point inspection of seed potato
  - Sampling
  - Document check
  - Laboratory testing plant pathogens
  - Laboratory testing plant insects
  - Laboratory testing nematodes
  - Submission of final test reports

- **Ascertaining the quality of imported plant and plant products**
  - Entry point inspections
  - Sampling
  - Document check
  - Receipt of samples submitted by entry points to NPQS
  - Laboratory testing of plant pathogens
  - Laboratory testing of plant insects
  - Laboratory testing of nematodes
  - Laboratory testing of weeds
  - Submission of test reports
  - Submission of final test reports
  - Release
  - Treatment recommendation
  - Re-export or destruction

- **Ascertaining the quality of imported seeds, fruits and vegetables**
  - Entry point inspections
  - Sampling
  - Document check
  - Receipt of samples submitted by entry points to NPQS

- Laboratory testing of plant pathogens
- Laboratory testing of plant insects
- Laboratory testing of nematodes
- Laboratory testing of weeds
- Submission of test reports
- Submission of final test reports
- Release
- Treatment recommendation
- Re-export or destruction

- **Prevention of imports done without fulfillment of phytosanitary requirements**
  - Document check
  - Sampling
  - Testing for pathogens in intercepted plants
  - Testing for insect pests in intercepted plants
  - Testing for plant parasitic nematodes
  - Testing for weeds
  - Submission of test reports
  - Submission of final test reports
  - Treatment recommendation
  - Treatment supervision
  - Re-export
  - Destruction

- **Post Entry Quarantine**
  - Field inspections
  - Keeping plants at DOA premises
  - Reports/ recommendations
  - Submission of final reports

- **Treatment for eradication of pests found in export and import plants and plant products**
  - Fumigation at NPQS
  - Supervision of fumigation done outside NPQS
  - Issuance of fumigation reports

- **Maintenance of reference collections**
  - Weed species and weed seed species
  - Insects
  - Diseased specimens
  - Live aquatic plants

- **Training and awareness programmes for stake holders**
  - Trainings
  - Supervision of undergraduates/ Diploma students
  - Awareness programmes
  - Workshops
  - Seminars

- **Quarantine related research**
  - Pest surveys
  - Pest risk analyses
  - Weed control research
  - Pathological research
  - Entomological research
  - Quarantine treatment research

- **Registration of plant nurseries**
  - Exporting plants to designation countries
  - Field inspection
  - Auditing
  - Submission of reports

- **Evaluation of facilities available with treatment providers**
  - Inspection of sites
  - Auditing

- **Issuing phytosanitary certificates**
- **Issuing Import Permits (Plants and plant products)**

STAFF LIST

Designation	No.
NPQS (Katunayake)	
Additional Director	01
Research Officer	07
Administration officer	01
Agriculture Monitoring Officer	02
Programme Assistant	04
Research Assistant	05
Programme Officer	01
Agriculture Instructor	12
Seed Technician	01
Management Assistant	07
Driver	04
Electrician	01
Laborer	03
Laborer- Contract	07
Watcher	02
KKS	02
Total	**60**
Plant Quarantine Station (Sea Port)	
OIC (RO)	01
Agriculture Officer	01
Agriculture Monitoring Officer	03
Research Assistant	06
Agriculture Instructor	11
Public Management Assistant	01
Driver	01
Laborer (Permanent)	01
Total	**25**

Designation	No.
Plant Quarantine Station (Air Port)	
OIC (AO)	01
Agriculture Officer	01
Research Assistant	01
Agriculture Instructor	08
Public Management Assistant	01
Laborer	02
Total	**14**
Plant Quarantine Station	
OIC (AO)	01
Labourer	01
Total	**02**

2.1.4 OFFICE OF THE REGISTRAR OF PESTICIDES (ROP) – PERADENIYA

The mandate of the Office of the Registrar of Pesticides is to execute statutory provisions of the Control of Pesticides Act No. 33 of 1980. All pesticides imported to the country and/or manufactured or formulated within the country are registered under the Control of Pesticides Act No. 33 of 1980 as amended by the Act No. 06 of 1994. The pesticides registration is the key provision in the course of life cycle management of pesticides in the country from importation through marketing of crops treated with pesticides. The range of products covers to agricultural pesticides (insecticides, fungicides, weedicides, nematicides, etc.), household pesticides, veterinary pesticides, industrial biocides, wood preservatives, public health related pesticides and rodenticides, but the list is not necessarily exhaustive. Applications submitted with relevant technical documents are evaluated for the product's credibility in terms of authenticity of data submissions, with the view of safety, efficacy and suitability under the local conditions, is being met. Since the suitability of pesticides is evaluated with technical merits of individual product's performance, separate registrations are mandated for each product and assign a separate registration number.

During the year 30 new registrations and 189 re-registrations have been completed conforming to the international guidelines and test protocols ensuring acceptability on safety, efficacy and environmental grounds. A sum of over Rs. 2.5 million have been collected as revenue through registration and re-registration fees. The issuance of import approvals is entertained on certain quality assuring protocols for pesticide products entering into the country. Apart from procedural control measures 1096 number of formulation analyses has been carried out, prior to marketing, covering 284 of import consignments during the above period. Approval of pesticide labels (397) and advertising materials (122) were also efficiently utilized as information management and exchange option to ensure better management of pesticides in the field. The Office of the Registrar of Pesticides effectively participated at several special activities during the year for efficient and safe management of pesticides in the country.

BUDGET

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

Table 2.1.4.1: Annual Budget – 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %	Income
Capital	4,794,629	4,544,539	58	
Recurrent	2,673,000	2,521,460	94	
				1,565,000
Registration & Re- Registration Fees				
Dealer Certification Fees				651,200
Pest Control Service Registration Fees				320,000
Pest Control Service Renewal Fees				10,000
Total	**7,467,629**	**7,065,999**		**2,546,200**

PROGRESS

Registration of pesticides

In this process, relevant information and documents are evaluated upon submission by the registrant. If the outcome of assessment is satisfactory registration is granted with approved label and containers. The registration fee is then submitted in order to allot a registration number and issue the Certificate of Registration. During the year, the total revenue collected in this activity was Rs. 1,565,000.00. In order to streamline the registration aspects, and also to accommodate a vide participation in decision making, expertise from relevant ministries and institutions who are involved with pesticides, directly or indirectly, are being consulted by appointing pesticide sectoral sub-committees (e.g., agrochemical subcommittee, domestic and public health subcommittee and industrial subcommittee) under the PeTAC.

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, 189applications were processed under this category. Total revenue realized under this category was Rs. 945,000.00. As a new decision rule of pesticide re-registration, all pesticide products registered before the year 2000 are required to submit fresh registration documents for latest safety requirements. Under this scheme, product safety, quality and the performance will be assessed from freshly generated toxicity and product quality tests.

Product assessment and registration of new molecules

Safer and environmental friendly pesticides were identified and promoted during the pre-evaluation of products for local trials, which facilitate the phase-out of hazardous products available in the market. Steps were taken to introduce a seminar type approach in evaluation of pesticides registration dossiers in order to have efficient and expedient evaluation of documents. One of the advantages expressed over these approaches were to share the knowledge among diverse disciplines for effective assessment of pesticides. More than 30 formulations were evaluated during the year and five (5) products were registered for use under following crop/pest categories.

1. Chlorantraniliprole 20% SC
   An insecticide for the control of brinjal shoot borer & bean pod borer, tomato fruit borer
2. Topramezone 33.6% SC
   A post emergent weedicide for the control of annual weeds in maize
3. Potassium bicarbonate 82% SP
   A fungicide for banana sigatoka leaf spot disease
4. Thiamethoxam 20% + Chlorantraniliprole 20% SC
   An insecticide for the control of rice brown plant hopper and leaf folder
5. Azoxystrobin 25% SC
   A fungicide for banana sigatoka leaf spot disease and downy mildew in cucumber

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, 595 Quality Certificates submitted by the importers were assessed for this purpose prior to issue of import approvals.

Screening of labels and advertising materials

Label approval procedure enables dissemination of proper information to the end user. To facilitate this process, label templates for all categories of agricultural pesticides were developed to improve the quality of label contents. More than 495 labels and over 122 advertising materials have been screened during the year. The number of corrective attempts placed on label approvals was significantly strengthened during the year due to the new policies introduced on trade names/brand names on pesticides marketed in Sri Lanka. The novel policy on pesticide trade names/brand names were introduced under the consultation of the Pesticides Technical and Advisory Committee (PeTAC). The new policy stated that the existing trade names/brand names of specialty products were allowed until the patency of the product (formulation and the active ingredient) has expired. All commodity pesticides (i.e., the products that have been lost its specialty status) should have a descriptive trade name along with the common name of the active ingredient(s). The new policy on trade names/brand names is expected to be benefiting the farmer/user by making an informed decision on correct and efficient use of pesticides.

A new set of regulations have been introduced for advertising of pesticides by the pesticide industry in consultation of the PeTAC. The new directives state that all advertising materials of pesticides should carry descriptive trade names in the prominent manner. The manner of advertising has been further restrained by prohibiting promotional materials in agricultural fields along road sides, on trees, poles and bus stands. In addition, a decision has been taken not to allow trade names used in other countries in the South Asian region when such products are registered in Sri Lanka. This decision has been taken due to uncontrolled broadcasting of foreign advertisements through satellite TV/radio channels in contrary to local advertising guidelines for pesticides within the country.

Field enforcement

As an ongoing program, the office of the ROP continued to coordinate with the Provincial, Inter Provincial and Mahaweli Authority field enforcement staff to implement the Pesticide Dealer Certification Scheme. Pesticide dealer certificates are valid for one year unless

cancelled for specific reasons. A fee is charged as a part of the regulator requirements for issuing a certificate. Total revenue realized under this category was Rs. 651,200.00

Training and awareness programs

Awareness of the public through radio and Print media program on pesticide-related issues were conducted in several occasions, especially on the new system of recruiting personal for pesticide dealer outlets.

Laboratory activities

Pesticide formulation analysis

Quality of pesticide is a major factor, determining the efficacy and the impact on the human health and the environment. All registered pesticides should conform to the physico-chemical standards set out by International Agencies such as FAO and WHO. Accordingly, each consignment is cleared for marketing if the local tests are conformed to the specifications. In the year 2012, 1096 formulation analyses have been conducted on 284 batches of imported consignments and the magnitude of cleared consignments for marketing were 699,247.0 kg and 4,667,110.0 L of solid and liquid pesticides, respectively.

Pesticide residue analysis

We have analyzed some vegetable samples (Cabbage-06, Mukunuwenna-06, Snake guard-06), taken from the Kandy and Nuwara Eliya markets for chlorpyriphos residues. Residues were detected in very minute amounts and only two (2) samples of cabbage exceeded its maximum residue levels (0.05 mg/kg) declared under the Codex Alimentarius Standards.

Legal prosecutions

There are three (3) on-going magisterial court cases against unscrupulous pesticide traders/manufactures/distributors under the Control of Pesticides Act No. 33 of 1980. In June, 2012, a pesticide trader at Eheliyagoda was fined by the Eheliyagoda Magistrate court for selling an adulterated pesticide.

Special activities

Training program of Agrochemical Sales and Technical Assistants (ASTA)

In keeping with "*Mahinda Chinthana*" future vision, all pesticide sales outlets are required to appoint technically qualified personnel called as "Agrochemical Sales and Technical Assistants (ASTA)". The proposed scheme will enhance the knowledge of judicious use of pesticides among agricultural communities and other sectors through improved understanding the nature and correct use of pesticides – to enable prevent negative health effect to consumers and farming communities by delivering technical messages for informed decisions. Underlying this effort is the premise that responsible use of pesticides and human health and environmental protection are mutually achievable – that we can increase

economic activity and create new jobs while we minimize irresponsible use and to improve the ethical sale of pesticides.

Ministry of Agriculture has funded 5.3 million rupees for the conductance of necessary training programs in collaboration with the National Apprentice and Industrial Training Authority, island wide. Nearly eighty (80) persons covering all areas of the country were trained as master trainers for the training of Agrochemical Sales and Technical Assistants. Five (5) Sinhalese medium and two (2) Tamil medium training programs were held for the training of master trainers. Now, the above program has been started in ten (10) districts, namely Moneragala, Badulla, Matale, Nuwara Eliya, Galle, Kegalle, Rathnapura, Kurunegala, Puttalam, and Kegalle.

Arsenic and toxic heavy metals in pesticides

The Office of the Registrar of Pesticides, working with the Pesticide Technical and Advisory Committee, has initiated a comprehensive review of heavy metal contaminants in pesticides affecting public health and the environment. At the initial step all pesticide registrants are requested to submit detailed analytical test reports for nine heavy metals (mercury, arsenic, chromium, cadmium, lead, nickel, cobalt, tin and thallium) and cyanide from independent accredited laboratories. Currently, Office of the Registrar of Pesticides is working on prioritizing the review of individual pesticide products imported to the country that have the greatest potential to result in environmental contamination. The PeTAC will continue to review levels of heavy metal contaminants in pesticides leading to formulate a risk assessment program for potential risks and to address those concerns. All pesticide registrants are informed to do analyses at or below the Limit of Detection (LOD) of 0.1 ppm for arsenic, mercury and cadmium and 1.0 ppm for all other heavy metals and cyanide.

Revisions of pesticide recommendations

A committee has been appointed to review the current pesticiderecommendation of the Department of Agriculture. The pesticide recommendation booklet of the Department of Agriculture has been published in 2009. The current list of recommendations includes banned or not-in-use/imported to the country. Consequently, the current long list of pesticide recommendations under any crop/pest category has been viewed so exhaustive for efficient and responsible use of pesticides by the farmer. Under the directives of the Secretary to the Ministry of Agriculture and the Director General of Agriculture, steps are being taken to cut down number of pesticides recommended under the single crop/pest category to a limited number required for managing one pest species using scientific criteria. A set of criteria has been developed for this purpose and a maximum of six (6) pesticides will be allowed for any crop/pest combination. The rest of the criteria include the persistent efficacy of the product, different modes of action, health and environmental hazardness in terms of WHO Hazard Class/LD_{50} of the formulation and the

Environmental Impact Quotient (EIQ) and the type of formulation. Under the directive of the Director General of Agriculture, the revised pesticide recommendations for insecticides, fungicides, and weedicides will be published at the near future.

Bio efficacy tests

A decision has been taken to verify the bio-efficacy of selected pesticides against recommended crop/pest combinations pertaining to their recommended application rates. In this action, pesticides which have been registered before 06 years are nominated for reassessment through bio–efficacy trials, and will be carried out by the research wing of the Department of Agriculture and other relevant crop-research institutes. In case of domestic pesticides, the Medical Research Institute is identified as the competent authority for conducting bio-efficacy tests. The bio-efficacy information will support label-claim of these pesticides for successful management of pests/diseases, and help in minimizing over-dependenceand indiscriminate use of pesticides in pest management program and minimize the residue accumulations at harvest.

Upgrading the pesticide analytical laboratory

The laboratory of the Office of the Registrar of Pesticides is equipped with highly sensitive analytical equipments such as gas chromatographs (GC), gas chromatographs with mass spectrometry (GC-MS) and high performance liquid chromatographs (HPLC). Quality assurance and compliance monitoring in pesticide formulations is one of the main objectives of functioning this laboratory. For effective utilization of those instruments for analytical purposes, the availability of highly sensitive measuring equipment would be an unequivocal necessity. Apart from that, it requires ultrapure (de-ionized) water for analytical purposes. The standard use of de-ionized water includes rinsing of laboratory glassware, preparation and diluting buffers, reagents and sample preparation for analytical methods such as HPLC and flame Atomic Absorption Spectrophotometer (AAS). More specifically, HPLC is an instrument which requires analytical reagents prepared in ultrapure (de-ionized) water. Since further analytical activities related to the heavy metals contaminants in pesticide formulations are planned at this laboratory during the year 2013, an instrument for generating de-ionized water will be a great assist. Accordingly, the laboratory acquired a highly sensitive analytical balance and a de-ionized water plant in the year 2012.

Development of environmental monitoring for Sri Lanka

A study was completed at the Uma-oya agricultural catchment, upper Mahaweli River Basin with the financial support of the International Atomic Energy Authority (IAEA) small scale agricultural research grant to Dr. J.A. Sumith (Research Officer). The project was co-funded by the University of New Brunswick, Canada under the Canada Research Chair grant to Prof. Kelly R. Munkittrick. The overall objective of this research program was to develop a sensitive environmental monitoring

program that identifies biological responses, the mechanisms of impact, and the stressors potentially responsible for any impacts on fish populations in agricultural areas in Sri Lanka. The long term objectives of this project were to develop a better understanding of the life history and potential parameters of fish (i.e. reproduction) influenced by agricultural stressors and to determine how sentinel fish species can be utilized to design more environmentally sustainable and sensitive monitoring programs for agricultural impacts, and thus minimize potential environmental impacts to ecological communities.

There were supportive evidences in this study to make diagnostic inferences about ecosystem impacts by a sequential order of response to exposure to agricultural pollutants within a biological system. Thus, one of the most important advantages recommending development and elucidation of effects was to develop an understanding of underlying mechanisms to diagnose the impact of agricultural stressors, and thereby help protecting ecological resources by suitable management and regulatory tools. This study concluded that there were potential eutrophication effects at higher elevations and chemical impacts at lower elevations but there were interactions between nutrients and elevation. Potential next steps would include studies on (a) sub-catchment(s) with known/correlated farming activities to sample before/after, with wild fish sampling before and after application of pesticides, including potential mesocosm/cage studies, (b) studies along a gradient of both nutrients at the same elevation and at different elevations with similar nutrient levels, (c) investigations of potential genetic influences on performance, and (d) confirmatory studies using benthic macroinvertebrates. These studies would help identify the subsequent studies to confirm impacts and would represent a comprehensive approach for assessing high pesticide use agricultural areas. Five publications were made under this project.

New guidelines for source change in pesticides

As has been practiced over the years, all specialty products are considered as new registrations and assign a new registration number and all commodity products are registered either as new registrations or “third-party” registrations, subjected to the preference of submitting a complete data package from the pesticide manufacturer and/or the formulator. The Office of the Registrar of Pesticides receives occasional requests for amendments to the source of pesticides during or after the registration of pesticides. The Office of the Registrar of Pesticides views that it is necessary to adopt strict procedures and compliance by the pesticide registrants on the various aspects of changes as they are providing crucial role in regulatory management of pesticides. A new guidance document was prepared and submitted for PeTAC approval in October, 2012. The guidance document explains the regulatory approach to the source of the technical active ingredient and the formulation used in approved products and the actions required of registrant when making changes to the source. It is expected that all registrants would inform any

change in technical aspects of pesticides to the Registrar of Pesticides without any delay and if they were unclear as to what action is required for previous changes, then they should contact the Office of the Registrar of Pesticides for clarification.

Initiatives on proper disposal of obsolete pesticide stocks

In March 2012, Office of the Registrar of Pesticides received requests for disposal options of outdated stocks of pesticides and laboratory chemicals accumulated in some of the regional agricultural stations of the Department of Agriculture. An estimated sum of 1,083 kg of solid and 508 L of liquid pesticides/chemicals were amongst the concerned requests. The matter has been communicated with M/s Holcim Geo-Cycle for a possible solution by incineration through co-processing technology during cement manufacturing. Office of the Registrar of Pesticides also communicated the matter with the Ministry of Environment to facilitate disposal options through Basel Convention (An international convention on transboundary transport of hazardous substances). A further disposal solution was requested through the Ministry of Environment for an outdated stock of methyl bromide accumulated with the Food Commissioner's Department. The stock of methyl bromide to be disposed of has been reported to be 1,915 kg. Methyl bromide is a highly hazardous substance. It is also designated under the Montreal Protocol as an ozone depleting substance, which requires strict control over the use and disposal.

Initiative on monitoring of severely hazardous pesticide formulations

Based on the past experience on pesticide poisoning monitoring and pilot activity during the year 2011, the aspect of unintentional/occupational poisonings has gained least attention among the scientific community. There are inadequate data of clinically identified cases on non-intentional and incidental poisonings in Sri Lanka. There are pesticide formulations that may be safely used in developed countries with sufficient protective measures but cannot be used safely under prevailing socio-economic and climatic conditions in Sri Lanka. Results of past regulatory decisions such as banning of highly hazardous pesticides and formulations have influenced and greatly contributed to risk reduction of pesticides. However, the information accumulated so far are mainly on suicides and focused on effects and management of poisonings in severely poisoned patients. With the new initiative of the Office of the Registrar of Pesticides, perspectives have been open up to extend the focus on occupational pesticide poisoning. In this activity, vulnerable populations to pesticides are taken for consideration and by a survey methodology, incident reports are complied with respect to the identity of pesticide formulations, exposure scenario and effects. Five training workshops were organized for Agricultural Instructors in the districts of Anuradhapura, Pollonnaruwa, Kurunegala, Hambanthota and Nuwara Eliya in collaboration with the Rotterdam Convention Secretariat in Geneva and the South Asian Clinical Toxicology Research Collaboration. It is

planned that, as a regulatory authority, Registrar of Pesticides will be guided by descriptive records of unintentional poisonings and confirmatory data by clinical studies when taking decision of highly hazardous pesticide formulations.

Licensing of pest control service providers

The regulations on pest control operators were published in the Extraordinary Gazette No. 1655/7 dated 25.05.2010 of the Democratic Socialist Republic of Sri Lanka under the Section 26 of the Control of Pesticides Act No. 33 of 1980. The existing scheme for licensing of institutions are based on the technical capacity and infrastructure in terms of prior experience, training qualifications, availability of equipment etc. in order to conduct specialized pest control services viz., general pest control, pre-/post-construction and structural termite control and pre- and post-quarantine fumigation using restricted and other pesticides. Regulations have stated to obtain prior approval from the Committee before issuing licenses for qualified pest control service institutions. Upon receipt of the applications and fees, 42 pest control companies were inspected for necessary expertise and compliance. As of December, 2012, 31 pest control services have been licensed as suitable to carry out pest control activities under different service categories.

In addition, the use of synthetic pyrethroids is subjected to strict control by a prior approval procedure of the Registrar of Pesticides. Such restricted pesticides have been permitted for use only by registered pest control service institutions equipped with qualified personnel for application with strict supervision. Some of the restricted pesticides (synthetic pyrethroids) are having national interests on mosquito control program in the country. Therefore, the permission to purchase of such pesticides with a written approval by the Registrar of Pesticides is also a part of the strict control. A prior approval procedure is adopted for use of restricted pesticides (especially synthetic pyrethroids) by government local authorities such as Pradeshiya Sabas and Urban Councils in consultation with the Anti Malaria Campaign and Dengue Control Unit of the Department of Health. The total number of applications processed during the year 2012 was 400.

Training course on pest control

Operators and Technicians involved in pest control could be considered as a group of guardians of environmental and public health. However, many still require continuous professional skills development in the subject area to capture new frontier technologies that would target species without affecting the health of non-target species or damaging the environment. Pest control in Sri Lanka is both complex and highly regulated and thus demands personnel with the relevant knowledge, skills and attitude to serve the nation.

Successful negotiations have been made with the Agriculture Education Unit (AEU) of the Faculty of Agriculture, University of Peradeniya for designing a pest control course and developed a 25 day long Certificate Course on Pest Control to the Professional and Technical Staff in the

industry involved in this aspect. The training will include in-class teaching, laboratory exercises, and practical/demonstrations conducted in real world settings to provide trainees with the hands-on experience they need to meet the specialized challenges of commercial environments. The Course provides pest control operators and technicians in either the public or private sectors of the industry with the essential knowledge required by professional pest controllers. The training course for the first group will be started in January, 2013.

Participation at initiatives on chemical management in Sri Lanka

The Office of the Registrar of Pesticides actively participated in developing project proposals on chemical/pesticide management in Sri Lanka under the funding support of the Global Environmental Facility (GEF) of the United Nations Environment Program to the Ministry of Environment. Sri Lanka became a signatory to the Stockholm Convention on Persistent Organic Pollutants (POPs) on 5th September 2001 and the Ministry of Environment became the focal point. Ministry of Environment obtained funding from GEF to prepare the national Implementation Plan to control 12 POPs, and the newly classified 9 POPs and other prospective chemicals are requiring intensive assessment. Sri Lanka is also a party to the Basel Convention on the control of Transboundary Movements of Hazardous Waste and their Disposal and compelled to find environmentally sound solutions for the management of POP chemicals as hazardous wastes. In January 2006, Sri Lanka became a party to the Rotterdam Convention on the Prior Informed Consent Procedure for Certain hazardous chemicals and Pesticides in International Trade in which the Ministry of Agriculture is served as the focal point. Few POPs are also included as hazardous chemicals and pesticides under this convention. Thus all three conventions are appropriate for the implementation of the activities identified under the National Implementation Plan (NIP) and many are complementary.

Pesticides are a small subset of chemicals and pesticide management in Sri Lanka is a highly regulated subject under the provisions of the Control of Pesticides Act No. 33 of 1980 and its amendment Act No. 06 of 1994. The use of POP pesticides were initially prohibited during the early seventies and the last POP pesticide (i.e., chlordane) used in Sri Lanka for termite control in building construction was banned in 1996. Hence, there are very minimal threats of illegal importation of POP pesticides into the country. However possibility exists for illegal importation POP pesticides under a different custom Harmonized System (HS) code as other chemicals that are not classified as pesticides. Proposals were made to upgrade institutional elements in pesticide management, use, analysis and disposal with possible financial support from funding agencies and the central government budget.

Guidelines for newcomers to the pesticide industry

Customarily, every new company engaged in pesticides trade including importation, storage, distribution and sale is approved by the

Pesticides Technical & Advisory Committee (PeTAC). The applications are accepted for registration of pesticides upon satisfactory evaluation of the company profile in terms of infrastructure capacity to store and manage pesticides in bulk, professional experience in marketing and personnel qualifications and other matters. In this connection, Office of the Registrar of Pesticides prepared guidelines for new companies with due consultation of the PeTAC, and potential applications are evaluated, accordingly. During the year 2012, two (2) new companies were accepted for engage in trading in pesticides in the country.

Initiatives on empty pesticide container management

The Office of the Registrar of Pesticides with the participation of the Ministry of Environment has begun a program for safe and efficient disposal of empty pesticide containers through Deposit Refund System. In August, 2012 the cabinet of ministers of the Ministry of Agriculture and the Ministry of Environment fundamentally agreed upon establishing suitable mechanisms to manage empty pesticide containers at the farmer field level. The initial surveys led by the Ministry of Environment amongst the farmers, dealers and the general public revealed wider acceptance on this project. The first phase of the proposed system will be implemented on glass containers and disposal facilities for plastic containers will be secondarily developed. However, in October, 2012 proposals invited through newspaper advertisement from potential plastic recyclers in order to select suitable recycling solution (i.e., allowable materials that can be produced) with due approval from the Central Environmental Authority. Further discussions are underway.

Huge stocks of plastic drums are collected at pesticide formulation/re-packing plants which make a big problem to the environment. Alternate strategies have been implemented to dispose of such empty pesticide plastic containers for garbage collection projects through government and non-governmental organizations. A prior approval procedure is adopted by the Registrar of Pesticides for issuance of containers out of the industry premises. Under this scheme, all containers are required to triple-rinse before storage. It is necessary to modify the plastic containers by making at least 8 holes in the drums to avoid the possible unsafe use and to reduce health risks. During the year 2012, over 23,000 plastic drums were issued by prior approval procedure among authorized parties. All steel-made containers (it is required to dent all containers after triple-rinsed) are allowed to dispose of by recycling with raw iron through prior approval procedure. During the year 2012, more than 8,000 steel drums (equivalent of 180 metric tons) were recycled through approved recycling facilities. The Office of the Registrar of Pesticides deems it is necessary to set forth the regulations for the management of emptied pesticide containers as a new activity for the next year.

Progress of activities during the year 2012

Item	Sub Activity	Total Annual Physical Target	Achievement up to End of the Year	%
01	Acceptance of Applications for registration after screening & allocation of application numbers	150	149	99
02	Evaluation of original Registration applications	30	30	100
03	Evaluation of third- party Registration applications	140	34	24
04	Evaluation of Re-registration applications	140	189	135
05	Evaluation of data for local trials	30	94	313
06	Issue of import approvals	1400	874	62
07	Evaluation of Pesticides Quality Certificates	1400	595	42
08	Screening of labels for approval	750	497	66
09	Screening of advertising material for approval	250	122	49
10	Inspection of factories	12	09	75
11	Inspection of approved repacking facilities and stores	02	09	450
12	Inspection and certification of premises for fumigation and household pest control operators.	30	27	90
13	Registration of pest control services.	30	33	110
14	Approval of obtaining CH_3Br for quarantine & pre- shipment treatment on accountable basis	60	88	147
15	Dispatch of samples to MRI & ITI for obtaining test reports on suitability for acceptance of applications	25	38	152
16	Issue of packing clearance as per the quality analysis of samples on consignment basis.	800	284	36
17	Inspection of sales outlets	140	70	50
18	Publishing revised guidelines for registration of pesticides/Biocides/…and guidelines for newcomers for the pesticides dealing who needs to import pesticides.	04	03	75
19	Media Programs(TV /Radio/Print)	12	25	208
20	Training/Certification of Agrochemical sales and technical Assistance.	25	0	0
21	Awareness Exhibition	4	03	75
22	Dealer training classes	30	0	0
23	Issue of dealer Training Certificates	1100	129	12
24	Issue of dealer certificates	2000	1184	59
25	Field Complaints	04	12	300
26	Legal Prosecutions	02	02	100
27	Technical Advisory Committee Meeting	06	06	83

Item	Sub Activity	Total Annual Physical Target	Achievement up to End of the Year	%
28	Meetings with industry representatives to inform PeTAC decisions.	06	05	67
29	Pesticides Sub Committee meetings of three Sub comities	09	06	137
30	Formulation analysis	800	1096	58
31	Random checking of pesticides impurities	12	07	150
32	Development and Implementation of programs for empty container disposal	02	03	88
33	Service or participation as technical Expertise/Members/resource persons for intra and inter Departmental organization meetings.	33	29	190
34	Participation as resource personnel for invitations from other institutes	10	19	15
35	Collection, compilation &dissemination of import statistics (Central Bank, Universities, Researches, Govt. Institutes etc.)	40	06	15
36	Other activities such as field surveys	04	02	150

PLAN FOR 2013

TECHNICAL WORK PLAN –2013

Program: **Pesticide Registration**

No	Item/ Activity	Total Annu. Phy. Target	Cumulative Physical Target for the Quarter				Expected Benefits
			1st	2nd	3rd	4th	
1	Acceptance of Applications for registration after screening & allocation of application numbers	150	40	80	120	150	In order to arrive at a decision whether the products do not cause harmful effects under local conditions and to minimize agricultural input cost
2	Evaluation of original registration applications/Order of dossier according	30	05	15	25	30	
3	Evaluation of third-party registration application	140	35	70	105	140	
4	Evaluation of re-registration applications	140	35	70	105	140	
5	Preparation of registration certificates for approvals	280	70	140	210	280	

No	Item/ Activity	Total Annu. Phy. Target	Cumulative Physical Target for the Quarter				Expected Benefits
			1st	2nd	3rd	4th	
6	Evaluation &Preparation of data for sub committees.	30	05	15	25	30	To release human and environmentally friendly formulations.
7	Preparation of import license for ROP approvals.	1400	300	550	1000	1400	To assure products importing from correct source of supply, and stop importing unwanted volumes.
8	Issue of import approvals	1400	300	550	1000	1400	
9	Evaluation of pesticides quality certificates	1400	300	550	1000	1400	To import quality pesticides and to ensure products conform to FAO specifications.
10	Screening of labels for approval	750	100	300	500	750	To give the correct message for the farmers and other relevant authorities on judicious use and protection.
11	Screening of advertising material for approval	250	50	100	200	250	
12	Inspection of factories	12	3	6	9	12	To assure factory standards are actually followed.
13	Inspection of approved repacking facilities and stores	12	3	6	9	12	To check whether packing activities are carried out according to standards and thereby maintain product quality.
14	Inspection & certification of premises for fumigation & house hold pest control operators	30	5	10	20	30	To regularize fumigation operations thereby avoid rejection of exports
15	Registration Pest Control services	30	5	10	20	30	To regularize Pest Control Operators in order to prevent unskilled people coming to this industry.
16	Approval of obtaining CH_3Br for quarantine & pre- shipment treatment on accountable basis	60	15	30	45	60	
17	Inspection of sales outlets	140	30	75	110	140	Prevention of adulteration and spurious products.
18	Dispatch of samples to MRI & ITI for obtaining test reports on suitability for acceptance of applications	25	7	15	20	25	Availability of quality products in the market.
19	Issue of packing clearance as per the quality analysis of samples on consignment basis.	800	200	400	650	800	

No	Item/ Activity	Total Annu. Phy. Target	Cumulative Physical Target for the Quarter				Expected Benefits
			1st	2nd	3rd	4th	
20	Media Programs i.TV ii. Radio iii. Print Media	264	22	142	153	264	To train the trainers and improve the awareness of the community.
21	Training / Certification of Agrochemical sales and Technical assistants.	25	5	10	20	25	
22	Awareness Exhibition	4	1	2	3	4	
23	Awareness programme for Auos	2	-	1	2	2	To ensure pesticides are sold only through trained people and certified outlets
24	Issue of dealer certificates	2000	500	1000	1500	2000	
25	Field complaints	6	1	2	4	6	To take legal action against persons contravening the provisions or regulations in the Act.
26	Legal prosecutions	4	-	2	3	4	
27	Technical Advisory Committee Meetings	6	2	3	5	6	To advise the Registrar on all matters relating to the COP Act
28	Meetings with industry representatives to inform PeTAC decisions	6	2	3	5	6	Scrutinizing matters in relation to recommendation and use of pesticides in industry sector
29	Pesticides Subcommittee meetings of three Subcommittees	18	6	9	12	18	Scrutinizing matters in relation to recommendation and use of pesticides in health, Public health & domestic pest control sectors
30	Formulation analysis	800	150	350	625	800	To analyze the quality of pesticides and residues in food and water.
31	Random checking of pesticide impurities	12	4	8	12	12	
32	Risk assessment on pesticide impurities including Heavy metals						Heavy metal impurity regulation program for pesticides
33	Effect non-target organism in the environment by pesticides						Removal of pesticides with adverse environment effects from the recommendation
34	Programme for the monitoring of resistance development of pesticides						Implementation of resistant management programme for pesticides
35	Establish a regulation scheme to assure the levels of pesticides residues in vegetables and fruits						MRL monitoring Programme
36	Evaluation of house hold pesticides to find their field effectiveness						Proper methods for testing of bio efficacy of domestic pesticides
37	Development and Implementation of programs for empty container Disposal	2	1	1	2	2	To minimize Environmental contamination.

No	Item/ Activity	Total Annu. Phy. Target	Cumulative Physical Target for the Quarter				Expected Benefits
			1st	2nd	3rd	4th	
38	Service for participation as technical Expertise/Members/resource persons for intra and inter Departmental organization meetings.	27	5	12	19	27	Reduction of pesticides related health and environmental effects.
39	Participation as resource personnel for invitations from other institutes	10	2	5	8	10	
40	Collection, compilation& dissemination of import statistics (Central Bank, Universities, Researches, Govt. Institutes etc.)	40	10	20	30	40	
41	Publishing revised guidelines for registration of pesticides / Biocides /.....and guidelines for new comers for the pesticides dealing who needs to import pesticides	2	-	1	2	2	
42	Other activities (such as field surveys)	4	1	2	3	4	

STAFF LIST

Designation	No.
Registrar of Pesticides	01
Research Officer	04
Agricultural Officer	01
Agricultural Instructor	06
Research Assistant	04
Agriculture Monitoring Officer	02
Programming Asst. (Agriculture)	02
Research Sub Asst.	01
Public Management Assistant	05
Driver	03
Watcher	01
Contract Laborers	02
KKS	01
Labourer	02
Total	**35**

2.1.5 PLANT GENETIC RESOURCES CENTRE (PGRC) – GANNORUWA

The Plant Genetic Resources Centre (PGRC) continues its activities to conserve and to promote the utilization of Plant Genetic Resources (PGR) of food crops. To achieve this PGRC continues to collect, introduce, conserve, evaluate and document the genetic diversity of food crops and related species.

The exploration activities of the Centre gained a remarkable achievement during the year by collecting germplasm in northern and eastern areas of the country. The seed gene bank of the center has 12,980 germplasm accessions as conserved materials. The utilization of germplasm has been increased by farmers and researchers.

The biotechnology unit of the Centre identified two Simple Sequence Repeat (SSR) markers to confirm the purity of tomato hybrid variety "Maheshi".

This report presents a summary of the progress achieved by the PGRC in the year 2012.

BUDGET

The annual budget for the year 20l2 is given in Table 2.1.5.1.

Table 2.1.5.1: Annual budget - 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Recurrent	11,306,000	10,838,719	96
Capital	2,580,000	2,170,522	84
Projects			
Integrated Management of PGR (AFACI project)	1,132,000	448,447	40
National Agricultural Research project	1,725,700	1,709,467	99
Total	**16,743,700**	**15,167,155**	**91**

PROGRESS

Exploration and Collection of Plant Genetic Resources

As one of the biodiversity hot spot country in the world, Exploration Unit of the Plant Genetic Resources Centre (PGRC) has made notable achievements in launching a collection of Plant Genetic Resources (PGR) in Northern and Eastern Provinces of Sri Lanka after the 23 years of establishment of the PGRC in 1989. The Exploration Unit was able to rebound strong link with the Agricultural Institutes and Agricultural Officers of the said provinces. In addition to field exploration, PGR was collected from the research institutes of the Department of Agriculture. Altogether, 814 samples were assembled during the 2012. A total of 784 seed samples were sent to the gene bank for conservation and the balance 30 samples which are vegetatively propagated material were established in the field.

Exploration and collection

During the 2012, Exploration unit has under taken six exploration and collection missions in Anuradhapura and Puttalam, Kandy, Mannar, Ampara,Trincomalee and Nuwara Eliya districts.

A total of 394 samples were collected through the field exploration. A summary of each exploration is given below.

Exploration 01- Nawalapitiya area

Three officers were involved in the exploration activity in the Nawalapitiya area on 06thMarch 2012. A total of forty one samples of different crops were collected.

Table 2.1.5.2: Collection of crop germplasm in Nawalapitiya

Crop	No of Samples	Area visited
Vegetable	l6	Nawalapitiya
Condiment	25	
Total	**41**	

Exploration02 - Mannar District

Germplasm collection in Mannar district was conducted from 19th to 22nd March 2012 with support of the extension staff. This is the first exploration mission made to this area after the inception of PGRC. A total of sixty four samples of different crops were collected.

Table 2.1.5.3: Collection of crop germplasm in Mannar

Crop	No of Samples	Area visited
Rice	01	Nanatan, Murungan
Coarse Grain	02	Pandiviritichan,
Vegetables	39	Pesale,
Grain	01	Keeri,
Legumes	02	Wanchiyankulem
Oil Crops	14	Velankulam, Madu
Condiments	03	
Root and Tubers	02	
Fruit crops		
Total	**64**	

Exploration 03 -Trincomalee District

The second exploration mission of the year20l2 was conducted at Trincomallee district from 28th to 30thMarch 2012. A total of one hundred and two samples of different crops were collected.

Table 2.1.5.4: Collection of crop germplasm in Trincomalee

Crop Group	No of Samples	An area visited
Rice	01	
Coarse Grain	09	
Vegetables	54	
Grain Legumes	01	Mullipothana, Kantale,
Condiments	16	Gomarankadawala, Padaviya
Root and Tubers	12	Sri Pura
Fruit crops	04	
Medicinal plants	04	
Sugar cane	01	
Total	**102**	

Exploration04- Galaha Area

Three officers were involved in the exploration activity in Galaha area on 9th August 2012. A total of thirty four samples of different crops were collected.

Table 2.1.5.5: Collection of crop germplasm in Galaha area

Crop Group	No of Samples	Area visited
Vegetables	18	Galaha
Condiments	16	
Total	**34**	

Exploration 05 - Ampara District

The Germplasm exploration mission was conducted after the 7 year period in Ampara district from 24th to 26th September 2012. A total of one hundred and twenty germplasm of different crops was collected.

Table 2.1.5.6: Collection of crop germplasm in Ampara

Crop Group	No of Samples	Area visited
Coarse Grain	19	Ampara, Dammana,
Vegetables	67	Lahugala,Pothtuvil,
Grain Legumes	17	Thirykovil, Mahaoya,
Condiments	09	Pathiyathalawa
Oil crops	05	
Medicinal plants	03	
Total	**120**	

Exploration 06 - Haguranketha Area

The Exploration team consisted of two officers collected 33 samples of different crops.

Table 2.1.5.7: Collection of crop germplasm in Haguranketha

Crop Group	No of Samples	An area visited
Coarse Grain	11	Unantanna,
Vegetables	15	Marassana
Grain Legumes	04	
Condiments	01	
Oil crops	02	
Total	**33**	

Collection of Crop Germplasm from Research Stations

PGRC is responsible for germplasm collection from the field as well as Research Station. Numbers of germplasm of various crops are maintained in these Research Stations. In addition, advanced lines (breeding lines) developed in the breeding program need to be collected for conservation. Some of the recommended varieties were not received by the PGRC. The germplasm of various crops from different sources need to be collected by the PGRC for conservation and future use in crop development.

The germplasm of various crops in Research Stations are increasing with the breeding and other research activities. Therefore, frequent collection of germplasm from Research Stations is advisable without loosing the valuable germplasm. A collection of germplasm from Research Stations has not been carried out for last several years especially from Research Stations in North and East.

A.Collection of Crop Gerrmplasm from Research Stations

The program was initiated with the Exploration mission to RRDI, Bathalagoda and FCRDI, MI and its satellite stations from 5th to 7th September2012.

The following Research stations were covered.

1. RRDI, Bathalagoda
2. FCRDI, MI
3. ARS, Vavunia
4. RARDC, Kilinochchi
5. ARS, Thinnaveli

Table 2.1.5.8: Amount of Germplasm collected from Research Stations (5th-7th September2012)

Research Station	Number of Germplasm Collected							
	Rice	Coarse Grain	Legumes	oil Crop	Condiments	Vegetables	Fruit crop	Others
RRDI, Bathalagoda	07	-	-	-	-	-	-	-
FCRDI, Mahailluppallama	-	01	46	02	12	01	02	-
ARS, Vavuniya	02	-	-	-	-	09	01	0l
RARDC, Kilinochchi	03	02	01	-	-	03	-	-
ARS. Thinnaveli	-	-	-	-	04	11	11	-
Total	**12**	**03**	**47**	**02**	**16**	**24**	**14**	**01**
Grand Total	**119**							

B. Collection of Crop Germplasm from Research Stations

An Exploration mission to ARS-Girandurukotte, ARS- Mathuruketiya, GLORDC Angunakolapellassa FCRDC-Horana and Regional Rice Research Centre, Bombuwela and its Satellite stations Ambalantota, Labuduwa and Bentota was carried out from 10th to 12thOctober 2012.

Table 2.1.5.9: Amount of germplasm collected from Research Stations

Research Station	Number of Germplasrn Collected							
	Rice	Coarse Grain	Legumes	Oil Crop	Condiments	Vegetables	Fruit crop	Others
ARS, Girandurukote	-	03	04	13	-	10	-	-
ARS, Madurukatiya	01	01	-	-	01	05	-	-
GLORDC Angunakolapellassa	-	-	-	-	-	42	-	-
FCRDC, Horana	-	-	-	-	02	06	-	-
Regional Rice Research Centre Bombuwela	11	-	-	-	-	-	-	-
Rice Research Station, Ambalantota	15	-	-	-	-	-	-	-
Rice Research Station, Labuduwa	12	-	-	-	-	-	-	-
Rice Research Station. Bentota	02	-	-	-	-	-	-	-
Grand Total	**128**							

C. Crop Germplasm received frorn Research Stations

A total of 173 samples of common beans was received from RARDC, Bandarawela on 3rdDecember 2012.

Passport Data

A total number of 200 entries (from Acc. No. 012779 to 012979) of passport data were sent to theData Management Unit of the PGRC.

CONSERVATION OF SEED MATERIALS

During the year 2012, 73 new accessions and 171 multiplied samples were conserved in the gene bank. The total number of gene bank holdings up to the end of year is 12980. The gene bank conservation status is given in the table 2.1.5.10.

Table 2.1.5.10: Conservation status of the gene bank

Crop Group	No of Accessions
Rice and related spp.	4541
Other cereals and related spp.	1657
Grain legumes and related spp.	2062
Vegetable legumes	1302
Solanaceous vegetables & condiments & related spp.	1221
Cucurbit vegetables	785
Brassicaceae vegetables	31
Alliums	20
Other vegetables	371
Leafy vegetables	167
Root and tubers	09
Mustard and related spp.	124
Oil crops	434
Fiber crops	66
Medicinal plants	27
Fruits	163
Total	**12980**

Utilization of germplasm

About one thousand and three hundred different crop accessions were distributed for research purposes. A total of 553 accessions of germplasm was distributed among farmers.

Research on seed behavior

A series of experiments were conducted to monitor the viability of accessions of winged bean, sesame and mustard collection of the gene bank from 1989 to 2007. One thousand and thirteen accessions were tested for viability. The results of active collection revealed that the viability of mustard and sesame remain as same as initial germination. Tested winged bean accessions revealed that viability of conserved samples have dropped below 85% from year 1989 to year 1991. However, after 1991, viability has remained in the conserved accessions.

GERMPLASM EVALUATION AND MULTIPLICATION

The following germplasm were multiplied and handed over to the Gene Bank for conservation:

Tomato (53 accessions), Brinjal (44 accessions), Yard long bean (11 accession), Luffa (5 accessions), Winged bean (7 accessions) , Okra (34 accessions), Amaranthus (22 accessions), Finger millet (8 accessions), Pearl millet (6 accessions), Little millet (2 accessions), Foxtail millet (2 accessions), Kodo millet (3 accessions), Rice (4 accessions), Hyacinth bean (7 accessions), Jack bear (7 accessions), Sword bean (15 accessions), Cluster bean (1 accession), Yam bean (1 accession).

A total of 23 red onion accessions were multiplied and these accessions will be tested in the dry zone to identify promising accessions.

Pre breeding

F 1 seeds of cross between Thumba and Bitter gourd were submitted to Gene Bank.The seeds of these crosses show dormancy and take about six months for germination. Some seeds germinated and seedlings were planted for further study.

Establishment of banana field Gene bank

Hundred and ten accessions of Banana collected from farmers' fields have been established in the field for characterization and evaluation purposes.

BIOTECHNOLOGY

Genetic purity testing of hybrid vegetable varieties (tomato & eggplant)

The objective of this study is to develop the protocol to maintain the purity of commercially available locally developed hybrid varieties using molecular markers. Two SSR primers were identified to confirm the purity of tomato hybrid variety Maheshi. Further confirmation has to be done.

Phenotypic and molecular characterization of okra accessions conserved at gene bank

Morphological characterized data were collected from thirteen conserved okra accessions. These data will be included into the PGRC database. Molecular characterized data were collected using six RAPD primers.

Conservation of PGR of *Dioscorea,* Sweet Potato, Potato and Banana species under *in-vitro* & plant house conditions

The objective of this study is to conserve and maintain crop germplasm under *in vitro* and *in vivo* form.

Seventy accessions of *Dioscorea* species are maintained both under *in-vitro* form in lab and potted form in planthouse. One hundred and nine accessions of sweet potato under *in-vitro* form in lab and 114 accessions of sweet potato under potted form in plant house conditions are conserved. Fifteen accessions of potato are maintained under *in-vitro* form.

PLANT GENETIC RESOURCES (PGR)INFORMATION MANAGEMENT SYSTEM

Plant Genetic Resources Database

The incorporation of data into the database has been continued. Presently database contains passport data of 12,979 accessions. Characterization data of 25 crops including rice, maize, finger millet, foxtail millet, sorghum, cowpea, mung bean, black gram, soy bean, pigeon pea, ground nut, bean, winged bean, yard long bean, brinjal, tomato, capsicum,okra, pumpkin, snake gourd, bitter gourd, *Amaranths*, luffa, mustard and sesame were included in the database.

Database of the National Information Sharing Mechanism of the Global Plan of Action(NISM-GPA)

NISM-GPA database is presently maintained at the PGRC and was improved and updated for the benefit of the users.

AWARENESS PROGRAMME

A total of fifty (50) school - awareness programs were organized and conducted by the exploration unit with the help of' other units of PGRC. Ten groups of post graduate and undergraduate university students followed short lectures and demonstration program on PGR conservation as a partial fulfillment of their practical and course work. Ten diploma students followed their 4 months special practical training program at the PGRC. In addition, 6 groups of teachers, 8 groups of farmers and another 21 groups from different institutes were attended for awareness programs conducted by the Exploration unit.

PLAN FOR 2013

- Continuation of exploration and collection of Plant Genetic Resources
- Processing and conservation of seed materials received from exploration and collection unit
- Maintenance of perennial crop germplasm
- *In vitro* conservation of plant genetic resources
- Continuation of exchange of germplasm
- Continuation on experiments on viability of conserved germplasm
- Characterization, multiplication and rejuvenation of plant genetic resources
- Continuation of database management of PGR
- Continuation of pre-breeding activities
- Molecular characterization of PGR and identification of desirable genes in different crop species
- DNA finger printing of PGR
- Genetic purity testing of varieties using molecular techniques
- Conducting public awareness programs on PGR conservation and management

STAFF LIST

Designation	No.
Deputy Director of Agriculture	01
Research Officer	10
Administrative Officer	01
Programme Assistant	02
Agriculture Instructor	03
Research Assistant	04
Research Sub Assistant	06
Public Management Assistant	08
Store Keeper	01
Peon	01
Driver	04
Lorry Cleaner	01
Tractor Driver	01
Electrician	03
Circuit Bungalow Keeper	01
Watcher	04
Cinema Machine Operator	01
Labourer (Grade II)	11
Labourer (Grade III)	05
Labourer (Contract)	22
Total	**90**

2.2 SEED AND PLANTING MATERIAL DEVELOPMENT CENTRE (SPMDC) – PERADENIYA

High quality seed and planting material are the most important inputs to increase the yield, quality of output and minimize unit production costs. The Seed and Planting Material Development Centre (SPMDC) plays a vital role in producing, distributing & marketing seeds and planting materials effectively and efficiently throughout the country. Production, distribution & marketing of basic seeds of all locally recommended crop varieties of Paddy, Other Field Crops, Vegetables, Potatoes and quality planting materials of Fruits and Vegetables are the main challenges faced by the SPMDC. The SPMDC has 19 seed farms under its purview to produce above basic seeds & certified planting materials. However, certified seeds of rice, other field crops and standard seeds of vegetable crops are produced through selected contract growers by 13 regional Assistant Director of Agriculture (seed) units dispersed in the country. The SPMDC, at present, operates its functions through above mentioned ADA (Seed) at regional level, under the guidance and monitoring of the Director (SPMFD) , Deputy Director (Paddy), Deputy Director (Vegetable & OFC), Deputy Director (Potato), Deputy Director (Horticulture) and Head Quarter Assistant Director of Agriculture. Mission of the SPMDC is to provide an assured supply of quality seed and planting material at competitive prices to the farming community of Sri Lanka. Production of basic and certified/standard seeds and certified Planting materials in government farms, supply of basic seeds to seed producers, multiplication of certified seeds through contract growers and supply for commercial cultivators, management of government farms, seed enterprise development and co-ordination, maintenance of buffer stocks of seed, co-ordination of seed and planting material supply are the major activities of the SPMDC.

Objectives:

- To ensure production, processing, storage and distribution of basic and certified seed and planting materials.
- To provide technical assistance and support for developing a seed and planting material industry in the stateand the private sector.
- To provide necessary training facilities and information on all aspects of seed and planting material to stakeholders.
- To achieve the seed and planting material security in the country
- The following activities were conducted during the year 2012, which include Maha 2011/12 and Yala 2012 seasons in order to fulfill the objectives of the centre.

BUDGET

Table 2.2.1: Annual budget – 2012 (Rs. million)

Vote /Project	Allocation	Expenditure	Expenditure %
Normal Capital	40.9	33.7	82
Normal Recurrent	51.4	44.3	86
Seed Production & Purchasing	432.0	421.5	98
Community Based Seed Production	6.0	4.7	78
Maize Hybrid Seed Production	0.78	0.65	83
Re-Activation of the Govt.seed farms at Paranthan & Murunkan (JAICA)	77.21	62.5	81
Accelerated Seed Farm Development	236.0	215.7	91
Total	**844.29**	**783.1**	**93**

PROGRESS

PRODUCTION & SUPPLY OF SEED PADDY

Basic seed paddy production and Certified seed paddy production in government seed farms- 2012

Foundation seed paddy (FSP) and registered seed paddy (RSP) of 25 recommended rice varieties were produced in ten government seed farms. Foundation seeds were produced using breeder seeds supplied by the Rice Research and Development Institute (RRDI), Batalagoda, Regional Agricultural Research and Development Centre (RARDC), Bombuwala, Rice Research Station (RRS), Ambalantota and Agricultural Research Station (ARS), Labuduwa. Production of Registered seed paddy in year 2012 was 126273 bu. (2588.6 mt.) and it was 12% increased over the year 2011. Also certified seed paddy (CSP) was produced at seed farms of SPMDC utilizing the rice fields, which were not used for basic seed paddy production. Together with the quantity of downgraded seed paddy from the basic seed production programme, the total quantity of CSP produced in farms during the year 2012 was 9488 bu (194.5 mt.).

Table 2.2.2: Basic Seed Paddy Production in government seed farms during 2012

	2011/12 Maha			2012 Yala			Total		
Farm	**FSP**	**RSP**	**CSP**	**FSP**	**RSP**	**CSP**	**FSP**	**RSP**	**CSP**
Aluttarama	14.23	114.23	13.37	8.84	100.16	33.83	23.07	214.39	47.20
Malwatte	10.48	190.61	7.18	1.89	123.88	18.86	12.37	314.49	26.04
Polonnaruwa	15.97	431.67	0.39	19.21	255.59	0	35.18	687.26	0.39
Bata-Atha	0	22.84	5.78	4.72	49.0	6.97	4.72	71.84	12.75
Ambalantota	2.07	93.40	14.27	0	0	0	2.07	93.40	14.27
MI	18.90	420.76	25.83	10.68	92.56	0	29.58	513.32	25.83
Kantale	9.14	210.0	0	10.25	218.53	0.1	19.39	428.53	0.1
Murunkan	1.52	107.99	7.75	0	0	0	1.52	107.99	7.75
Paranthan	5.84	98.40	8.02	3.81	41.45	0	9.65	139.85	8.02
Karadiyanaru	0	0	0	0	17.53	52.15	0	17.53	52.15
Total (mt.)	**78.15**	**1689.9**	**82.59**	**59.4**	**898.7**	**111.91**	**137.55**	**2588.6**	**194.5**
Total (bu.)	**3812**	**82434**	**4029**	**2898**	**43839**	**5459**	**6710**	**126273**	**9488**

Certified seed paddy production through contract seed production programme – 2012

Certified seed paddy production was done by contract growers. Under this programme, SPMDC had a target to purchase 90,000 bu. in the year 2012. (Maha 2011/12 60000 bu, Yala 2012 30000 bu). During Maha 2011/12. due to favourable weather conditions and comparatively high purchasing price offered by DOA 60366 bu (1237.5 mt) of CSP was purchased while in yala 2012, due to the drought conditions prevailed throughout the island, only 3917 bu of CSP was able to be purchased. The total annual purchasing of CSP, as shown in Table 2.2.3 (i) by 9 ADA regions was 64283 bu. which was 71% achievement of the target.

Table 2.2.3 (i): Quantity of certified seed paddy purchased under contract growing programme-2012

ADA Region	Quantity Purchased			
	2011/12 Maha (mt.)	2012 Yala (mt.)	Total (mt.)	Total (bu.)
Ampara	168.1	0	168.1	8200
Aluttarama	129.9	27.4	157.3	7673
Bata-Atha	174.2	0	174.2	8498
Polonnaruwa	40.8	0	40.8	1990
Kantale	92.1	0	92.1	4493
Vavuniya	0	4.8	4.8	234
Kilinochchi	33.3	27.2	60.5	2951
MI	156.2	3.4	159.6	7785
Nikawaratiya	97.7	10.4	108.1	5273
Palwehera	345.2	7.1	352.3	17185
Total	**1237.5 mt.**	**80.3 mt.**	**1317.8 mt.**	
	60366 bu.	**3917 bu.**		**64283 bu.**

Emergency seed paddy (ESP) supply Programme-2012

On a special programme to supply 289,666 bu. of seed paddy for Maha 2012/13 as a relief for the drought affected farmers in Yala 2012, SPMDC contributed in supplying 161760 bu. of seed paddy for this programme as 84416 bu. of ESP , 42847 bu of RSP and 34497 bu of CSP. The private sector supplied the rest of the requirement.

Table 2.2.3 (ii): Quantity of Emergency seed paddy purchased -2012

ADA Region	Quantity Purchased		
	2012 Yala (mt.)	Total (mt.)	Total (bu.)
Ampara	291.5	291.5	14218
Aluttarama	189.1	189.1	9224
Polonnaruwa	319.6	319.6	15590
Kantale	558.9	558.9	27104
Vavuniya	104.8	104.8	5114
Kilinochchi	42.9	42.9	2094
MI	84.9	84.9	4142
Nikawaratiya	80.3	80.3	3917
Palwehera	61.8	61.8	3013
Total	**1733.8 mt.**	**1733.8 mt.**	**84416 bu.**

To increase the use of quality seed paddy in commercial cultivations, SPMDC has conducted a collaborative quality seed production programme with the participation of several agencies including private sector organizations. Under this programme, RSP was issued to the relevant agencies. The resulting crops and the seed were certified by the Seed Certification Service (SCS) of the Department of Agriculture (DOA).

Furthermore, RSP was also issued to farmers under the secondary seed paddy production programmes to enhance the production of quality seed paddy.

Quantities of certified seed produced by various public and private sector organizations are given in Table 2.2.4 .The actual quantity produced by the private sector was higher than the amount given because some companies did not participate in the official seed certification programme as they used their own quality control systems. During the year 2012, quantity of CSP produced under the official certification programme was around 14,523 metric tons (708,709 bu.) (Table 2.2.4) which was equivalent to 12 % of the total seed paddy requirement of the country. However together with ESP supply, the total seed paddy supply for commercial paddy cultivation was 911,564 bu, which is 15.43% of the total requirement of the country. Supplying of certified seed paddy over 15 % of the national requirement is considered a satisfactory situation.

Table 2.2.4: Collaborative Certified Seed Paddy Production Programme-2012

Institute	2011/12 Maha		2012 Yala		Year 2012		Production	
	Qty. of RSP issued by DOA (mt.)	Extent Certified (Ac.)	Qty. of RSP issued by DOA (mt)	Extent Certified (Ac.)	Qty. of RSP issued by DOA (mt.)	Extent Certified (Ac.)	mt.	bu.
DOA	78.5	1916	13.65	333	92.2	2249	1317.8	64283
Province	128.5	1512	34.4	598	162.9	2110	2970	144895
IP	36.5	430	27.1	471	63.6	901	1090	53200
Agrarian Ser.	25.6	301	1.0	17	26.6	318	508	24798
Mahaweli	14.0	165	2.5	43	16.5	208	305	14919
Cooperatives	7.6	89	6.9	120	14.5	209	244	11951
Farmer Org.	106.5	1253	74.4	1293	180.9	2546	3115	151980
Individual Farmers	150.6	1765	61.6	1070	212.2	2835	3772	184042
Private Companies	26.6	313	37.1	645	63.7	958	1041	50828
Other	7.62	90	0.92	16	8.54	106	160	7813
Total	**582.0**	**7834**	**259.5**	**4606**	**841.5**	**12440**	**14523**	**708709**

Issue of Seed Paddy

In 2012, total seed paddy issued by the DOA for seed production and commercial cultivation is given in Table 2.2.5. Foundation seeds produced from breeder seeds in the previous season was used to produce registered seed in government seed farms. Registered seed was supplied to the contract growers as well as to private seed growers including private sector organizations to produce certified seeds. During 2012, total supply of registered seed was 1588.94 mt. (77,509 bu). Supply of Certified seed paddy was 1001.9 mt. (48,874 bu).

Table 2.2.5: Quantities of Seed Paddy Issued by the DOA (mt)-2012

Season	Program	Foundation	Registered	Sub Total	Certified	Grand Total	
						mt.	bu.
2012 Yala	Farm	33.72	3.94	37.66	0	37.66	1837
	Cont. Growing	2.34	13.65	15.99	3.38	19.37	945
	Private	8.86	267.09	275.95	40.12	316.07	15418
	Extension	0.18	486.42	486.60	262.54	749.14	36543
	Sub Total (mt.)	45.10	771.10	816.20	306.04	1122.24	
	Sub Total (bu.)	2200	37615	39815	14929		54744
2012/13 Maha	Farm	39.8	6.17	45.97	106.72	152.69	7448
	Cont. Growing	0	28.97	28.97	0	28.97	1413
	Private	5.8	168.3	174.10	12.22	186.32	9089
	Extension	1.31	1492.76	1494.07	1390.84	2884.91	140727
	Sub Total (mt.)	46.91	1696.2	1743.11	1509.78	3252.89	
	Sub Total (bu.)	2288	82741	85030	73648		158678
Issues for the year 2012	Farm	73.52	10.11	83.63	0	83.63	4080
	Cont.Growing	2.34	42.62	44.96	3.38	48.34	2358
	Private	14.66	435.39	450.05	52.34	502.39	24507
	Extension	1.49	1979.2	1980.7	1653.4	3634.0	177273
	Sub Total (mt.)	**92.01**	**2467.3**	**2559.3**	**1709.12**	**4268.45**	
	Sub Total (bu.)	**4488**	**120357**	**124845**	**83372**		**208217**

Production and Distribution of Seeds of Other Field Crops in Year 2012

Thirty three varieties of twelve Other Field Crops were used to produce four different classes of seeds (Foundation, Registered, Certified and Commercial seeds) during year 2012.

Basic seed (Foundation and Registered seeds) production in Year 2012

Total quantities of Foundation seed produced during this year in Government seed farms and registered seed produced under Government farms and contract seed farms are given in Table 2.2.6. In this year total basic seed (Foundation and Registered), production was 70,750 kg , and it is 17.25% lower than that of

the previous year (85520 kg.). This is mainly due to the effect of the adverse weather conditions experienced throughout the year on several contract grown crops. Due to the availability of sufficient amount of the buffer stocks of Soybean seed (25000 kg) low production targets were set .under contract program. Big Onion seed production was started in Govt. seed farm MI for the first time.

Certified Seed production

Certified seeds of OFC were mainly produced through the contract seed farms. However, hybrid seed of Maize variety "Sampath" was mainly produced in Government Seed farms at Maha Illuppallama, Alutharama and Bata Atha. Total amount of certified seed production increased 38% over year 2011 and reached 443.12 mt. (Table 2.2.7.) is mainly due to expansion of contract programme of Blackgram, Chilli,, Groundnut, Cowpea, Sesame and Maize (OPV) seed during this year. However, targeted amount of Soybean seed under contract production was not purchased because of the availability of sufficient buffer stocks. A limited quantity of commercial seeds of green manure crop sunhemp was also produced for the use in government seed farms and research stations as a green manure crop.

Issue of OFC seeds during Year 2012

The amount of Basic (Foundation and Registered) and certified seed issued during year 2012 is given in Table 2.2.8. Total seeds of OFC issued during year 2012 was around 551.64 mt, which is more than twice the issue of the previous year (268.73 mt.). This significant achievement in supply of OFC seed facilitated increasing supply of seed to the national crop enhancement programme of OFC started in year 2012.

Table 2.2.6: Basic Seed Production (kg) of OFC– Year 2012

Crop	Foundation			Registered						Total Basic Seed Production
	Seed Farm			Seed Farm			Contract Programme			
	2011/12 Maha	2012 Yala	Total	2011/12 Maha	2012 Yala	Total	2011/12 Maha	2012 Yala	Total	
Blackgram	304	692	996	693	843	1536	3884	3083	6967	9499
Chilli seeds	243	720	963	0	0	0	0	0	0	963
B. Onion	68	0	68	0	0	0	0	0	0	68
Cowpea	2054	277	2331	3614	885	4499	2601	1564	4165	10995
Sesame	0	107	107	387	218	605	170	453	623	1335
Greengram	973	1130	2103	1255	621	1876	2083	3062	5145	9124
Groundnut	400	522	922	1672	87	1759	1653	2042	3695	6376
Fingermillet	968	213	1181	2151	375	2526	1806	0	1806	5513
Maize (OPV)*seeds	866	2048	2914	3376	1620	4996	9315	8370	17685	25595
Soybean	146	482	628	654	0	654	0	0	0	1282
Total	**6022**	**6191**	**12213**	**13802**	**4649**	**18451**	**21512**	**18574**	**40086**	**70750**

*****OPV= Open pollinated varieties

Table 2.2.7: Certified OFC Seed Production (kg) in Govt. Seed Farms and Under Contract Growing-2012

Crop	Contract Programme							Seed Farm							Grand Total
	2011/12 Maha		Total	2012 Yala		Total	Sub Total	2011/12 Maha		Total	2012 Yala		Total	Sub Total	
	Cer.	Com.		Cer.	Com.			Cer.	Com.		Cer.	Com			
Blackgram	52113	168	52281	12827	5471	18298	70579	544	0	544	0	0	0	544	71123
Chilli Seed	0	0	0	942	8701	9643	9643	59	0	59	167	0	167	226	9869
Cowpea	10921	333	11254	6378	4969	11347	22601	272	0	272	116	27	143	415	23016
Sesame	512	48	560	3583	923	4506	5066	156	55	211	245	0	245	456	5522
Greengram	27933	1679	29612	107903	2525	110428	140040	0	0	0	0	0	0	0	140040
Groundnut	12511	14169	26680	31258	61294	92552	119232	0	0	0	1105	0	1105	1105	120337
Fingermillet	297	0	297	0	0	0	297	323	0	323	0	0	0	323	620
Maize (OPV)*Seeds	31037	8000	39037	15556	0	15556	54593	0	0	0	0	0	0	0	54593
Maize(Sampath) seeds	0	0	0	0	0	0	0	3189	0	3189	502	0	502	3691	3691
Soyabean	0	0	0	7691	6214	13905	13905	0	0	0	0	0	0	0	13905
Sunhemp	0	0	0	0	0	0	0	0	230	230	0	125	125	355	355
Sesbania rostrata	0	0	0	0	0	0	0	0	50	50	0	0	0	50	50
Total	**135324**	**24397**	**159721**	**186138**	**90097**	**276235**	**435956**	**4543**	**335**	**4878**	**2135**	**152**	**2287**	**7165**	**443121**

Table 2.2.8: Issue of OFC seeds (kg) during year 2012

Crop	2012 Yala (kg)						2012/13 Maha (kg)						Year 2012 (kg)					
	Br.	Fou./ Basic	Reg.	Cer./Std.	Com.	Total	Br.	Fou./ Basic	Reg.	Cer./Std.	Com.	Total	Br.	Fou./ Basic	Reg.	Cer./Std.	Com.	Total
Blackgram	66.8	401	3291	13527	2899	20185	73	412	6300	23222	2217	32224	140	813	9591	36749	5116	52409
Chilli	11.95	79	0	3523	0	3614	1	57	0	2996	0	3054	13	136	0	6519	0	6668
Cowpea	72.1	486	1651	11788	878	14875	12	820	2767	13154	643	17396	84	1306	4418	24992	1521	32271
Sesame	0	16	1464	2109	484	4013	0	41	379	2239	698	3357	0	57	1843	4348	1182	7430
Greengram	62	441	4209	55773	19568	80053	75	160	6725	96000	31344	134304	137	601	10934	151773	50912	214357
Ground nut	159.05	857	4339	24405	26337	56097	226	463	2843	13259	46898	63689	385	1320	7182	37664	73235	119786
Fingermillet	3.75	14	68	366	134	586	9	82	2408	627	862	3988	13	96	2476	993	996	4574
Maize (OPV)	40	807	3671	6117	0	10635	40	479	15353	46612	4763	67247	80	1286	19024	52729	4763	77882
Maize (Hybrid)	0	0	0	318	0	318	0	0	0	623	0	623	0	0	0	941	0	941
Soyabean	63	75	4822	22292	0	27252	0	158	796	6053	250	7257	63	233	5618	28345	250	34509
Sunhemp	0	0	0	0	525	525	0	0	0	0	295	295	0	0	0	0	820	820
B.Onion	0	2	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	2
Total	**479**	**3178**	**23515**	**140218**	**50825**	**218215**	**436**	**2672**	**37571**	**204785**	**87970**	**333434**	**915**	**5850**	**61086**	**345003**	**138795**	**551649**

PRODUCTION AND SUPPLY OF VEGETABLE SEEDS - 2012

Basic seed production

There are 55 DOA recommended varieties in 18 vegetable crops grown in the country. Production of basic seed of some varieties was carried out in seven government seed farms (Table 2.2.9). Total quantity produced in 2012 was almost twice that of year 2011 (3136.67 kg) which is mainly increase high production of Bean, Bushitavo, Amaranthus and Winged bean.

Table 2.2.9: Basic Vegetable Seed Production in Government Farms -2012

Crop	Quantity Produced (kg)		
	2011/12 Maha	2012 Yala	Total
Bean	3227.0	969.0	4196.0
Bittergourd	_	5.9	5.9
Brinjal	19.2	18.7	37.9
Bushitavo	_	267.7	267.7
Mea	197.1	_	197.1
Okra	356.7	_	356.7
Snakegourd	51.1	16.2	67.3
Wingedbean	172.0	126.0	298.0
Tomato	10.0	25.0	35.0
Amaranthus	198.9	289.4	488.3
Luffa	183.8	39.1	222.9
Cucumber	-	0.8	0.8
Sweet melon	_	28.5	28.5
Spinach	_	11.6	11.6
Total	**4415.80**	**1797.90**	**6213.70**

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 2.2.10. The total production in Year 2012 was also higher (around 2.56 times) than that of the previous year (16785.5 kg) which was a similar trend as in basic seed production. Higher production in contract growing was mainly due to the higher quantity of bean seed purchased under the programme.

Table 2.2.10: Standard Vegetable Seed Production (kg) by DOA-2012

Crop	Farm Programme			Contract Programme			Grand Total
	2011/12 Maha	2012 Yala	Total	2011/12 Maha	2012 Yala	Total	
Bean	24.5	_	24.5	21521.5	_	21521.5	21546.0
Bittergourd	46.3	100.9	147.2	99.0	3364.0	3463.0	3610.2
Brinjal	37.4	234.7	272.1	69.0	_	69.0	341.1
Bushitavo	3.6	94.2	97.8	1047.5	783.0	1830.5	1928.3
Capsicum	177.9	488.0	665.9	_	30.4	30.4	696.3
Cucumber	55.1	_	55.1	32.2	118.1	150.3	205.4
Luffa	426.8	_	426.8	_	665.0	665.0	1091.8
Mae	874.2	170.0	1044.2	3082.8	861.0	3943.8	4988.0
Okra	544.7	902.9	1447.6	269.1	184.2	453.3	1900.9
Spinach	85.3	150.0	235.3	43.6	_	43.6	278.9
Snakegourd	133.6	393.5	527.1	160.5	861.5	1022.0	1549.1
Tomato	245.6	120.9	366.5	_	_	_	366.5
Wingedbean	666.3	_	666.3	234.4	2926.8	3161.2	3827.5
Raddish	186.5	_	186.5	192.8	100.0	292.8	479.3
Total	**3507.8**	**2655.1**	**6162.9**	**26752.4**	**9894.0**	**36646.4**	**42809.3**

Hybrid Vegetable Seed Production

F1 hybrid seeds of one Brinjal variety and two tomato varieties were produced successfully in seed farms (Table 2.2.11). Brinjal was produced in Kundasale, Ambepussa and Alutharama while tomato was produced only in Kundasale farm. Production of F1 seeds of both crops were much higher than that of year 2011.

Table 2.2.11: Hybrid Vegetable Seed Production in Govt. Farms (kg)-2012

Crop	2011/12 Maha	2012 Yala	Total
Tomato	15.615	6.8	22.415
Brinjal	49.150	31.5	80.650
Total	**64.77**	**38.3**	**103.07**

Vegetable Seed Distribution

Vegetable seeds were distributed through the DOA sales outlets and registered dealer network. These dealers include Agrarian Service Centres (ASCS), Cooperative societies, Farmer organizations, Provincial DOA and private registered seed merchants. Quantities of vegetable seeds supplied by DOA are given in Table 2.2.12.

Supply of Standard seed in 2012 was much higher when compared to the year 2011, where as supply of Basic seed was slightly higher in

2012. Supply of standard vegetable seed during year 2012 was increased to accomodate requirements of Divi-Naguma programme. Further, overall supply is remarkably higher than that of the year 2011.

Table 2.2.13: Vegetable Seed Supplied by DOA – 2012 (kg)

Crop	Basic			Standard			Grand Total
	2012 Yala	2012/13 Maha	Total	2012 Yala	2012/13 Maha	Total	
Bean	448.40	1261.00	1709.40	1027.80	3936.00	4963.80	6673.20
Bittergourd	38.48	70.90	109.38	2780.40	289.10	3069.50	3178.88
Brinjal	2.43	3.78	6.20	338.40	458.44	796.84	803.04
Bushitavo	208.50	224.50	433.00	2278.25	2204.20	4482.45	4915.45
Capsicum	7.65	5.20	12.85	147.30	295.00	442.295	455.15
Cucumber	3.35	5.85	9.20	341.91	257.20	599.11	608.31
Luffa	13.00	58.30	71.30	950.40	431.10	1381.50	1452.80
Mae	72.50	101.50	174.00	1783.60	1272.60	3056.20	3230.20
Okra	140.90	167.70	308.60	2101.85	96.65	2198.50	2507.10
Pumpkin	4.90	0	4.90	1.00	4.50	5.50	10.40
Raddish	10.25	55.00	65.25	1571.39	270.95	1842.34	1907.59
Snakegourd	44.65	103.80	148.45	1650.40	284.60	1935.00	2083.45
Spinach	1.30	1.30	2.60	18.95	34.80	53.75	56.35
Sweet Melon	0.25	0.95	1.20	17.50	13.00	30.50	31.70
Tomato	4.84	4.79	9.63	314.60	62.00	376.60	386.23
Wingedbean	44.80	156.30	201.10	3644.10	1036.90	4681.00	4882.10
Amaranthus	1.35	1.00	2.35	7.00	0	7.00	9.35
Total	**1047.54**	**2221.87**	**3269.40**	**18974.85**	**10947.04**	**29921.89**	**33191.29**

Supply of Vegetable Seed Home Gardening packs for Divi Naguma Programme

Over 1.1 million packs with 10 crops were supplied for the Divi –Naguma programme during year 2012.

Table 2.2.12. Supply of Vegetable Seed Home Gardening Packs for Divi –Naguma Program-2012

Month	No. of Packs Issued
April-2012	100,000
October-2012	1,002,408
Total	**1,102,408**

PRODUCTION AND ISSUES OF SEED POTATO IN 2012

The production of Pre-basic (G0), Basic (G1, G2, G3) and Certified seed of variety Granola were 1.5 mt., 82.29 mt. and 13.44 mt. respectively during the 2011/12 Maha season. Production of Basic and Certified seeds of variety Desiree were 6.48 mt., 0.8 mt. (Table 2.2.13).

The production of Pre-basic, Basic and Certified seeds of variety Granola, during 2012

Yala were 6.710 mt., 295.92 mt. and 127.64 mt. respectively. The total quantity of seeds produced in year 2012 was 534.0 mt. (Table 2.2.13 & 2.2.14)

Although, the target could not be achieved due to the drought prevailed during 2012 yala season, the production is 1.5% higher than that of year 2011. Comparatively a higher percentage of consumption potato was received due to the Tuber Moth attack which could not be controlled due to the drought.

The quantity of seeds issued for seed producers in year 2012 was 443.9 mt. (Table2.2.15).

2.2.13: Production of Pre-basic (Go) and Basic (G1, G2 & G3) seed potato (mt) during year 2012

Variety	Pre-Basic Seed			Basic Seed		
	2011/12 Maha	2012 Yala	Total	2011/12 Maha	2012 Yala	Total
Granola	1.501	6.710	8.211	82.291	295.926	378.217
Desiree	_	_	_	6.481	_	6.481
Total	**1.501**	**6.710**	**8.211**	**88.772**	**295.926**	**384.698**

Table 2.2.14: Production of Certified Seed Potato (mt) during year 2012

Variety	2011/12 Maha	2012 Yala	Total
Granola	12.641	127.646	140.287
Desiree	0.802	_	0.802
Total	**13.443**	**127.646**	**141.089**

Table 2.2.15: Seed Potato Supplied by DOA (MT) during year 2012

Variety	2012 Yala	2012/13 Maha	Total
Granola	93.9	350.0	443.9

PRODUCTION & SUPPLY OF PLANTING MATERIAL IN 2012

Planting material production programs were implemented under Farm Advanced Account.

Quality planting material production programmes were practiced in 20 DOA farms which fulfilled the national requirement of planting material.

547,019 plants were produced & 230,895 plants were distributed during year 2012. Vegetable community pots were produced on request of vegetable growers (Table 2.2.16).

Already prepared about 250000 Mango & Rambutan root stocks for budding & grafting.

Table 2.2.1.6: Production and Supply of Planting Material in DOA Farm in 2012

Crop	Prod.	Issues
Budded Plants		
Avacado	14693	10556
Belifruit	1149	853
Durian	13040	8258
Guava	4514	26
Wood Apple	2719	1471
Jack	12891	8410
Ugurassa	966	712
Lime	2427	1525
Mango	173857	43508
Mandarine	2992	2769
Jambu	2451	1426
Orange	18692	23979
Rambutan	49121	44656
Anoda	1868	712
Sapadilla	2145	1383
Starfruit	2563	1337
Mangustin	139	121
Pears	1915	1072
Apple	161	154
Peaches	100	62
Other	2663	2437
Sub Total	**311066**	**155427**
Rooted Cuttings		
Grapes	758	99
Jambu	2418	1784
Permogranate	1565	2024
Lemon	2252	2024
Lime	13	05
Guava	04	04
Pears	835	0
Dragonfruit	2760	0
Granadilla	1817	0
Other	9432	8138
Sub Total	**21854**	**14078**
Seedlings		
Amberalla	14600	4252
Starfruit	3544	916
Papaya	5456	3873
Permegranate	30479	10869
Guava	5242	1903
Kathuru murunga	4456	1953
Miti murunga	3846	9273
Mangustin	2010	606
Lime	23512	15017
Nelli	2367	584
Anoda	4063	1478
Passion Fruit	7794	2694
Other	106730	7972
Sub Total	**214099**	**61390**
Grand Total	**547019**	**230895**
Vegetable pots	60483	59564

2.2.1.7 Production of other commodities

Product	Quantity
Fruits (kg)	
Banana	21384
Mango	9311
Papaya	1335
Grapes	80
Pine-apple	4712
Guava	138
Rambutan	52
Pomagranate	28
Pears	227
Orange	14
Animal Products	
Milk(L)	22950
Curd(Pots)	6098
Compost (mt.)	458
Consumption Paddy(kg)	20598
Consumption Potato(kg)	138941
Consumption Vegetable(kg)	34701

Product	Quantity
Consumption OFC (kg)	
Maize	3192
Maize green cobs (nos.)	2916
Dry chilli	381
Greengram	1064
Cowpea	1815
Sesame	479
Soyabean	127
Fingermillet	1251
Blackgram	307
Groundnut	3280
Other	
Cassava (kg)	11150
Amberalla (kg)	84
Coconut (nuts)	47529
King coconut (nuts)	3317
Aricanut (nuts)	13785
Banana plants (nos.)	1225

Performance of the Advance Accounts in 2012

The 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 2.2.18.

Table 2.2.18: Performance of the Advance Accounts

Farm	Income (Rs.)	Expenditure (Rs.)	Profit / Loss (Rs.)
Aluttarama	34,949,002	45,364,818	-6,201,412
Ambalantota	7,490,793	9,661,727	1,398,739
Bataatha	9,988,140	36,689,309	-22,298,515
Kantale	30,077,878	21,520,838	9,004,137
Maha-Illuppallama	54,261,726	60,029,122	5,758,950
Malwatte	24,825,192	28,341,727	1,421,550
Polonnaruwa	47,991,732	43,811,034	11,358,036
Ambepussa	9,981,503	15,735,208	5,035,640

Farm	Income (Rs.)	Expenditure (Rs.)	Profit / Loss (Rs.)
Kundasale	16,728,587	19,157,851	3,251,500
Middeniya	1,850,873	15,413,367	-10,931,573
Piduruthalagala	29,516,750	19,535,791	7,112,178
Sita Eliya	19,324,869	25,076,434	-2,645,657
Uderadella	25,421,936	11,932,435	11,713,457
Meepilimana	12,473,766	12,847,431	1,596,189
Karadiyanaru	7,170,482	9,493,464	1,338,286
Kandapola	17,868,623	12,452,497	4,238,065
Murunkan	6,885,220	3,863,897	1,433,647
Paranthan	9,511,017	8,550,472	2,620,635
Total	**366,318,089**	**399,477,422**	**67,281,009**

Despite extreme weather conditions throughout the period, thirteen farms managed to make profits.

- Improvement of seed distribution through opening of new seed sales centres.

PLAN FOR 2013

- Continuation of Infrastructure Development activities under farm Development such as land Development, development of Irrigation facilities, increasing availability of machineries and agricultural infrastructure, paving way for the high productivity in seed farms and enhancing the production of basic seeds.
- Strengthening of contract seed production programme and increasing the certified seed production of paddy, OFC and vegetable.
- Contribution in supplying of 40% of vegetable seed packs and planting material for the Divinaguma National Programme in 2013.

STAFF LIST

Designation	No.
Director	01
Agricultural Officer	28
Accountant	01
Agricultural Instructor	136
Farm Machinery Instructor	01
Ag. Monitoring Officer	03
Programme Assistant	02
Administrative Officer	02
Management Assistant	83
Farm Clerk	16
Driver	36
Tractor Operator	36
Electrician	02
Machine Operator	08
Mason	01

Designation	**No.**
Carpenter	03
Budder	24
Curcuit Bunglow Keeper	04
KKS	05
Storeman	21
Watcher	59
Lorry Cleaner	10
Special store labour	02
Sanitary Labour	04
Labour (Grade iii)	351
Total	**839**

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 and memoranda of understanding, and working groups.

BUDGET

Table 2.3.1: Annual Budget - 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	1,584,770	1,497,865	95
Recurrent	2,960,913	309,1818	99
NARP Project	2,552,990	693,117	27
TRIVSA Project	183,565	182,088	99
Total	**7,282,238**	**5,464,888**	**75**

PROGRESS

SOCIO ECONOMIC RESEARCH

Fourteen Socio economic research studies were conducted and seven studies have to be continued in the year 2013. In addition to Cost of Cultivation Studies, four Socio-economic research studies such as Study on farmer's perception and decision on recommended rice varieties adoption in Sri Lanka, Evaluation of productive efficiency of rice farming in Sri Lanka, A study on agricultural productivity and Situation review of potato sector in Sri Lanka were completed into the stage of initial drafts of reports. Other seven Socio-economic research studies such as Total factor productivity decomposition of rice cultivation of Sri Lanka, Intensification and diversification of rice cultivation in Sri Lanka, Assessment of wildlife risk on food crop production, Assessment of social capital and willingness to accept rice technologies, and Farm level evaluation of preference for attributes of Sampath hybrid were continued for the year 2013.

Studies on Cost of Cultivation

The data of Cost of Cultivation Studies include average yield, gross and net returns, total and

unit cost of production and farm gate price. 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. Steps were taken to expedite cost of cultivation study series that were lagging behind the schedule mainly due to transport problems caused by breaking down of vehicles and inadequacy of funds. Cost of cultivation studies of Maha 2010/11 and 2011 Yala were published and Maha 2011/12 study was in the final stages of completion at the end of the year. Field survey of 2012 Yala was begun but the study progress was hampered due to inadequacy of allocations on fuel and adverse weather conditions prevailed during latter part of the year that made field travelling very difficult. Provisional reports were prepared from a subsamples for limited circulation in English and Sinhala languages of the studies for 2011 Yala , 2011/12 Maha and 2012 Yala.

Adaptability of rice to stress prone environments

A study was conducted to evaluate the effects of varieties and technologies for stress prone environments on rice yield, farmer income, and poverty. The average rice yields in Maha and Yala seasons in the surveyed stress-prone villages are 2.7 t/ha and 2.5 t/ha, respectively. These are lower than the national averages of 4.6 t/ha and 4.4 t/ha for the maha and yala seasons, respectively. This indicates that varieties tolerant of biotic and abiotic stresses could be important in raising rice yield in these stress-prone environments. Improved technologies could increase average household income by Rs. 15,300 – 31,750,depending on the amount of yield increase. This amount of income gain can be transformed into a reduction in the incidence of poverty by 4-8%. Improved technologies can potentially lift 3,000-24,000 poor rice farmers above the poverty line. This estimate includes the direct impact on poor farmers, and additional indirect impact will be generated through lower prices that benefit poor consumers. Given the dominance of some of the Bg varieties that are locally adopted and have desired grain quality, a strategy to develop farmer-acceptable higher yielding varieties rapidly is necessary to incorporate the new traits from GSR materials into the Bg parent varieties. This approach can be effective in generating farm-level impact rapidly.

Rice Variety adoption in Sri Lanka

To sustain the productivity growth of rice, it is important that the rice breeding program of Sri Lanka continues to improve rice varieties that best adapted to Sri Lankan conditions. A study was conducted to analyze the current investments in rice research and to estimate cultivar-specific adoption under improved varieties using expert estimation and survey method. A researcher survey was conducted to analyze investment in rice research in different eco systems by measuring total scientific time devoted for research. This was reported in Full-Time Equivalent basis (FTE). Results of expert panel elicitations were compared with the findings of the survey on cultivar specific rice variety adoption in Sri Lanka for integrity. The results revealed that, most of research investment spent on Wet Zone rice production than the Dry and Intermediate eco systems. Dry and Intermediate rice cultivation has almost reached its climax of production and productivity. Therefore, a need is raised to exploit the potential gains from Wet Zone rice

cultivation. The expert panel estimation of varietal spread in Sri Lanka was comparable with the survey findings resulting the same pattern of variety adoption. Bg 352 reported as the most popular variety having a spread of 20 percent of area under national cultivation. Hence, the policy makers, breeders as well as farmers are informed well in advance of the adoption of rice varieties for strategic decision making enabling efficient resource allocation.

PRODUCTION AND MARKETING STUDIES

The SEPC was involved in five production and marketing studies and two of them were completed initially to draft report stage; (a) Analysis of marketing margins of rice industry in Sri Lanka;(b) Economic evaluation profitability of green gram cultivation of Sri Lanka. Three studies;(a) Evaluation of potato seed production programme of Agricultural Research Station, SeethaEliya; (b) Export market performance of agro-food industries in Sri Lanka; and (c) A study on production and marketing of maize were continued for the year 2013.

Financial evaluation of profitability of green gram cultivation in mid season in the Hambantota district

In the year 2011 in Sri Lanka, the annual national extent brought under green gram cultivation was 9355 ha, national production was 10838 tons, and imports constituted 11515 metric tons. Mahinda Chinthana Vision for the Future – The Development Policy Framework of the Government of Sri Lanka plans to raise national annual production of green gram to 45,170 mt and reduce annual imports to 200 mt by the year 2015. The DOA and the Ministry of Agriculture have identified mid season (third season) green gram cultivation as a major strategy in raising national annual green gram production. Hamabantota district has shown a remarkable progress in green gram cultivation in mid season and extents in paddy fields exceeded 8000 hectares in the year 2011. This study was conducted to estimate the estimate financial viability of mid season green gram cultivation, and to identify factors favourably and unfavourably affecting expansion of mid season green gram cultivation in the district, and to generate feedback information relevant for future project designing and research. Three seed establishment methods recommended by the DOA and another 6 varieties of the above methods were adopted by farmers. The percentage extents of varieties grown were 30% of MI 5, 16% of MI 6, and 54% of 'Australian'seed. Even though seed was subsidized at 50% of cost to farmers, inadequate supply of recommended seed has caused higher percentages of farmers to use consumption seed supposed to be of Australian origin for cultivation. The seed rates used by farmers were 9 kg/ac of 'Australian'seed, 10.4 kg/ac for MI 5, and 8.3 kg/ac of MI6. Uniformity of 'Australian'seed received higher responses of farmer preference, whereas the MI varieties received higher farmer preference for disease tolerance. The MI varieties had higher average yields over the 'Australian' seed. The 'Australian' type received higher prices over the recommended varieties.

AGRICULTURAL POLICY STUDIES

Four policy analysis studies such as Economic impact of the trade policies on potato industry in Sri Lanka, Impact of trade liberalization of food crop sector in Sri Lanka, Return to research and development of maize in Sri Lanka, Contribution of 100 years of service of DOA for the development of farming community were initiated. The first three studies were continued for the year 2013. The last one was a collaborative study with Hector Kobbekaduwa Agrarian Research and Training Institute to which SEPC component was sent to the Principal Researcher.

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 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 regarding food security at national level. The SEPC produced eight monthly crop forecast reports during the year.

In Maha 2011/12 sown extent of paddy was reported as 774,828 ha and the production forecast was 3 million Mt and it was the highest ever reported during the past. Yala 2012 ended reporting paddy sown extent of 395,902 ha but nearly 48,000 ha of paddy lands were affected due to drought condition in the major paddy producing areas: especially, in Kurunegala, Batticaloa and Moneragala districts and Mahaweli system H. The production forecast adjusted for the drought damage was 1,213,671 Mt. With the high production in Maha 2011/12, the expected paddy production of year 2012 is 4.2 million Mt which is 12 % rise in production average of last 5 years (2007-2011). The cultivation progress of OFCs as a whole in Maha 2011/2012 was 135,724 ha and it is 57% rise in extent reported compared to previous Maha season. The cultivation extent of OFCs of Yala 2012 was 71,478 ha and 4,987 ha of total OFC cultivation have been affected due to drought in Yala 2012, especially in gingelly and soya bean. Still the production forecast of all OFC crops was higher than the previous *yala* except finger millet and gingelly.

PROJECT PLANNING, PREPARATION AND COORDINATION

The SEPC collected 31 Project proposals from various institutes / centers/unit of the DOA and submitted to the MOA for perusal with the treasury. The SEPC continued its coordination role by its officials coordinating (a) Organic manure production and utilization project; (b) Disciplinary working groups; (c) National Agricultural Production Plan for the DOA; (c) Farm Development Plan; (d) Implementation of memoranda of understanding. The SEPC was successfulin coordinating and obtaining approval for recruiting human resources for NARP projects.

Preparation of Market Driven National Food Production Plan OFC, Vegetables & Fruits 2013-2015

Mahinda Chinthana Vision for the Future – The Development Policy Framework of the Government of Sri Lanka has emphasized achieving national and household food and nutrition security in the country and plans to raise current annual growth rate of 4.5% in agriculture sector to 10%. Market price variability unfavorably affects farmers when prices are low and consumers when market prices are extremely high. Generally risk averse farmers are unable to derive benefits from high price situations since farmer level production is low in such circumstances. Accordingly, high price variability situations harm household food security of either farmers or consumers or both groups. Further, risks associated with high price variability acts in a vicious circle dissuading farmers from farming, and consequent production shortfalls invite high prices and subsequent food insecurity situations among poorer groups. In this context, the Ministry of Agriculture has laid high emphasis on achieving market price stability with prices fair for both farmers and consumers. Market Driven National Food Production Plan for Other Field Crops, Vegetables & Fruits is an effort to achieve price stability of farm commodities by transforming subsistence farming into commercial farming, leading agriculture into agribusiness, and farmers into farm-entrepreneurs. It focuses on increasing year-round crop production to cater the monthly food requirements matching with the recommendations of Medical Research Institute by minimizing the severe price fluctuations. The SEPC played a major role in preparing this plan in collaboration with the Ministry of Agriculture, and Hector Kobbakaduwa Agrarian Research and Training Institute.

National Agricultural Research Plan

The SEPC received funds for implementation of nine projects under National Agricultural Research Plan (NARP). Three research projects were terminated and 6 were continued for the year 2013.

Small Scale Project (TRIVISa)

The SEPC completed the Small Scale Project on Tracking Improved Varieties In South Asia (TRIVISA), a project implemented in collaboration with International Rice Research Institute.

AGRICULTURAL DATA MANAGEMENT

The SEPC continued to provide data for the DOA and clients outside of the DOA facilitating planning and research work.

Publishing AgStat -2012

Agstat 2012 (Volume VIII), a booklet on agricultural statistics comprising of salient features of information on food crop sector was complied and published in August-2012. The booklet 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 Enterprise Budget (Fruits and Floricultural Crops)

The enterprise budget for selected fruits crops (Orange, Lime, Banana, Passion fruit, Pineapple, Rambutan, Papaya, Cashew, Pomegranate, Dragon fruit , Pears,Mango and Durian) and floricultural crops (Anthurium, Alstromeria, Gebera, Carnation and Madona lily) were prepared and the document was at the stage of printinting at the end of the year. The budget includes benefit cost analysis of commercial cultivation of these crops adopting recommended technology. The latest economic information such as input quantities, costs, returns, benefit cost ratios and net present values have been given. The data are useful for entrepreneurs, farmers and policy makers when making production and marketing decision at the farm level and national level. The benefit cost ratio for cultivation of were 3.59 for orange, 2.25 for lime, 1.26 for banana, 1.92 for passion fruit, 4.40 for pineapple, 5 for rambutan, 1.30 for papaya, 1.9 for cashew, 6.6 for pomegranate, 16.74 for dragon fruit , 5.98for pears, 1.69 for mango, and 5.3for durian.

HUMAN RESOURCES AVAILABILITY AND DEVELOPMENT

An Additional Director and an Administrative Officer were added to the SEPC carder. An agricultural Economist was on study leave during the year pursuing his post-graduate program abroad and another Agricultural Economist was on leave for foreign employment. Six members of staff of the State Management Assistants participated in workshops on productivity improvement.

Training Programmes participated

- Ms C.Chandrasiri, Agricultural Economist, participated in a training programme on 'Grassroots Economic Development following Sufficiency Economic Philosophy', 25th June -3rd August 2012, Bangkok, Thailand, funded by TICA
- Dr. R.M. Herath, Agricultural Economist, participated in Rregional workshop on sampling for agricultural census and surveys, held in Thailand during 13.05.2012-18.05.2012
- Dr. R.M. Herath, Agricultural Economist, participated in the second meeting of Steering Group Agriculture Statistics , held in Thailand during 18.07.2012-20.07.2012
- Dr. R.M. Herath, Agricultural Economist, participated in the twenty forth session of the Asia and Pacific, held in Viet Nam during 05.10.2012-12.10.2012
- Mrs N.P.Liyanage, Agricultural Economist participated in a Training program on "Introduction to sampling and basic principles of sample selection with special reference to S & T research" held at SLAAS Head Quarters, Colombo on 15 July 2012
- Ms B.R. Walisinghe, AE, RRDI, Bathalagoda participated in a Workshop: TRIVSA (Tracking Improved Varieties in South Asia)

Project Planning workshop, KIIT, Bhubaneswar, Orissa, India, March 23-24, 2012 sponsored by International Rice Research Institute (IRRI), Philippines.

- Ms B.R. Walisinghe, AE, RRDI, Bathalagoda participated in a Workshop on - ARTNeT Conference on Empirical and policy issues of integration in Asia and the Pacific -2 November 2012, Hotel Galadari, Colombo, Sri Lanka sponsored by United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) and the Asian Development Bank (ADB).
- Mr. H.U.Warnakulasooriya, Additional Director attended a regional training workshop on on food security analysis of food consumption data collected in National Household Surveys, 23-27, 07, 2012, Bangkok, Thailand

Contribution of SEPC staff as coordinators/committee members

- Mr T.H.C.S Perera, Director SEPC worked as the coordinator for the DOA for National Agricultural Research Plan (NARP) that consisted 56 research projects.
- Mr. H.U.Warnakulasooriya, Additional Director worked as the Chairmen of the Price Committee of the DOA
- Mr. H.U.Warnakulasooriya, Additional Director worked as a Member of the National Advisory Committee on Trade Facilitation, Export Development Board
- Dr. R.M.Herath, Agricultural Economist worked as the Coordinator of the project: "Enhancement of utilization and production of organic fertilizer" funded by the Ministry of Agriculture Development and Agrarian Service and implemented by the Institutes and Centres of the DOA.
- Dr. R.M.Herath, Agricultural Economist worked as the coordinator of the disciplinary working group meetings of the DOA
- Dr. R.M.Herath, Agricultural Economist served as a member of rice development committee appointed by the Secretary, MOA
- Dr. R.M.Herath, Agricultural Economist served as the Secretary of Technology Release Committee of the DOA
- Dr. R.M.Herath, Agricultural Economist served as a member of steering group for Agricultural Statistics established by UNESCAP and FAO
- Dr. R.M.Herath, Agricultural Economist served as a member of project proposal evaluation committee of IFAD project

PLAN FOR 2013

Table 2.3.2: Total Number of Projects under Different Categories

Category	No.
Agricultural policy analysis	3
Environmental studies	1
Human resources development	2
Agric data management and Management Information supply	7
Project Formulation and evaluation	4
Production and marketing research	4
Socio Economic Research	10
Total	**31**

STAFF LIST

Designation	No.
Director	01
Addl.Director	01
Agricultural Economist	12
Agricultural Monitoring Officer	01
Economist Assistant	09
Programme Assistant	05
Agriculture Instructor	02
Management Asst Service	08
Driver	04
Labourer	03
K.K.S.	01
Total	**47**

3.1 EXTENSION & TRAINING CENTER (ETC) – PERADENIYA

The goal of the Extension & Training Division is to achieve highest level of productivity in the food crops sector to ensure food security of the country as well as to improve living standards of the farming community. Achievements of the division are focused on four main areas viz.extension, training, agricultural education and examination. Following activities are carried out to achieve the objectives of the division by respective units.

- Direct extension programmes under major irrigation schemes conducted by six inter-provincial units
- Collaborative extension programmes with provincial and Mahaweli areas.
- Conducting training programmes for extension staff, farmers, entrepreneurs and others at three in-service training centers, four District Agricultural Training Centers and Farm Mechanization Training Center.
- Conducting two-year diploma course in agriculture at the Schools of Agriculture Kundasale, Pelwehera, Angunakolapelessa, Vavuniya and Karapincha.
- Conducting Young Farmers Club activities.
- Conductingbee keeping development activities at two bee development units at Bindunuwewa and Mawathagama.
- Popularization of environmental friendly agriculture in the country by plant nutrient and organic agriculture Unit.
- Conducting agriculture Enterprise Development, 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.
- Conducting training programs for Agriculture Research and Production Assistants' at Special training centers.

BUDGET

Table 3.1.1: Annual budget – 2012 (Rs. million)

Head	Allocation	Expenditure	Expenditure %
Capital	48.54	45.8855	95
Recurrent	120.422	110.382	92
Special Capital Projects			
Funds Under DOA Vote			
Training and capacity building	10	8.844	88
Agricultural Training Farms	20	15.3631	77
Funds Under Ministry Vote			
Farm Development Programme	17.2	13.7	80
Establishment of Medium Level Vegetable farm through Micro Irrigation technology	2.8	2.8	100
Community based seed development programme	3.75	3.75	100
Asian Network for Sustainable Organic Farming Technology	0.05	0.05	100
Total	**222.76**	**200.77**	**90**

SPECIAL PROJECTS

SPECIAL PROJECTS

1. Training and capacity building

This special project was implemented with the view of improving capacity and the quality of the services provided by the Schools of Agriculture, In-Service Training Institutes, Farm Mechanization Training Centre, District Agricultural training centres and other Special training Centres which conducts the one year training programme for Agricultural Research &Production Assistants.

Laboratory equipment and chemicals, Horticultural equipment, Animal husbandry equipment, audio visual equipment, Training aid, reading materials and some other facilities needed for training were provided to improve the quality and capacity of training provided by the above centres.

In addition,local trainings were conducted for the officers of the Department of Agriculture and this programme supported the foreign trainings conducted for the departmental officers. Total amount of Rs.8.844 million was spent to achieve aforesaid activities.

2. Agricultural Training Farm Land Development

Under this project, farm lands of Schools of Agriculture, in-service training institutes, Farm Mechanization Training Centre ,District Agriculture %raining Centre, Polonnaruwa and special training centres which conducts the one year training programme for Agricultural Research &Production Assistants and head office premises of the Department of Agriculture have been developed spending Rs.15.36 million rupees.

3. Farm development programme

Identified farms at seven sub institutes of Extension and Training Center viz. In-service Training Institutes, Hansayapalama and Angunakolapellessa, Schools of Agriculture, Kundasale, Angunakolapellessa, Pelwehera, & Vavunia, and Horticultural Crop Development & Training Institute, Bibila were developed,and crop cultivations were established especially for seed and planting material production purposes. Soil conservation and proper drainage techniques, improvement of water supply, establishment of crop production structures, and some other improvements of land were applied in developing the farms. Rs.13.7 million was spent for the above activities.

4.Establishment of Medium level Vegetable farms through Micro Irrigation

Forty sprinkler irrigation systems were provided under 50% farmer contribution for selected farmers. In addition, 15 training programs were conducted for farmers on micro irrigation technology.

5. Community based seed Production Villages

The aim of project was to promote seed production in the villages by selected farmers to ensure sustainable seed supply. The allocation for the projects was Rs. 3.75 million and total allocation was spent. The progress of the project in year 2012 can be summarized as follows.

This programme was conducted in identified 158 villages and the number of farmers benefited by this project was 324. Farmers were trained on seed production technologies. In addition, basic seed materials and equipment for post-harvest handling were provided for farmer groups. 125 farmers were registered at Seed Certification Centre of the Department of Agriculture.

6. ANSOFT (Asian Network for Sustainable Organic Farming Technology) Project

Ten workshops were conducted under this project in the selected organic villages. No. of 104 Officers & 284 farmers were participated. About 200 packets of other field crop seeds and local planting materials were distributed among farmers. There is a potential of purchasing organic products of farmers by number of companies.

7. Rice Export Zones Project

This project was conducted with the objective of producing high quality (export quality) paddy in Polonnaruwa, Hambantota, Mannar, and Ampara districts. Awareness programs on processing of quality rice were conducted by the engineers of the Institute of Postharvest

Technology for owners of the selected paddy mills, Agriculture Instructors and Assistant Directors of agriculture. Twenty two paddy millers were identified for processing of high quality rice.

Number of 3304 farmers cultivated 2214 ha of paddy lands and produced 8523 mt of paddy. However, the cost of production was comparatively higher than the other paddy producing countries and it was difficult to compete with the other countries in the world market. The amount of money spent for providing technical assistance and organizing farmers and paddy millers were Rs.273,220.50.

8. Training of Agro chemicals Sales & Technical Assistants (ASTA)

This programme was conducted in collaboration with the Office of the Registrar of pesticides office of the Department of Agriculture and under this programme, acurriculum with 12 modules,NAC (National Apprentice Certificate) curriculum outline, and hand books for trainers were prepared, and also training for trainers (TOT) was conducted for 47 number of NAITA officers & 78 number of Agriculture Instructors during the year 2012. At end of the year, Training of Agro chemicals Sales & Technical Assistants (ASTA) has been started in seven districts.

EXTENSION ACTIVITIES OF INTER-PROVINCIAL AREAS

Six Interprovincial (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.

Table 3.1.2: Comparison of total Paddy extents cultivated in IP areas in the years 2011 & 2012

Cropping Season	Extent cultivated (ha)	Cropping Season	Extent cultivated (ha)
2011 Yala	1,41,886	2012 Yala	1,24,645
2010/11 Maha	1,94,612	2011/12 Maha	1,84,206

The above table shows that the paddy extents cultivated in 2012 Yala and 2011/12 Maha reported a reduction in the cultivated extents. The shortage of water in the reservoirs did not permit to cultivate the targeted extents in Yala 2012 cropping season as a mechanism to save water for the 2011/12 Maha cropping season. Yet a significant reduction in the paddy harvest was not reported.

The other field crops cultivated in six inter-provincial areas, are mainly big onion, red onion, maize, green gram, ground nut, gingerly, cowpea, soy bean, chilly, finger millet and black gram. The total land extent

under other field crops were 7298.945 ha in2011/12 maha and 13135.95 ha in2012 yala. Specific information and performances of each interprovincial area are given below,

Inter-provincal area - Hambantota

1. Introduction:

Hambantota IP area covers extents of paddy about 15000 ha under major irrigation, 1400 ha under minor irrigation and 50 ha under rain fed conditions. Upland, land extent is about 39546 ha, where low country vegetables and fruits such as gourds, banana and papaya are cultivated. Lunugamwehera, Liyangastotota (Ridiyagama Reservoir) and Samanala wewa are the major irrigation schemes which provide irrigation facilities for crop cultivation. The two major cropping seasons, yala and maha and the third cropping season after Yala cultivation are being done under above stated three irrigation schemes.

2. Agricultural Extension activities

Hambanthota IP area comprises of two segment namely Walawa and Kirindi oya. Agricultural extension activities are performed under the auspices of the extension staff of these two segments covering two Districts viz. Hambanthota and Rathnapura. The two agricultural segments cover 06 Divisional Secretary'sDivisions viz. Ambalantota, Hambantota,Tissamaharama, Lunugamwehera, Sooriyawewa and Balangoda. Extension activities are performed in the areas coming under the authority of 07 Agrarian Services Centers viz. Ambalantota, Lunama, Badagiriya, Weerawila, Yodakandiya, Beralihela and Kaltota. District's agricultural training centre (DATC) situated in Kirindioya agriculture segment which has residential facilities for 25 persons.

Agricultural services are provided to farmers as a package with the view to enhancing the agricultural knowledge, improving skills and developing their attitudes to increase national food production to ensure food security and uplift the living standards of farming community by increasing their income and profits.

Main crop cultivated in Hambanthota IP area is paddy with an average yield of about 7.1mt/ ha last year. Statistics show that, there is an increasing trend to cultivate specially banana as a cash crop.

3. Special Achievements in 2012

3.1. Third season cultivation of green gram

3.2. Promotion of off season cultivation of red and big onion.

3.3. Increase the production of chilli and finger millet.

3.4. Popularizing of the production & use of organic manure.

3.5. Production of seeds at community level.

3.7. In collaboration with Ministry of Economic Development, technical assistance was provided to the project named community development and livelihood development.

Inter-provincial area– Kandy

1. Introduction:

Interprovincial area Kandy includes five Divisional Secretary's' divisions namely Minipe, Wilgamuwa, Kandaketiya, Rideemaliyadda, Mahiyangana in Kandy, Matale and Badulla districts. The IP area comprises of 12474 Ha of low lands and 7403

ha of uplands with 32385 number of farm families. Crop cultivation is done under 06 irrigation schemes viz. Sorabora, Mapakadawewa, Dambarawa, Nagadeepa, Bathmedilla, Baduluoya (Badulla district), Minipe I and II of Yodaela scheme, Rathaella (kandy district) , and Minipe III and IV (Matale district) . Farmers grow paddy in low land at large scale during both cropping seasons yala and maha. During yala cropping season, (dry season) around 40% of the paddy lands were used to cultivate other field crops. Other field crops grown are maize, groundnut, green gram and Chili.

2. Extension Activities

Although the extension activities were performed in three segments representing the three districts, two segments are combined as a solution for the shortage of staff prevailing at present. There are seven agrarian service centres; two in Kandy district, two in Matale district and three in Badulla district. The agrarian service centre's commanding areas are divided into 14 agriculture extension ranges.

3. Special achievements in 2012

a. Demonstrations of DOA proven technology

Parachute method of sewing paddy was an advanced technology. Number of 80 demonstrations of ½ Ac were established to cater to the objective of reducing the seed rate, cost of cultivation and increasing productivity.

These demonstrations were used to convince the farming communities on the advantages of the parachute method against the normal sowing methods.

Table 3.1.3: Yield comparison of parachute method of sowing paddy against normal method

	Parachute sowing Method	Normal sowing Method
Average yield (Bu/Ac)	136	105
Cost of production (Rs/Kg)	13.34	18.60
Profit (Rs/Ac)	40,854	20,160

The parachute sowing method has recorded low cost of production and doubled profit than normal sowing methods.

b. A Remarkable increment was observed in the self-seed paddy production among the paddy farming community.

Table 3.1.4: comparison of self-seed paddy production

Season	2011 Yala	2012 Yala
No. of farmers	622	1013
Extent(ha)	49	100

c. Off season cultivation of other field crops in new areas.

A number of demonstrations were established in paddy growing areas of Badulla district under the Nagadeepa and Badmedilla-Baduluoya irrigation schemes in Yala season 2012. The results are shown in table 3.1.3.

Table 3.1.5: Results of off season cultivation in new areas

Crop	No. of Demonstration	Extent (Ac)	Average yield (kg/Ac)
Red onion	40	01	8000
Big onion	36	4	4000
Big onion (seed production)	23	1/4	107

Inter-provincial area - Ampara

1. Introduction:

The Deputy Director of Agriculture (Inter Provincial) office, Ampara consists of four agricultural administrative Segments, viz. Uhana, Damana, Adalachchena, and Sammanthura. These four segments include twenty five Agrarian Service Centers & Eighty Five Agriculture Instructor ranges, sixteen Divisional Secretary'sdivisions and four hundred and thirty grama niladari divisions. Main crop cultivated in this area is paddy and the major field crops cultivated are maize, green gram, cowpea, ground nut, and chilly. The major vegetables cultivated in this interprovincial area were radish, okra, bitter gourd, snake gourd, luffa, long bean, brinjal, and tomato. Banana, papaya, pineapple, and mango are cultivated as major fruit crops.

Table 3.1.6: Vegetables grown in two cropping seasons in 2012

Vegetable	Cropping season(ha)	
	Yala	Maha
Radish	6	105
Okra	140.2	194
Bitter guard	57.2	153
Snake guard	92	135
Luffa	64.5	167
Long bean	90.15	178
Brinjal	108.7	299
Tomato	540	12.8

2. Achievements of Yala2012

2.1. Chilli is grown mainly in maha croping season in Ampara IP. A campaign was launched to promote cultivation of chilli in both seasons in 2012. The results stated were 510 ha in 2012 maha and 182 ha in yala 2012.

2.2. Production of organic manure by the farming community was another significant achievement. In the year 2012, 10,000 farmers involved in production & use of organic manure and they produced 20,000 mt.

Inter-provincial area - Monaragala

Inter Provincial area of Monaragala includes Siyambalanduwa, Okkampitiya, Ethimale & Thelulla agrarian service centre divisions. Total extent of the paddy is about 2984ha. Ethimale, Kotiyagala, Muthukandiya & Handapanagala are the major irrigation tanks in this IP area. Paddy is the main crop grown and maize is the second largest crop cultivated. Special programmes other than the routine technical programmes implemented during the year 2012 are as follows,

1. Parachute paddy sowing method

An extent of 35 acres of paddy land was cultivated using parachute method of sowing in Muthukandiya agriculture instructor (AI)

range. The yield increment was about 20% compared with the normal sowing method.

2. Agriculture as a Business

Under farm business school programme, 40 farmers were trained and business plans were prepared for their future use to re-orient them to make agriculture as a business venture. In addition, 22 Krushi Seva Piyasa(Agriculture sales outlet) managers were trained (5 day training programme) on basic agribusiness management.

3. Other field crop programme

A programme to strengthen the other field crop production was implemented in 512 ha. Greengram, black gram, finger millet, Sesame, Chilli, Big oinion (off season cultivation) were promoted in Yala 2012. Following materials were distributed among the selected farmers to mobilize them to cultivate other field crops.

Tarpaulin sheets were distributed to improve quality of seeds, grinding machine for value addition, sprinkler irrigation systems, agro chemicals and seeds (only for big onion, maize & chilli)

Demonstrations were conducted using chilli (insect proof net to control of leaf curl complex and to introduce bag culture) & maize seeds (use of ridges to introduce row planting with space). These DOA proven technologies were not used by farming communities, although those were cash crops.

Inter-provincal area- Anuradapura

1. Introduction

Anuradapura interprovincial area covers 12 major irrigation systems in Anuradapura Kurunegala, Matale and Puttalam districts. It includes 35 agriculture Instructor divisions and 175 grama niladari divisions. Special programmes other than the routine technical programme implemented during the year 2012 are as follows,

2. Special Achievements in 2012

Green gram cultivation in third Season

An extent of lands of 120 ha was cultivated in paddy lands immediately after harvesting of 2011/12 Maha paddy crop, in collaboration with the Department of Irrigation at Rajanganaya scheme. A number of 250 farmers were selected, and they were given seeds by government with 50% farmer contribution. Different seeding techniques were used such as row seeding, broadcasting. Crop management was minimum. A cost of Rs. 5000 per acre incurred starting from purchasing of the seeds to harvesting. The income recorded was Rs. 40000 /acre.

Big onion seed production programme & big onion cultivation

In the year 2012, 45000 Kg of mother bulbs were vernalized at Rahangala and it was distributed among 1200 farmers to motivate them to produce big onion seeds. Farmers were supplied with polythene, fish nets and plastic crates to support their efforts. . Around 4500 kg of true seeds were produced. This enabled to cultivate over 300 ha of big onion in Yala 2012. Farmers also sold true seeds at a rate of over Rs. Over Rs 10,000/Kg.

Farmers recognized production of true onion seeds as a profitable venture.

PEACE Project (Pro-poor economic Advancement & Community Enhancement Project)

Under commercial fruit crop cultivation program, 16 ha of Mango and 5 ha of orange cultivations were established. Number of 50 pruning kits were distributed for the rehabilitation of existing mango orchards. Other than Karthakolamban, planting materials of the variety of mango, TOM EJC which possesses higher qualities for export market were provided to farmers on 50% farmer contribution. This project was implemented with selected farmers of Rajanganaya left and right banks, Nachchaduwa and Nuwarawewa.

Dayata Kirula – 2012

Number of 10 model villages were established in line with the 'Deyata Kirula' 2012 exhibition which was held in Anuradhapura District. Establishment of model home gardens, homestead development, pruning of existing fruit orchards, aquatic weed control, bee keeping, promotion of parachute method in paddy sowing were the activities performed in these model villages. Over 1000 farm families were benefited through this project.

Parachute method in sowing paddy

In order to reduce cost of cultivation & to obtain a higher yield, this technology was introduced in demonstration scale in 2008. In Yala season 2012, it was reported that the extent of lands in which the technology was adopted was 2000 ha.

Inter-provincial area - Polonnaruwa

1. **Introduction**

IP area Polonnaruwa includes three ADA divisions (Segments), eight agrarian service centres (ASC) and thirty Agriculture Instructor divisions. Segment I includes Medirigiriya and Higurakgoda ASCs, Segment II includes Elahara and Girithale ASCs and Segment III includes Sewagama, Pulastigama and Galamuna ASCs, and also the major irrigation schemes in the IP area are Parakrama Samudra, Girithale, Kaudulla and Minneriya. This area comprises of five AGA divisions and one hundred and ninety grama niladari divisions. The total extent of lands in Polonnaruwa IP is 96000 ha and it composes 46092 farm families. The total extent of arable lands is 34739 ha. Other than the major crop paddy, OFC, vegetable crops and fruit crops are also cultivated.

SPECIAL ACHIEVEMENTS IN 2012

Youth involvement

The members of the young farmers club representing Polonnaruwa inter provincial area won the challenge cup for national quiz programme conducted by headquarters of young farmers clubs of the central department of agriculture. The members of this 'Divulagiriya' young farmers club in Debarella Grama Niladari division of Pulastigama Agrarian Service Centre, operate a cooperate farm and produce seed paddy, maize, chilli and water melon. Their outstanding contribution to

agriculture was rewarded by the North Central Province by assisting them financially with 50% contribution by provincial development fund to obtain an electrically operated paddy cleaner with a capacity of 75 bushels per hour, electrically operated single line poly sack bag sealer machine and poly sack bags to store seed paddy. Total amount spent by the province was Rs.65 000.00 (50% of the total value of the items provided).

Model village programme

Forty four Model villages were developed capturing its specific/unique agricultural potential in the three agricultural segments. Proven agricultural technologies were disseminated through this programme among the agricultural communities of Polonnaruwa IP Area. The 44 model villages included 05 bee keeping villages, 10 Fruit cultivation villages and a total of 370 of ¼ acre paddy plots with parachute method of sowing paddy and 560 home gardens. The best model village of each agricultural segment was selected in 2012. The agriculture instructors of the selected model villages were facilitated by the office of the Deputy Director (Agriculture Extension) of Polonnaruwa Inter-provincial area for his/her commitment & vision.

Achievements in the rice sector Development programme – 2012

Six inter provincial areas Ampara Anuradhapura, Polonnaruwa, Kandy, Monaragala and Hambantota that feed under major irrigation schemes are known as high potential areas for rice production which cover about 30 % of total annual paddy cultivation extent in Sri Lanka and contributes 40% of national paddy production.

In Maha 2011/2012 and Yala 2012,paddy cultivation extents in interprovincial areas were 184206 ha and 124645 harespectively. The targeted paddy extent was not achieved due to drought condition prevailed at the beginning of the 2012 yala season. Continuation of this drought spell damaged the inter-provincial paddy extent of 7855ha which includes 7614 ha from Polonnaruwa IP area and 241 ha from Monaragala IP area.However the six interprovincial areas achieved a paddy production of 1.01 million mt in 2011/2012 Maha, and 0.66 million metric tons in Yala, 2012.

The main objectives of inter provincial extension programme were to enhance the average paddy yield from 5mt/ha onwards, to lower the average cost of production of paddy upto 13 Rs/kg and to minimize the environmental hazards. The strategies adopted to achieve these objectives were seedling broad casting (Parachute method) in crop establishment, integrated plant nutrient management practices for soil fertility promotion of integrated pest management practices for reducing the pesticide usage. Establishment of secondary seed farms and promotion of self-seed paddy production programs were launched to increase the availability of high quality seed paddy. In addition a special awareness programme was conducted to control the threat of weedy rice in inter-provincial areas.

In-Service Training Institute - Gannoruwa

In-Service Training Institute, Gannoruwa, is the main agricultural training institute at national level, and it is responsible to improve knowledge skills and attitudes of agricultural officers, entrepreneurs, farmers and others interested in agriculture.

The total number training programmes undertaken in 2012 was 127 (14,025 man days),and it comprised 82 (12603 man days) and 11 (529 man days) training programmes conducted for officers and farmers respectively, and 34 field training programmes (893 man days).

In-Service Training Institute – Angunakolapelessa

This is one of the agricultural training institutes in the 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 offers in-service training for above groups in Galle, Matara, Hambantota Provincial Districts and Hambantota Inter Provincial area.

During the year under review, total of 74 training programmes were undertaken (3012 man days) and this included 55 for officers (1914 man days) and 11 for farmers (660 man days), 08 field training programmes (438 man days). And seven workshops /seminars/meetings/discussions (287 man days), were also conducted.

In-Service Training Institute – Hansayapalama, Aralaganwila

The In-Service Training Institute, Aralaganwila is located in Mahawaeli block B and the training center conducts training programs for extension staff of Sri Lanka Mahaweli authority , officers of Department of Agriculture, other government officers, non-government officers, Farmers and entrepreneurs of Mahaweli block B,C,D,G as well as Ampara and Polonnaruwa Interprovincial areas.

As tools of training programs, model farm, technical publications of Department of Agriculture and cyber technology is being used. During the year 2013, the institute hopes to establish a profitable and self-sustainable commercial farm model for young farmers. In 2012; 64 training programmes (2053 man days) were conducted and it comprised 19 programmes (685 man days), 12 programmes (244 man days), conducted for officers and farmers respectively and 33 field training programmes (1125 man days) . In addition the center was strengthened by developing the farm under farm development programme and land development programme.

Farm Mechanization Training Centre

Farm Mechanization Training Center (FMTC) located in Anuradhapura is the sole national level training institute on farm mechanization. Training mandate of the FMTC mainly focused on following aspects,

- Operation and maintenance of 4 Wheel Tractors- 10 days

- Operation and maintenance of 2 Wheel Tractors -5 days
- Operation and maintenance of Water pumps -2 days
- Operation and maintenance of Sprayers - 2 days
- Operation and maintenance of combine harvesters - 2 days
- Micro Irrigation introductory course- 2 days
- Micro Irrigation design course- 5 days
- Agricultural hand tools
- Home gardening

During the year 2012, FMTC conducted 68 training programs (6097 man days) and those included 21 for officers (858man days), 12 programs for farmers (508 man days), 35 training programmes for students from university, schools, technical colleges, and agriculture schools (4731 man days).

In addition, FMTC grants its support to the field extension staff in carrying out extension activities related to farm mechanization. Apart from that, FMTC provides advisory services on farm mechanization for the necessary institutions.

In addition, three rice Transplanters, two seeders, one Power Weeder, and 400 nursery trays with the value of Rs.1469421.00 (FOB price) were donated by Yanmmar company, Japan through JICA senior volunteer and three two wheel tractors, one set of tool, and one set of spare parts with the value of Rs.2881635.00 were donated by JICA Sri Lankan office.

Horticultural Crops Training and Development Institute - Bibile

Horticultural Crops Training and Development Institute was established in 1st of April 2003 by amulgamating the school of agriculture Bibile and research farm HORDI Bibile. The institute is situated at Bibile in Monaragala district. (Agro ecological zone IL_2).

The main objectives of the institute are,

- Introduction of new technology on horticulture & maintaining profitable commercial farm.
- Production of different fruit plant with new technology.
- Clone conservation of fruits.
- Proceeding training programs with new technology for Government officers, NGO officers, farmers, and students (School/University).
- Establishment and maintaining training oriented demonstration field.
- Field experiment on new recommendation.

During the year 2012 the institute was strengthened by with the provision of farm implements & office equipment, renovation of internal farm road, and construction of fence around the farm field to enhance the quality of the services provided by the institute.

Training programs conducted by this institute during the year 2012 as follows;

- Sixty two officers (in 2 Batches) were trained under one year Training programme for Agriculture Research & Production Assistants.
- Five days training programme was conducted for 20 SLAgS officers.

- Two days training programme was conducted for 40 nurserymen.
- Hundred & fifty schools students were trained on fruit cultivation techniques.

In addition, 12,000 seedling and 28,000 budded plants were produced.

Under the farm development programme implemented in year 2012, 16.3 ha of farm land were cultivated under different crops. [Paddy (7.6 ha), Chilli (0.8 ha), Ground nut (1 ha), Banana (1 ha), Rambutan (0.6 ha), Passion fruit (0.6ha), Pineapple (1 ha), Orange (2 ha), Mango (0.5ha), Soybean (1.2 ha), and 1.6 ha of pineapple, and 0.8 ha of orange were also cultivated under fund received through District Agricultural Director.

District Agricultural Training Centre - Weerawila

District Agriculture Training Center (DATC) is located in the low country dry zone. (DL_5 – DL_{16}) This center was established in 1986 under the project of Lunugamvehera human settlement. Functioning under the guidance of Extension and Training Center is responsible for implementing training activities to educate and uplift the knowledge of Agriculture of farmer community, school children as well as officers of DOA, PDOA, other government institutes and non-government organization.

During the year 2012, this training center conducted one year training for 42 no of Agricultural Research & Production Assistants and also 13 trainings for farmers (285 Mandays), and 05 workshops (196 Mandays) were conducted.

District Agricultural Training Centre – Ampara

During the year 2012, a total of 53 training programmes were undertaken (2070 man days) and this included 13 for officer trainings, (714 man days), 17 for farmer trainings (430 man days), 07 field trainings, (653 man days), 11 field visit farmers (143 man days) and 5 outdoor training for farmers (130man days). Also 18 workshops (529 man days) were conducted on different aspects.

District Agricultural Training Centre - Polonnaruwa

District Agricultural Training Centre at Polonnaruwa fulfills the district agriculture technological training requirement of farmers and officers. Farm of the DATC spreads in 4.5 ac land extent and Paddy, vegetables, fruits and OFC are cultivated as modules in the farm, emphasizing different crop varieties and different agriculture technological applications.

During the year 2012, a total of 56 training programmes were undertaken (1497 man days) and this included 32 for officer trainings, (957 man days), 14 for farmer trainings (326man days), and 10 outdoor training for farmers (214 man days).

District Agricultural Training Centre - Palamunai

The District Agricultural Training Centre-Palamunai was handed over to the Department of Agriculture on 23rd of September 2007 with office and teaching aids facilities by UNDP.

Objective of the training centre is providing theoretical and practical training in Tamil medium on Agricultural Techniques to the farmers, related agricultural officers, teachers, school children, Samurdhi beneficiaries and several NGOs operating in the area to develop farming activities.

The area of 0.75 acre has been allocated to the demonstration field from the total 01 ac land of the centre.

During the year 2012, a total of 33 training programmes were undertaken (1193 man days) and this included 10 officer trainings (316 man days), 12 farmer trainings (401 man days),7 field trainings (228 man days), 2trainings for Agro chemical dealers (191 mandays) and 2 trainings for school students (57 man days).

Women's Agricultural Extension Programme (WAE)

Mission of Women's Agriculture extension programme is to increase women's contribution to agricultural development through improvement of standard of living and nutritional level of family units. Objective of this programme is to promote better home environment and initiate income generation activities for households focusing on women. WAE Programme is implemented at grass root level by WAE officers who are attached to the office of the Deputy Director (Extension) in each agriculture administrative district.

Extension activities performed in 2012

During the year 2012, 948 district extension officers were trained on Women's Agricultural Extension programme. Number of 5104 number of farm women were trained on food & nutrition, entrepreneurship development. In addition, 140 number of women's organizations were established. 1653 number of households were developed through home gardening and kitchen improvement. Three articles, 03 television programmes, 01 Radio programme, 65 field days, and 16 study tours were conducted under women's agriculture extension programme. Furthermore, stalls were conducted at 4 exhibitions.

Other special activities performed by this unit are,

- Under local food promotion programme, 5 sales outlets were organized with the participation of women Agricultural entrepreneurs in Anuradhapura district at 'Dayata Kirula' exhibition - 2012.
- With the view to promoting of fresh fruit, Vegetables, and leafy vegetables consumption through new approaches; 2 sales outlets were organized with women Agricultural entrepreneurs in Kandy district at Centenary Celebration Exhibition of DOA at Gannoruwa.
- A number of 29 entrepreneurs were successfully trained and provided opportunity for marketing their local food products at Hela Bojun Alevi

Piyasa at Agriculture Technology Park Gannoruwa.

- 'Post-harvest Assistance Project' was implemented under World Food Programme in all 5 districts of northern province (Jaffna,Vavuniya, Mullathive, Kilinochchi, Mannar). The main objective of the projects is to support farm women groups on post-harvest technologies, income generation and family nutrition.
    - Under this project, 30 officers were trained on post-harvest handling and rice based product.
    - Number of 885 number of farm women were trained on post-harvest technology especially preparation of rice based products.
    - A crew cab was modified as a mobile food demonstration unit
    - Preparation of a training manual on rice based food products including different food recipes

Agro Enterprise Development &Information Service

Mandate of the Agro-Enterprise Development and Information Service (AgEDIS) is assisting to promote agro based enterprises which lies within the framework of the Department of Agriculture by providing relevant technical support. Currently this institute contributing to do 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.
- Support district agricultural extension officers to promote entrepreneurial skills of the farmers by introducing "Farm Business School" (FBS) approach and conducting related trainings with the technical and financial support of the FOA TCP 3302 pilot project.

Achievements of the unit during the year 2012 are as follows;

- Ten number of agro enterprise related training programmes were conducted for 176 trainees.
- Under Provision of on-farm technical advisory services two property holders from Ogastawatta, Dodangolla and Dankotuwa have been served to develop 17 acres of agric-properties. In addition a practical demonstration was conducted at kodayana, Siyambalanduwa with 35 farmers' participation.
- Six number of new "krushi Seva Piyasa" were established in Kuliyapitiya, Buttala, Ayagama, Halmillewewa, Balangoda and Vavuniya areas. As well 5 day special technical training was conducted for 22 managers of 'Krushi Seva piyasa' on Basic Agribusiness Management.

- One Hundred and eight extension officers from 10 districts were trained as master trainers on 'Farm Business Schools' (FBS). The trained officers are in a process of Conducting FBSs for selected farmer groups from 2012 yala season onwards in their districts.

Bee development unit – Bindunuwewa, Bandarawela

Bee keeping development unit is responsible for the development and extension of bee keeping among farmers. In order to 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.

During the year under review, 23 number of training programmes were conducted on bee keeping for officers, farmers and university students and also 2 training programmes were conducted on production of bee keeping equipment.

In addition this unit produced 450 kg of bee honey, 240 number of bee colonies, 486 number of bee boxes, 280 number of smokers, 352 number of brood frames, 265 number of honey frames, 2991 number of queen guards. A number of 7000 bee keeping equipment were certified and six training programmes were done outside the station under 'Divi Neguma' programme. Further, the contribution was given to three exhibitions, 'Deyata Kirula', 'Govi Sathiya', and Centenary Celebration of DOA.

20 training programs on Bee Keeping were conducted. Also six training programs were conducted outside the station under 'Divi Neguma' programme.

Other activists performed by this unit during the year are mentioned below.

- Nine model villages on bee keeping were maintained.

Young Farmers Club (YFC)

Young Farmers Clubs are the village level institutions of the young farmer's clubs movement. Other components belonging to the young farmers' clubs movement are district level primary consultative committee, provincial consultative committee, and national level federation. Relevant activities are planned, and implemented by these committees at different levels with the participation of members.

There are nearly thousand Young Farmers Clubs formed and one third of them are registered at the head quarters.

During the year 2012, Island wide programs were conducted to create the participation of young farming generation for agricultural extension.

A total number of 15 training programs for officers and 82 training programs for YFC members were conducted. In addition, 105 of cultural programs, 95 of religious programs, 35 of educational programs, 32 of social programs were conducted by YFC. In addition facilities were provided for 25 number of radio quiz competitions, conducted mainly for young farmers.

Water Management and Protected Agriculture Unit

Water management and Protected Agriculture unit is dealing with following subjects in respect of technology generation & dissemination to the technical staff of the Department of Agriculture and to the farming community in Sri Lanka.

- Irrigation & Irrigation management
- Micro Irrigation Management and Fertigation
- Controlled environment Agriculture (Protected Agriculture- poly tunnels, rainout shelters, Net houses)
- Commercial Farming (Advanced planning of commercial farms) for annual & perennial crops.
- Advanced nursery Management.

Dissemination of required technical knowledge for the establishment of small and large scale farms is also a vital role of this unit. In addition, technical support on irrigation management and protected agriculture for the farm development programme also provided. Further a poly-net house was designed during this year. Also a survey was started to find out the progress of projects done by this unit during the period 2006-2011.

Achievements during the year 2012 are as follows.

- Training on micro irrigation technology and protected agriculture were conducted for officers and farmers.
- Under the special projects financial allocation of Rs.2.8 Million and 100% of expenditure was incurred during the year 2012. This amount was mainly spent for the distribution of Sprinkler irrigation systems for selected farmers.
- Relevant technical support for rainout shelter cultivation under 'Divi Negma' Programme (Designing and Agronomic practices) was provided.
- Trainings on rainout shelter cultivation were conducted for selected officers from all district and farmers.

Planning and Progress Monitoring Unit

The Planning andprogress monitoring unit focuses on preparing action plans, monitoring and evaluating financial and technical activities, and special projects conducted by the Extension & Training Division. The unit is also involved in preparation of indicative targets for annual implementation programme, providing information for annual performance report of the Department of Agriculture, Central Bank report and Budget Speech and disseminating information to relevant agencies.

Agricultural education

The five Schools of Agriculture located at Kundasale, Pelwehera, Angunakolapelessa Vavuniya and Karapincha are offering two year program leading to Diploma in Agriculture. The Schools of Agriculture at Labuduwa, Wariyapola and Anuradhapura function as special training centers and offer short term courses in agriculture. A number of 202 students were passed out from Schools of Agriculture in the year 2012.

The number of students studied in the different SOA in year 2012 is given in the table.

Table 3.1.7: No. of Students in the Schools of Agriculture 2012

Agriculture School	Year	Medium						Total	Grand total
		Sinhala		Tamil		English			
		Boys	Girls	Boys	Girls	Boys	Girls		
Kundasale	1st	31	33	9	10	09	17	109	215
	2nd	45	20	6	10	13	12	106	
Angunakollpellessa	1st	31	21					52	89
	2nd	26	11					37	
Pelwhera	1st	39	15					54	97
	2nd	34	09					43	
Vavuniya	1st			15	15			30	60
	2nd			23	07			30	
Karapincha	1st	24						24	24
	2nd								
Total		**230**	**109**	**53**	**42**	**22**	**29**	**485**	**485**

One year practical agriculture training course for Agricultural Research & Production Assistants (ARPA)

Target group of this course is ARPA attached to the Department of Agrarian Services. This course was started in eight training centers in 2005 and continues until the course being completed by all ARPA. The first group comprising 676 ARPA completed the training in 2006, second group comprising 246 ARPA completed the training in 2008 and the third group, 278 ARPA completed the training in 2011. Details of ARPA trained in 2011/2012 are given below.

Table 3.1.8: Progress of training programmes conducted in 2011/2012

Training Center	Number of ARPA trained		Total No. of ARPA trained
	Batch I2011/I	Batch II2012/II	
School of Agriculture Anuradhapura	**18**	**-**	**18**
School of Agriculture Wariyapola	**25**	**-**	**25**
School of Agriculture Labuduwa	**13**	**24**	**37**
District Agricultural Training Center Weeravila	**22**	**20**	**42**
Horticultural Training & Development Center Bibile	**39**	**24**	**54**
Total	**117**	**68**	**185**

EXAMINATION UNIT

Activities carried out by the Examination Unit of the Extension & Training Centre during the year 2012 are as follows,

- A competitive examination was held in order to select students for the two year diploma course in agriculture conducted at schools of Agriculture. Sixty officers of the Department of Agriculture and 1744 school leavers sat for the aforesaid examination.
- In addition, examinations were conducted for first year and second year students of the diploma in agriculture of the schools of Agriculture and 281 number of first year students and 204 number of second year students sat for the aforementioned examinations.
- Final examination was conducted for one year training course for the Agriculture Research and Production Assistants and 138 candidates sat for the this examination.
- Moreover, efficiency-bar examinations for 1055 DOA officers were also conducted.

Organic Agriculture and Plant Nutrient Unit

The aim of the unit is to popularize environmental friendly agriculture in the country. During the year 2013, flowing three projects were implemented under this unit,

1. ANSOFT (Asian Network for Sustainable Organic Farming Technology)
2. Community based seed production project
3. Rice Export Zones Project

In addition, officers of this unit participated as resource persons for the trainings conducted by In-service training centers and other institutes and at farmer level. Also an organic agriculture stall was conducted in the centenary exhibition of the Department of Agriculture with a view to disseminating technology with respect to organic farming.

PLAN FOR 2013

Extension & Training Programmes

Following programmes will be implemented by the Extension and Training Centre in year 2013.

- Agricultural extension programme in 6 Inter-provincial areas

  The focus for 2013 will be to enhance the productivity of the major crop paddy grown in IP areas to ensure food security of the country. The technical activities and the propaganda programmes will be implemented to achieve this task under major irrigation, minor irrigation and rain-fed conditions in the cropping seasons. It is also envisage to produce quality seed paddy in the community itself.

  Cultivation of other field crops in off seasons, during 3rd cropping season will be emphasized as a solution to cut down on imports & save foreign exchange. Extension activities will be implemented to increase extents, production & productivity and to produce quality seeds.

  Production of fruits will be enhanced through rehabilitation programmes & introduction of agro ecologically suitable fruit varieties. Vegetable production will also be strengthened appropriately by each IP area.

  The total crop production programme will be linked with marketing (local & export) through the efforts of the each IP area.

  Establishment of technology adoption zones (TAZ) to disseminate DOA proven technologies in the ASC commanding areas. Each agriculture instructor is to establish a TAZ in collaboration with the relevant researchers in her/his field of work. The target is to develop a TAZ for two cropping seasons, but the time frame will vary with the technology. Eg: soil conservation methods, pruning of fruit crops etc. This could be a platform not only for agronomic researchers, but for socio-economic researchers and agricultural extension researchers. Another salient factor is TAZ findings could be used to readjust technologies based on social acceptance and profit making.

- Agriculture education programme at Schools of Agriculture (SOA)

  Conducting two year Agriculture Diploma Programme at five Schools of Agriculture, Kundasale, Pelwehera, Vavunia, Angunakolapelessa, Karapincha.

  Around 250 diplomats will passed out, and a new batch will be recruited for the course during 2013.

- During the year 2013, about seventy five trainees will sit for the final exam of one year training programme conducted for Agricultural Research and Production Assistants (ARPA) at special training centers Labuduwa, Wariyapola, Bibile, Weeravila, Anuradhapura. It has been planned to initiate one year agriculture certificate course with NVQ level 3&4 at special training centers Labuduwa, Wariyapola, Bibile, Weeravila,

Anuradhapura with the view to training youths in high tech agriculture in order to develop necessary recruits for the two year agriculture diploma course.

- Conducting 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.

- Conducting following exams according to the exam calendar of year 2013.

    - Examinations of two year diploma programme
    - 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 the 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.

- Conducting quiz programme and other training programs for Young Farmers Clubs
- Women agriculture extension progamme
    - Training of DOA officers, new entrepreneurs for sales centre at Gannoruwa technology park.
    - Field local food demonstration by mobile food demonstration unit
    - Preparation of training aid 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.

- Agro enterprise development programs
    - Conducting ten agro-enterprise related awareness and skill development short term training programs for 200 potential entrepreneurs.
    - Establishment of ten new Krushi Seva Piyasa
    - Providing necessary logistic support and guidance to extension officers for implementation of farm business school programs in 10 districts under FAO funded special project.
    - Launching and management of a farmer data base which will be a very useful tool to the crop leaders and buyers to strengthen their marketing links under the FAO project.
- Micro irrigation &Protected AgricultureConducting training programs on rainout shelters protected agriculture and micro irrigation

    Activities of the national committee on micro irrigation & protected agriculture.
- Conducting agricultural extension programs to popularize environmental friendly agriculture in the country.

Special Projects planned for 2013

- Land development activities at Schools of agriculture, In-service training institutes, Farm mechanization centre, and bee keeping development unit.
- Training &capacity building of staff of the Extension &Training Centre
- Construction of a new hostel at Pelwehera School of Agriculture
- Construction of a toilet complex at In-Service Training Institute, Gannoruwa
- Development of Sri Lanka School of Agriculturefor producing competent professionals

STAFF LIST

Designation	No.
Director	1
Additional Director	2
Deputy Director	8
Assistant Director	39
Agriculture Officer	7
Lecturer	44
Subject Matter Specialist	1
Agricultural Monitoring Officer	14
Programme Assistant	26
Graduate Trainee	5
Agriculture Instructor	233
Research Assistant	2
Farm Machinery Instructor	1
Technical Officer	1
Mechanic	1
Bee Keeper	5
Budder	4
Carpenter	4
Machinery Attendant	2
Machine Operator	3
Administrative Officer	2
Management Assistant service	94
Translator (English)	1
Store man	9
Farm Clerk	3
Office Duty Assistant	11
Steward	3
Cook	18
Watcher	73
Sanitary Labourer	8
Driver	35
Lorry Cleaner	1
Earth Mover Operator	11
Water Pump Operator	1
Labourer	187
Circuit Bungalow Keeper	2
Compositor	1
Contract Labourer	189
Total	**1052**

3.2 INFORMATION & COMMUNICATION CENTRE (ICC) - PERADENIYA

The Vision of the Information & Communication Centre is toachieve excellence in agriculture information and Communication Technology for national prosperity.

Mission is to adopt Information and Communication Technology (ICT) for agriculture to make food crop sector more efficient and effective, improve access to DOA services, and create a more citizen centric government.

This new centre was established on 1st March 2012 as a separate division. The activities under taken by the ICC in achieving it's goals and objectives are collection, management & dissemination of information by means of electronic and print media through five units under the purview of this centre viz. Farm Broadcasting service, Audio Visual Centre, Agriculture Publication Unit,Gannoruwa Agro Technology Park and Batta-atha Agro Technology Park.

Foundation stone was laid to construct National Agriculture Information and Communication Centre at Gannoruwa, according to the government policy on the exchange ofAgriculture Information as envisaged in the "Mahinda Chinthana Future Vision".

Construction of this building is a three year project and total estimated cost is Rs 325 million. A cabinet approval has been already granted for establishment of Agriculture information network among 550 Agrarian Service Centers.

This project will maintain a regular farmer production data base as a solution for marketing problems experienced by farmers. This data base will provide

I. Mechanism to link farmers and wholesale buyers (both local and foreign)

II. Information for suppliers to make them aware the requirement of raw materials.

III. Information on crop forecasting for decision makers to determine availability and requirement of country.

BUDGET

Allocations received and expenditure incurred under different votes are given in Table 3.2.1.

Table 3.2.1: Annual budget – 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	6,920,372	6,013,831	87
Recurrent	19,403,000	18,539,000	96
Projects			
Media Programme	24,285,266	24,263,600	99
Park	4,500,000	3,867,294	85
Dayata Kirula 2012	15,000,000	15,000,000	100
Crop forecasting	1,760,000	1,735,850	98
Divinaguma	20,755,000	20,721,752	99
AFACI	2,500,000	2,210,621	88
Total	**95,123,638**	**92,351,948**	**97**

AUDIO VISUAL CENTRE

Audio Visual Centre (AVC) is the main information and communication unit of the Department of Agriculture (DOA) under the Information and Communication Centre. Mandate of the center is to cater DOA on information and communication needs and therefore, the Centre involves in producing wide spectrum of instructional media materials and implementing Information and Communication Technology (ICT) initiatives for agriculture development in Sri Lanka. Following activities are being conducted by the unit.

- Production of two TV documentary programmes weekly *Govibimata Arunalu* on Sunday at 6.30pm on National TV and*Mihikatha Dinuwo* on Friday at 6.15pm on National TV
- Design and production of Agricultural publications, leaflets, posters, large format hoardings, banners, etc.
- Management of Agro Technology Park at Gannoruwa and Bata-atha
- Organizing agricultural exhibitions at regional and national level
- Toll free Agricultural Advisory Service "Govisahana Sarana Sevaya" (Short Code 1920)
- Implementation of ICT initiatives in agriculture;
  - Websites - DOA (www.agridept.gov.lk), *Wikigoviya*website (www.goviya.lk), Rice Knowledge Bank in Sri Lanka.
  - Interactive Multimedia CDs production on various crops and subjects
  - Cyber Extension Project and AgMIS farmer database

- Training on Audio Visual Teaching Aids and Presentation Technology
- Activities related to establish National Agriculture Information network and Agriculture Information and Communication Centre

PROGRESS

Training

10 Training programmes were conducted covering 425 man days on preparation of AV aids, cyber extension & websites design.

Graphic Communication

Technical publications

Ten New technical publications were designed including Centenary Diary 2012 & five Centenary publications viz Edible Landscaping, Maize, Integrated Pest Management for Vegetable Crops, Underutilized Fruit Crops, Insects & Mites in other Field Crops.

Leaflets/ Broachers	34
Hoardings/ Display Boards	11
Exhibition/Research posters	984
Paper supplements/Posters for offset printing	30
Desktop presentation	15
Colour pages/Invitation/Greeting cards	155
Lables/Stickers/Nameboards	4023
Banners	66

Video/Photography

Producing, editing and telecasting TV programmes on Rupavahini inclusive of Divinaguma.P

Programmes

Mihikatha dinuwo	48
GovibimataArunalu	53
Other Documentaries	07
TV spots	20
Copying Video Programmes	17
Digital Photography	19,135

Information Technology

Pages were updated as follows

DOA website	555 hrs/163 items
RKB website	02 items
Wikipedia website	18 hrs/74 Items

Database and Software development 1140 hrs/

Govi sahana sarana advisory service

Answers were given to problems as follows

No. of queries	50,000
Skype (Video calls)	60
Mails	400

Network administration and monitoring

Monitoring of 1172 hrs & 61 items and maintaining hardware 2057 hrs & 602 items.

Exhibitions

Three Exhibition sites were designed for Centenary celebration, Gannoruwa and Dayata kirula,*Oya Maduwa*. The Department of Agriculture exhibition stall / site secured first place for past seven years.

- Centenary exhibition

Centenary exhibition of DOA held in August, 2012 was designed, coordinated and monitored by AVC.

A park - Gannoruwa

As the result of centenary exhibition, infrastructure facilities were further improved. (New toilet complex, food court, concrete paving, ponds, resting places etc.)

Dissemination of Agro technology &providing instructions to public and school studentsas follows.

Number of visitors - School Children 65,107

Number of visitors - Adults 77,539

Income Rs.951,765/=

- One Stop Shop

  The concept of one stop shop was strengthening the A-park in addition to food court to sell and promote traditional food and plants of private registered nurseries.

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 including farmers. 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 come under the purview of this unit. This unit was re-established in 29th June 2012. 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. Activities carried out and progress achieved during the 2012 is given below.

Income

Three million rupees earned during this year from various activities. Nearly 2.5 million rupees earned by selling of publications and IMMCDs through two sales centers of this unit and table 2 shows the details. A stall established at Deyata Kirula National exhibition siteand Rs. 367,963.00 was earned through selling of DOA publications and CDs. In 2012 a total of Rs 187,795.00 earned from selling of waste papers, used plates, other used materials and issuing of tender documents etc.

Table 3.2.2: Sales of Publications (Rs.)

Month	Sales centre No. 1(Galaha Junction)	Sales centre No. 2(Gannoruwa)
January	23,788	84,882
February	49,129	52,169
March	67,732	102,838
April	33,535	73,437
May	54,901	75,428
June	77,792	70,819
July	23,489	580,398
August	32,409	103,232
September	66,155	51,107
October	117,930	121,680
November	36,735	92,320
December	64,789	86,896
Total	**648,384**	**1,495,206**

PROGRESS

During the year under review following new books are published by this unit: Mango (Sinhala and Tamil), Pineapple (Sinhala and Tamil), Integrated Pest Management in Vegetables (Sinhala and Tamil), Edible Landscaping (Sinhala and Tamil), Maize, Pears cultivation, Diary –2013, Govikam Sangarawa and Kamatholil Vilakkam. In addition to the above, about 28 publications were reprinted. Six publications were printed and distributed for other divisions. Details of the printed publications are given in following tables.

Table 3.2.3: New Books published in 2012

No	Name of the Book	Number of Copies
1	Mango (Sinhala)	2,500
2	Mango (Tamil)	1,000
3	Pineapple (S)	2,500
4	Pineapple (T)	1,000
5	Integrated Pest Management(S)	2,500
6	Integrated Pest Management (T)	1,000
7	Edible Landscaping (S)	2,500
8	Edible Landscaping (T)	1,000
9	Maize (S)	2,500
10	Pears Cultivation (S)	2,000
11	Diary (E)	5,000
12	Govikam sangarawa	10,000
13	Kamatholil Vilakkam	650

Table 3.2.4: Publications of Other Divisions

Name of the Publication	Amount	Division
Cost of cultivation	200	SEPC
Agstat – 2012	350	SEPC
Tropical Agriculturist	750	DOA
New Crop Varieties	1250	Research
A Checklist of Insectspests and Disease	1250	NPQS
ASDA Journal	1050	ASDA Secretariat
Self seed paddy production	500	SCS

Table 3.2.5: Details of Reprinted Publications

Name	No. published
Pomegranate (S)	2500
Water Melon (S)	2500
Leafy Vegetables (S)	5000
Mushroom (S)	5000
Banana Diseases	2500
Vegetable Cultivation (S)	10,000
Brinjal (S)	2,500
Self seed paddy production (S)	3,000
Dwarf ambarella (S)	2,000
Bee Keeping (S)	2,500
Home Garden (S)	20,000
Nutrition (S)	2,500
Local Food preparation	10,000
Obtaining high yield in paddy (S)	2,500
Home Garden (T)	5,000
Obtaining high yield in paddy (T)	2,500
Orange (s)	2,500
Agro Ecological Regions	1,500
Field Problems of Paddy (S)	2,500
Seed Paddy Storage (T)	1,200
Self seed Production	1,100
Papaw (T)	500
Hydroponics (S)	2,500

Agriculture press

In addition to the DOA publications given above, 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. Summary of the number of copies printed in the agriculture press is given in the table 6.

Table 3.2.6: Summary of the printed materials

Type of Publication	No. of copiesPrinted
Posters	191,300
Books and booklets	23,406
Invitation card	12,365
Certificates	33,962
News letters	33,650
Letters	43,450
Forms	153,010
File covers	1,992
Letter heads	3,650
Others	11,135
SCS Labels	300,000
Forms for Crop Forecasting Program	172,102
Books for Crop Forecasting Program	25,000
Leaflets	1,055,120

Publications issued at free of charge

Following number of publications were issued among technical staff of DOA and Provincial DOA during this year.

1. Govikam Sangarawa

Volume 42 No. 4 - 3820

Volume 43 No 1 - 3570

Volume 43 No 2 - 3570

2. Kamatholil Vilakkam

(Vol. 49 No 2 – 4) - 408

3. Agtec

Volume 13 No 3 & 4 (Sinhala) - 3820

Volume 14 No 1 & 2 (Sinhala) - 3570

Volume 14 No 1 & 2 (Tamil) - 284

Volume 14 No 3 & 4 (Sinhala) - 3570

Volume 14 No 1 & 2 (Tamil) - 284

4.Recommended Crop Varieties- 460

Art Competition held

An art competition was held among school children to mark the centenary celebration of the DOA. About twenty six thousand in both Sinhala and Tamil speaking students participated in this competition, and action has been taken to send certificates to all the participants

FARM BROADCASTING SERVICE

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 desirable. Farm Broadcasting Service in Colombo is the main branch and functions closely with national broadcasting and telecasting channels to get the respective programmes aired. In addition, there are three regional Farm Broadcasting Units at Anuradhapura, Matara and Kandy, and the radio programmes produced by them are broadcasted respectively via 'Rajarata', 'Ruhunu' and

'Kandurata' regional broadcasting channels. agricultural radio programmes produced by Farm Broadcasting Service are in various formats such as documents, variety programmes, magazines, drama, live programmes, short messages etc. The basis for most of the programmes is the discussion held with experienced research and extension officers of the department of agriculture and experience farmers on particular agricultural activity or farmers who encounter related problems. Live programmes, which enable listeners to interact through telephones, are very popular, and it gives an opportunity to get solutions for their agricultural issues immediately.

1. Making awareness about more productive new agricultural practices among farmers.
2. Making awareness on problems encountered in farming and possible effective solutions for those problems.
3. Creating interest in agriculture as potentially profitable income generator.
4. Development of positive attitude with respect to agriculture among farmers.
5. Making awareness of farming community on environmental and other hazardous consequences relating to different agricultural practices.
6. Providing platform for farmers to express their views and ideas with respect to agriculture related policies and strategies introduced by the relevant authorities.
7. Promotion of home gardening activities in all homes in the country to ensure food security, nutrition and chemicals free food items.
8. Making agriculture a very attractive carrier to young men and women in the country.

PROGRESS

This service broadcasts radio programmes on agriculture mainly in Sinhala and Tamil languages throughout the country via different radio channels and broadcasted radio programmes during the year 2012 are given bellow.

Table 3.2.7: Radio programmes broadcast during the year

Programme	Live/ Recorded	Channel	Time	No. of programmes
Colombo Unit - Sinhala programmes				
Govithanata Payak	Live	Sinhala Swadeshiya FM91.7/FM91.9	Monday 9.00 am – 10.00am	51
Govigedara	Recorded	Swadeshiya FM91.7/FM91.9	Monday 6.45 pm – 7.00pm	51
Sarabhoomi	Recorded	Swadeshiya FM91.7/FM91.9	Sunday 6.45 pm – 7.00pm	47
Youth Quiz programme	Recorded	Swadeshiya FM91.7/FM91.9	Saturday 7.00 pm – 7.30 pm	42
Seilama	Recorded	Swadeshiya FM91.7/FM91.9	Saturday 6.30pm – 6.37pm	51
Mahagedarin Govigedarata	Live	Swadeshiya FM91.7/FM91.9	Thursday 6.30pm – 7.30pm	40

Programme	Live/ Recorded	Channel	Time	No. of programmes
Women Extension programmes	Recorded	Swadeshiya FM91.7/FM91.9	Monday, Thursday, Friday 10.00 am – 11.00am	53
Andaharaya	Recorded	Swadeshiya FM91.7/FM91.9 Commercial service FM 94.3/FM94.5 City FM – FM 89.6/FM89.8	Daily 6.20 am & 6.20pm	360
Tamil Programmes				
Vitathottam	Recorded	Tamil Swadeshiya FM 107.8	Friday 7.00am-8.00am	49
Vannamarudam	Recorded	Tamil Swadeshiya FM 107.8	Saturday 7.00pm-7.30pm	45
Rajarata Unit – Sinhala Programmes				
Saruketha	Recorded	Rajarata FM 107.3	Wednesday 7.07pm- 7.15pm	42
Boradiyamankada	Recorded	Wayamba Handa FM 90.1	Monday 6.45pm-7.00pm	12
Aththama	Recorded	Wayamba Handa FM 90.1	Daily 7.20pm	100
Wayamba Gewaththa	Live	Wayamba Handa FM 90.1	Thursday 3.00pm-3.30pm	8
Athwala	Recorded	Rangiri Sri Lanka FM 104.4/105.4	Daily 7.20pm	100
Maheshika wasabawana	Recorded	Rangiri Sri Lanka FM 104.4/105.4	Daily 2.00pm-4.00pm	120
Kandurata Unit – Sinhala programmes				
Kalavita	Recorded	Kandurata Sevaya FM107.3/107.5	Daily 7.00am-7.30am & 4.00pm – 4.30pm	390
Aswanna	Live	Kandurata Sevaya FM107.3/107.5	Friday 8.00am-9.00am	54
Govibima	Recorded	Kandurata Sevaya FM107.3/107.5	Saturday 8.00am-8.15am	47
Kandurata Unit – Tamil programmes				
Kurinchimalarhal	Recorded	Kandurata Sevaya FM107.3/107.5	Wednesday 7.00pm-7.30pm	48
Muhuduhal	Recorded	Kandurata Sevaya FM107.3/107.5	Friday 7.00pm-7.15pm	46
Short messages	Recorded	Kandurata Sevaya FM107.3/107.5	Daily 6.30pm-7.30pm 3 times / day	1080

Programme	Live/ Recorded	Channel	Time	No. of programmes
Ruhunu Unit – Sinhala Programmes				
Ruhunu Bimai Govi Dathai	Recorded	Ruhunu Sevaya FM 107.3/107.5	Wednesday 5.45 pm – 6.00pm	47
Divimagata Athwalak	Recorded	Ruhunu Sevaya FM 107.3/107.5	Saturday 3.45 pm-4.00pm	47
Govidathata Ape Saviya	Recorded	Ruhunu Sevaya FM 107.3/107.5	Daily 2.00pm-4.00pm	460
Hath Adiya	Recorded	Ruhunu Sevaya FM 107.3/107.5	Monday 7.00pm	44
Salupaliya	Recorded	Ruhunu Sevaya FM 107.3/107.5	Wednesday 6.30pm- 7.30pm	44
Kandamalla	Recorded	Ruhunu Sevaya FM 107.3/107.5	Saturday 6.45pm-7.00pm	39

FBS Programmes for exhibitions

Media publication, media coverage's on Agriculture exhibitions, field days and National events are given bellow.

Table 3.2.8: FBS programmes for exhibitions

Exhibitions/Field days / National events	Days
Dayata Kirula	09
DOA century Celebration	05
Distributed of Agricultural equipments under Japanese aids	01
Dakshina Krushikarma	05
Navodaya - Labuduwa	
Isurudiriya Festival and Agriculture exhibition	01
Field day - Bombuwala Rice Research Station	02
Diploma Certificate awarding ceremony	

Training Programmes by FBS

Following training programmes were conducted for listeners clubs.

Table 3.2.9: Training programmes conducted by FBS

Topic	No of trainers	Unit
Bee keeping	38	Colombo
Food technology	33	Colombo
Budding	21	Colombo
Home garden landscaping	48	Colombo
Fruit crop pruning	47	Colombo
Urban agriculture	27	Colombo
Crop clinic	48	Colombo
Fruit crop pruning	25	Kandurata
Home garden	28	Kandurata
Fruit plant potting	32	Kandurata
Koswade preparation	30	Ruhuna
Pruning	30	Ruhuna

AGRICULTURE TECHNOLOGY PARK - BATAATHA

The main objective of this park is the capacity building of various stakeholders in the agricultural sector, farmers, university students and entrepreneurs etc. School children become

major target recipients who are provided with the opportunities to learn agriculture science while gaining a sound practical knowledge.

This is a paradise not only for farmers, school children and general public to learn agriculture; Promoting agro-tourism is another dimension of the park; A unique selling point to encourage tourists to visit Sri Lanka. This is a new concept to promote tourism in Sri Lanka other than its historical sites, wild life, sand and sea.

Therefore, Bataatha is a paradise for agriculture enthusiasts. Summer huts with decks overlooking Lakes, Paddy fields, Fruit garden are common inthe park for reality and enjoy scenic beauty.

Bataatha has different demonstration sites such as Rice garden, Leafy vegetable garden, Fruit orchards, underutilized fruit garden, Medicinal garden, Chena, Spice garden, Banana garden etc. in an aesthetically pleasing edible landscapingenvironment. Arched two hands, is the gateway to the park; a symbol of the shared labour.

The park is abundant with numerous vegetable plants; a live Agro biodiversity; a live agriculture crop museum in an aesthetically pleasingenvironment; known as edible landscaping; now a days. Two sides of the road are hedged with a dragon fruit belt; a plant ideally suited for the dry zone conditions; belongings to the cactus family.The fruit is edible and considered to be very expensive in Sri Lanka; a message for visitors on a high valued crop.

One other important aspect of this garden is the facilitation provided for agricultural education. There are 15 facilitators within the ground to guide visitors. Unlike other normal gardens and parks in the world, service of facilitators (Agriculturists with Diploma in Agriculture) are provided to make aware farmers, school children, and other general public on each section of the park.

Another facility made available is this park is the self explanatory instructional technical board in all three languages; Sinhala; Tamil and English.

PROGRESS

Table 3.2.10: Progress during 2012

Description	Income (Rs)
School student	52,575.00
Other students	21,220.00
Adults	282,620.00
Tourist children's	1,000.00
Adult tourists	21,000.00
Vehicle Parking Charges	28,620.00
Auditorium	1,500.00
farm Product	150,295.00
Seed Paddy Production (5661)kg	237,766.62
Total	**796,236.62**

PLAN FOR 2013

Audio Visual Centre

- Establishment of one stop shop at Pelwehera farm.
- Establishment of Agro park at Seetha Eliya

- Continuation of production of two TV documentaries & continue designing printed media materials.
- Continuation of construction work of the National Agriculture Information & Communication Centre.
- Organizing Dayata Kirula and Govisathiya exhibitions.
- Continuation of ICT activities (New database for value chain)
- Addition of integrated agriculture site for A-park Gannoruwa

Agriculture Publications

- Ten Revised publications.
- Actions have been taken to introduce a new way of presentation style and contents to Govikam sangarawa(GS) and Kamathlil Vilakkam (KTV) Magazines
- Six new publications under AFACI project
- 200,000 leaflets will be published on various subjects.

Farm Broadcasting Service

- New radio belt during the week between 6.30 pm – 7.30 pm.
- A frequency for a channel will be the obstacle for a new radio channel.

Agro Technical Parks- Bata atha

- Farmer training programme on nursery management, fruit & vegetable crops, bee keeping, grain and other field crop management.
- Opening of restaurant and children park

STAFF LIST

Designation	No.
Director	01
Additional Director	01
Deputy Director of Agriculture	02
Assistant Director of Agriculture	04
Subject Matter Specialist	01
Agriculture Officer	05
Lecturers	02
Agricultural Instructor	50
Programme Assistant	04
Media Assistant	03
Audio Visual Assistant	03
IT Assistant	02
Management Assistant	13
Artist	02
Forman (acting)	01
Photographer	01
AV Technician	01
Book Binder	01
Machine minders	03
Compositor	01
Farm Clerk	01
Office Work Assistant	02
Drivers	14
Tractor Driver	01
Cinema operator	02
Store man	01
Watcher	07
Sanitary Labourer	01
Lorry Cleaner	01
Carpenter	01
Welder	01
Electrician	01
Painter	01
Labourers (Permanent)	22
Labourers (Contract) / Computer Operators	166
Total	**321**

4.1 ADMINISTRATION DIVISION

The role of the Administration division can briefly be defined as the Performance of various matters of establishment during the period from an appointment to the retirement. Matters involving grant of study leave and general conduct are also included in the tasks of the division. The division has to deal with organizations such as Public Service Commission, Attorney General's Department, Parliamentary Advisory Committees, Office of the Commissioner of Parliamentary Affairs regarding various appeals and also with other ministries and departments. Coordination of this overall process in accordance with guidance and instruction of the Ministry of Agriculture is vested with the division.

BUDGET

Allocation received and expenditure incurred during 2012 are given in Table 4.1.1

Table 4.1.1 Annual budget – 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	14,419,414	14,414,946	99
Recurrent	7,533,255	7,399,165	97
Total	**21,952,669**	**21,814,111**	**98**

PROGRESS

Appointments

Appointments made by the Director General of Agriculture.

Designation	No. of Appointments
Sri Lanka Agriculture Service	01
SL Administrative service	03
SL Accounting service	02
SL engineering service	01
Public Management Assistant (supra)	15
Agricultural Instructor	156
Research Assistant	84
Compositor	01
Store man	47
Research sub assistant	12
Seed man	29
Tractor operators	49
Budder	53
Circuit bungalow keeper	11

Promotions

Following promotions were made during the year under review.

Designation	No.
Sri Lanka Agricultural Service 11/1	12
Electrician 11/1	04
Tractor operators 11/1	17

Absorb in to Grades

Research assistant- special grade	03
Agriculture instructor-class 1	63
Agriculture instructor- class 11	42
Labour	510

Retirement from the Service

Designation	No.
Sri Lanka Agriculture Service	14
Media Assistant	01
Research assistant	02
Agriculture instructor	33
Work inspector	01
Public Management Assistant - Supra grade	02
Farm clerk	26
Driver	16
Plant Yard Attendant	01
Welder	01
Pump Operator	01
Machinist	01
Carpenter	01
Seed technician	01
Watcher	16
Research sub assistant	02
Circuit bungalow keeper	01
Cook	01
Office Employee Assistant	06
Labour	02
Sanitary labour	01

Deceased While in Service

Sri Lanka Agriculture Service	02
SL Accounting service	01
Agriculture instructor	01
Public management assistant	01
Driver	03
Tractor operators	01
Circuit bungalow keeper	01
Mason	01

Release of Officers to Other Posts

Sri Lanka Agriculture Service	01

Vacation of Post

Sri Lanka Agriculture Service	03
Agriculture instructor	01
Machinist	01

Resignation from Post

Sri Lanka Agriculture Service	01
Agriculture instructor	41
Research assistant	06
Farm Machinery Instructor	01

Termination of Service

Agriculture Instructor	01

Officers released to Provincial Councils

Sri Lanka Agriculture Service	01
Agriculture Instructor	07
Research Assistant	01

Reinstatement in Service

Sri Lanka Agriculture Service	02

Disciplinary Inquiries

Table 4.1.2: Disciplinary inquiries in the year 2012

	Number of inquiries pending at the beginning of the year 2012	Number of inquiries initiated during the year 2012	Number of inquiries completed during the year 2012	Number of inquiries pending as at 2012.12.31
Preliminary Investigation and Inquiries of Petitions	87	69	46	100

F.R.104 Inquires

Table 4.1.3: FR inquiries in the year 2012

Number of inquiries pending at the beginning of the year 2012	Number of inquiries initiated during the year 2012	Number of inquiries completed during the year 2012	Number of inquiries pending as at 2012.12.31
540	91	145	486

Amount of the loans granted and types of salary advance

Distress loans

Numbers of vouchers approved - 774

Amount paid - Rs. 9,2815,029.00

Bicycle loans

Numbers of vouchers approves - 35

Amount paid - Rs. 210,000.00

Property loans

Numbers of Application recommended – 57

Amount paid - Rs. 6,1603,000.00

Motor bicycle loans

Numbers of Application recommended - 09

Amount paid - Rs. 1,350,000.00

"Agrahara" Insurance Scheme

- Value of Bills Submitted for Reimbursement of Hospital Charges and Eye Glasses: Rs. 8,073,161.84

Number of applications: 932

- Number of death claims submitted: 06
- Benefits for natural death: Rs. 600,000.00
- Number of natural death claims submitted: 12

Total amount of reimbursements and claim applied for: Rs. 8,673,161.84

Security Deposits

- Number of personnel whose security deposits were released after retirement: 73
  Amount released: Rs. 1,085,690.53
- credited to the government account:
  Rs. 8,677,582.08
- Number of security bond recommendations traded to the ministry for deposit of securities: 586

Payments of Pensions

Files of the payment of pensions received as follows.

- For payments of pensions 280
- For death gratuity 10
- For ex-gratia payment 01
- For reversions 195
- Release of minority receipts 08

Study Leave

No. of officers gone abroad for post graduate degree.

For PhD

Research Assistant	01

For MSc

Deputy Director	01
Assistant Director of Agriculture	01
Research Officers	03
Programme Assistant	01

No. of officers returned after completing post-graduate degree.

For MSc

Research officers	01
Individual Tours	01

For PhD

Research Officers	02

Release of officers for BSc and MSc degree within the island

PhD Degree

Research Officers	01

MSc degree

Assistant Director of Agriculture	01
Research Officers	01

Completing BSc Degree within island

BSc degree

Agriculture instructor	01

MSc degree

Agriculture Officer	02
Lecturer	03
Research Officer	01

Overseas visits for training, workshop and other conferences

Designation	No. of Visits
Director General of Agriculture	03
Addl. Director General of Agriculture	03
Director	17
Chief Engineer	01
District Director of Agriculture	01
Additional Director	03
Registrar of Pesticides	01
Deputy Director	12
Assistant Director of Agriculture	13
Engineer	04
Agriculture Economist	05
Lecturer	12
Research Officer	43
Agriculture Officer	05

Subject Matter Specialist	01
Agriculture Instructor	10
Programme Assistant	04
Media Assistant	01
Technical Officer	01
Farm Machinery Instructor	01

Local training

Trainings Organized during the year	**No. of Officers attended**
Disciplinary Action Training for Public Management Assistants	77
Training on Maintenance of Personal files, for Public Management Assistants	97
Productivity Improvement Workshop, for Public Management Assistants and Other Secondary Level Officers	
Workshop – 1. Step – 1	43
Workshop – 2. Step – 1	47
Workshop – 3. Step – 1	78
Workshop on Technical Knowledge for Drivers	15

Officers directed for trainings conducted by external institutions	**No. of Officers directed**
Training Course on Document management, conducted by The National Archives Department	01
Trainings Conducted by the Central Bank of Sri Lanka	02
Technical Trainings conducted locally, by Various Institutions	30
Non Technical Trainings conducted locally, by Various Institutions	30
Trainings Conducted by SLIDA	01
Trainings Conducted by PSTI	32

- Practical Training facilities were provided for 27 trainees from Technical Colleges of Sri Lanka.

Recoveries

The Total recoveries to the Government from officers who have breached agreements are Rs.4,182,187.56

STAFF LIST

Designation	**No.**
Additional Director General (Administration)	01
Director (Administration)	01
Deputy Director (Administration)	01
Assistant Director (Administration)	01
Administrative Officer	06
Translator (English)	02
Translator (Tamil)	01
Programme Officer	11
Legal Assistant	01
Public Management Assistant	93
Driver	06
Office Employee Assistant	21
Watcher	06
Labour	27
Total	**178**

4.2 ENGINEERING DIVISION – PERADENIYA

The prime objective of the Engineering Division is to provide quality infrastructure facilities promptly to the Department of Agriculture to enable it to attain the departmental objectives.

The main functions of the Engineering Division can be categorized as follows:

- Procurement of Capital Assets :
  - Civil engineering constructions
  - Procurement of Machinery, vehicles and Office Equipment
- Maintenance of infrastructure facilities:
  - Buildings and structures
  - Vehicles and Machinery
  - Office Equipment
- Other Services:
  - Operation and Maintenance of the drinking water supply scheme in Kundasala
  - Providing engineering advisory services to all Divisions of DOA

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 activities carrying out in these workshops are repairing and servicing of vehicles. In addition, inspectors of works were stationed in three regional offices in order to attend civil engineering requirements in the region efficiently.

BUDGET

The budgetary allocations and expenditure under different votes for the year 2012 are given in Table 4.2.1

Table 4.2.1: Annual budget – 2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	2,892,245	2,124,748	73
Recurrent	8,835,945	7,893,912	89
Total	**11,728,190**	**10,018,661**	**85**

PROGRESS

Progress of Civil Engineering Works

The activities carried out can be categorized as follows:

- New construction and repairs carried out by the Division – this includes preparation of estimates, tender management and awarding contracts, work supervision and approval of payments
- Preparation of Estimates to carry out the duties by other Divisions– Because of the limitations of

human resource, specially shortage of technical staff, Engineering Division prepare estimates only on the requests of the Directors.

The summary of the Civil Engineering works carried out by the Division in 2012.

Requests Received

- New Constructions: 149
- Repairs: 549

Total work carried out:

- Estimates Sent : 454
- Tender Called : 167
- Minor Repair in Maintenance: 80
- Estimates Prepared : 621

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	9,590,282.26
Finance	2,310,084.56
RRDI	-
SCPPC	5,891,648.72
Extension & Training	42,850,107.65
SEPC	852,440.00
HORDI	12.998,382.36
SPMDC	26,130,686.23
NRMC	568,399.41
FCRDI	4,561,365.20
Engineering	1,055,398.59
Total Amount	**93,810,413.12**

Progress of Mechanical & Electrical Engineering works

The activities carried out in the year 2012 can be categorized as follows:

a. Procurement of Works

- Registering of garages & service stations
- Registering of suppliers

b. Vehicle repairs and maintenance 2012

Table 4.2.3: Vehicle repairs and recommendations given

Location		Major Repairs	Minor Repairs	Recommendations	Total
Kundasale		10	96	6	127
Head Office				125	125
Polonnaruwa		3	17	45	73
Angunakolapelessa		40	95	200	346
Seetha Eliya		9	92	96	208
Total	**62**		**300**	**472**	**879**

c. Procurement of Machineries and Equipments

Table 4.2.4: Value of Goods Procured by the Engineering Division in 2012

Division	Total Rs.
• Engineering Division	633,535.80
• Administration Division	843,848.28
• Finance Division	1,845,817.00
• Extension & Training Division	23,833,741.40
• Socio Economics & Planning Centre	346,447.60
• Seed & Planting Material Development Centre	10,725,554.68
• Natural Resource Management Centre	731,579.80
• Horticulture Research & Development Institute	3,448,077.54
• Seed Certification & Plant Protection Centre	22,662,918.43
• Field Crop Research & Development Institute	6,608,048.00
• Rice Research & Development Institute	2,878,078.50
• Progress Monitoring & Evaluation Unit	170,672.40
• Ministry of Agriculture	55,000.00
Total	**74,783,319.43**

Water Supply Scheme at Kundasala

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 adversely affected due to lack of trained technical staff in the Division. Number of vacancies exist 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.

PLAN FOR 2013

Vote	Allocation (Rs)	Expecting Time
2001 – Repairing of staff quarters	1,500,000.00	October 2012
2102 – Office Furniture and equipment	450,000.00	August 2012
2103 – Machinery	300,000.00	June 2012
2105 – Land Improvement	500,000.00	November 2012
2401 – Training Capacity Building	300,000.00	November 2012

STAFF LIST

Designation	No.
Chief Engineer	01
Mechanical Engineer	02
Civil Engineer	02
Electrical Engineer	01
Engineering Assistant	02
Inspector of Works	06
Engineering Foreman	01
Farm Mechanical Instructor	03
Administrative Officer	02
Public Management Assistant	14
Drivers	06
Mechanic	12
Electrician	03
Carpenter	02
Mason	01
Welder	01
Tinker	01
Machine Operator	01
Store man	02
Labour (Special- Stores)	01
KKS	01
Watcher	02
Labour	10
Total	**77**

4.2.1 FARM MECHANIZATION RESEARCH CENTER (FMRC) – MAHAILLUPPALLAMA

Farm Mechanization Research Center is located within the Mahailuppallama agricultural complex, about 35km from Anuradhapura. FMRC has been established to promote appropriate farm mechanization in Sri Lanka by introducing farm mechanization technology to reduce cost of production, improve quality, enhance productivity & increase volume of agricultural products.

The major objectives of FMRC is to introduce effective agricultural mechanization technologies compatible with the socio economic & field conditions prevailing in different parts of the Sri Lanka. The activities carried out by FMRC are as follow.

- 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.
- Production of 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 agriculturalmechanization, technologies among farmers & other users.

The center consists with following sections.

1. Research & Development Section
2. Testing & Evaluation Section
3. Agricultural & Industrial Extension Section
4. Farm Machinery Maintaining & Repairing Section
5. Administrating Section

BUDGET

The allocation and expenditure under deferent votes for 2012 are given in the following table.

Table 4.2.1: Annual budget – 2012 (Rs.)

Vote	Allocation	Expenditure	%
Recurrent	6,054,710	5,830,488	96
Capital	2,355,196	2,173,717	92
Total	**8,409,906**	**8,004,205**	95

PROGRESS

Research & Development Section

Seed Paddy Cleaner

Automated feeding system was introduced to High capacity seed paddy cleaner. Fabrication of parts is in progress, and preliminary field test was completed using existing seed paddy cleaner
& grain cleaner.

Axial Flow Water Pump

Four wheel tractor powered Axial flow water pump was designed and fabricated and tested successfully.

Low Land Power Weeder

Short comings in existing machine was identified and a new power Weeder proto type was designed and fabricated.

Four Wheel Tractor Coupled Injector Planter

Fertilizer Applicator for four (4) wheel tractor coupled injector Planter was introduced.

Riding Type Drum Seeder

Fabrication of the proto type was completed andit was successful. Field performance test was completed. Modifications are on going to finalize the product for commercial scale manufacturing.

Modifications to the Existing Ground NutDe Corticator

Basic Modifications of existing machine was completed.

Modifications to the Existing Pulse Processing Machine

Cleaning and grading assembly unit was fabricated and field tests were conducted.

Agricultural & Industrial Extension Section

Large number of people including undergraduates, farmers, teachers, school students, technical college students and staff visited the center for learning and study on Farm machineries. Field demonstrations were held at various places in Sri Lanka to produce hand on experience to farmers and extension officers on paddy mechanization package, maize mechanization peckages, flood irrigation systems etc. Dayata Kirula exhibition held at Oyamaduwa and Govi Sathiya Exhibition held at Gannoruwa were very productive events which imparted more information to farmers on farm machineries.

Table 4.2.2: Extension programs during the year 2012

Type of program	Number of programs
Filed demonstrations	25
Radioprograms	03
Exhibitions	02
Visitors	1838

Testing & Evaluation Section

Farm Mechanization Research Center was established to test and evaluate locally manufactured or imported agricultural machineries in Sri Lanka.

Following machines were tested during the year 2012.

Table 4.2.3: Machines tested during the year 2012

Type of Machine	Received Machine	Pass	Fail	On going
Four wheel tractors	4	1	2	4
Two Wheel Tractors	1	2	2	7
Hand Sprayers	3	3	4	1
Power Sprayers	2	2	1	6
Rotary Cultivators	-	-	-	2
Combine Harvesters	1	-	-	1
Tractor Attach Implements	-	-	2	8
Water Pump	5	3	-	11
Multi Chopper	1	1	-	1
Hand Tools	7	7	8	4
Total	**24**	**19**	**19**	**45**

Farm Machinery Maintaining & Repairing Section

This section was established to repair DOA Farm Machineries& Vehicles and toinspect, estimate and recommend repairs and give technical assistance for all kind of machinery repairs.

Following recommendations were given as repairs during the year 2012.

Table 4.2.4: Maintenance & Repair of Farm Machinery

	Light Vehicle Out	Light Vehicle FMRC	Motor Bike Out	Motor Bike FMRC	Heavy Vehicle Out	Heavy Vehicle FMRC	Total
No. of Recommend ations	98	00	13	00	47	00	158
No. of Repairs	51	14	07	04	23	10	109

A total of 13 services have been completed during the year 2012.

STAFF LIST

Designation	No.
Mechanical Engineer	04
Engineering Draftsman	01
Engineering Forman	01
Management Assistant	03
Research Assistant	01
Farm Machinery Instructor	02
Agricultural Instructor	02
Driver	02
Store man	01
Tractor Operator	02
Plant Helper	02
Mechanist	03
Mechanism	02
Fitter	01
Welder	02
Tinker	01
Blacksmith	01
Carpenter	01
Watcher	01
Unskilled Labour	09
Contract Labour	29
Total	**71**

4.3 FINANCE DIVISION – PERADENIYA

The prime objective of the Finance Division

Establishment and operation of a sound financial management system to achieve the objectives of the Department of Agriculture. Functions coming under the purview of the Finance Division are;

- 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 during 2012(Rs.'000)

Project	Project Description	Revised Estimate	Expenditure	Progress as a %
285 – 1 – 1	Administration & Establishment Services	25,753	21,891	85
285 – 2 – 2	Agriculture Research & Development	403,859	290,949	72
285 – 2 – 3	Agriculture Extension & Training	125,385	115,148	92
285 – 2 – 4	Seed Certification & Plant Protection	817,283	727,359	89
	Total	**1,372,280**	**1,155,348**	**84**

The anticipated financial progress of capital projects was unable to achieve as imprest was not enough in 2012**.** As such, application has been made to incur expenses after being transferred a sum of Rs.122 million under each project to the deposit account. Capital expenditures under each project together with relevant liabilities are as follow.

Capital Expenditure with Liabilities

Table 4.3.2: Capital expenditure with liabilities during 2012 (Rs'000)

Project	Project Description	Revised Estimate	Expenditure with liabilities	Progress as a %
285 – 1 – 1	Administration & Establishment Services	25,753	22.465	87
285 – 2 – 2	Agriculture Research & Development	403,859	365,805	91
285 – 2 – 3	Agriculture Extension & Training	125,385	119,627	95
285 – 2 – 4	Seed Certification & Plant Protection	817,283	770.139	94
	Total	**1,372,280**	**1.278,037**	**93**

Recurrent Expenditure – 2012

Table 4.3.3: Recurrent expenditure during 2012 (Rs'000)

Project	Project Description	Revised Estimate	Expenditure	Progress as a %
285 – 1 – 1	Administration & Establishment Services	202,235	221,690	99
285 – 2 – 2	Agriculture Research & Development	773,956	769,386	99
285 – 2 – 3	Agriculture Extension & Training	586,915	581,822	99
285 – 2 – 4	Seed Certification & Plant Protection	410,994	409,957	99
	Total	**1,994,498**	**1,982,855**	**99**

Operation of Advance Account

Activities

Table 4.3.4: Operation of Advance Account during 2012 (Rs'000)

Description	Approved limit Revised (Rs.)	Actual Amount (Rs.)
1. Maintenance of Agricultural Farms		
Maximum limit of Expenditure	385,000	382,826
Minimum limit of receipts	375,000	404,861
2. Public Officers Advance Account		
Maximum limit of Expenditure	180,000	165,925
Minimum limit of receipts	110,000	164,017

Farm Advance Account

Details of the Farm advance account are as follows.

- **Profit and Losses of the account**

Profit and Losses of the farm advance account from 2002 to 2012 are mentioned below.

Table 4.3.5: Profit and losses of the account

Year	Profit/losses before adjusted subsidies (Rs. Million)	Subsidy (Rs. Million)	Net profit/losses after adjusted development subsidies (Rs. Million)
2002	- 21.6	-	- 21.6
2003	- 28.5	-	- 28.5
2004	- 44.3	-	- 44.3
2005	- 24.6	39.0	14.4
2006	- 50.6	51.0	00.4
2007	14.0	50.0	64.0
2008	- 94.0	50.0	- 44.0
2009	01.3	50.0	51.3
2010	02.2	50.0	52.2
2011	- 60.7	-	- 60.7
2012	67.3	-	67.3

Action has been taken to present the format of this account in 2012 after being revised the format used so far in accordance with the financial regulations and accounts standards. It mentions details corresponding to financial regulation and the management procedure.

The following details are shown by the accounts in 2012.

Table 4.3.6: Details shown by the accounts in 2012

Details	Amount (Rs. million)
Working Profit	182.73
Net profit before adjusting nominal changes	67.328
Net profit (after adjusting nominal changes)	51.333

There was a severe drought at the beginning of the year 2012 (this can be proved by providing seed paddy to the drought affected areas by the government at free of charge) and floods prevailed at the end of the year (Postponing of "Deyata Kirula" exhibition due on 4th February 2013 up to 23.03.2013 as unable to executed relevant constructions due to floods provide evidence for this. We can satisfy over the objectives achieved even under the unfavourable situation.

The progress of 2012 is the best progress achieved in the advance account history.

Allocation Received under the Department votes for Special Projects

Table 4.3.7: Allocation and expenditure of special projects (Rs'000)

Index No.	Vote No.	Name of the Project	Received Allocation	Actual Expenditure	Progress as a %
01	285 - 2 - 2 - 2 - 2502	Infrastructure development needed to improve rice research & development(RRDI)	67,505	65,408	97
02	285 - 2 - 2 - 3 - 2502	Development of Hybird, Rice,Maize, Fruit and Vegetables	9,000	8,176	91
03	285 - 2 - 2 - 4 - 2502	Small scale Agricultural research project (US)	15,000	14,999	100
04	285 - 2 - 3 - 2 - 2105	Agriculture school farms	20,000	18,418	92
05	285 - 2 - 3 - 4 - 2502	Media programme	26,200	26,199	100
06	285 - 2 - 3 - 6 - 2401	Annual Symposium of Department of Agriculture. (ASDA)	3,000	2,879	96
07	285 - 2 - 4 - 1 - 2502	Seed production & purchasing programme	432,162	431,661	99
08	285 - 2 - 4 - 4 - 2502	Seed Act	17,000	13,969	82
09	285 - 2 - 3 - 7 - 2502	Agro Park	4,500	3,458	77
10	285 - 2 - 4 - 5 - 2502	Accelerate Farm Development programme	236,460	216,443	92
11	285 - 2 - 4 - 7 - 2502	String thing of Seed Cer. Activities	53,120	11,324	21

Collection of Revenue

Table 4.3.8: Collection of revenue during 2012

Revenue Heads	Category	Actual Receipts (Rs. '000)
20 - 02 - 02 - 99	Loan Interest	14,901
20 - 03 - 02 - 99	Sale of other assets	812
20 - 03 - 99 - 00	Other receipts	181,809
20 - 02 - 01 - 01	Rent and others	18,331
20 - 03 - 02 - 18	Department Sale & Other charges	140,236
20 - 04 - 01 - 00	W & O.P	67,582
	Total	**423,671**

STAFF LIST

Designation	No.
Chief Accountant	01
Deputy Director (Finance)	06
Assistant Director (Finance)	02
Budget Assistant	02
Translator	01
Public Management Assistant	83
K.K.S	07
Drivers	04
Unskilled Labourer	14
Total	**120**

4.4 PROGRESS MONITORING AND EVALUATION UNIT (PMEU) – PERADENIYA

The PMEU is responsible for monitoring and evaluation of activities and programmes conducted by all institutes and centers of the DOA. In addition, it holds the responsibility of preparing Annual Action Plan, Annual Performance Report, monthly progress reports and other relevant reports for the Ministry of Agriculture and other institutes. Progress review meetings are also convened by the PMEU in order to streamline the activities of the DOA.

BUDGET

Table 4.4.1: Annual budget -2012 (Rs.)

Vote	Allocation	Expenditure	Expenditure %
Capital	1,006,168	696,942	70
Recurrent	1,844,700	1,467,639	80
Total	**2,850,868**	**2,164,581**	**76**

PROGRESS

COMPILATION OF ACTION PLANS

Action plans for the year 2012 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 2012. 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 2012

Vote	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure %
Capital	324	209	64
Recurrent	1994	1982	99
Projects under DOA votes	1048	946	90
Projects under Ministry votes	141	103	73
Total	**3507**	**3240**	**92**

PROGRESS MONITORING OF SPECIAL PROJECTS

Special Projects under DOA votes

Progress of 14 special projects under DOA votes were monitored and monthly reports including physical and financial progress 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 2012

Project	Institute	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure %
1. Land and land improvement	DOA	64.2	60.38	94
2.Training and capacity building	DOA	14.78	12.32	83
3.Infrastructure development RRDI	RRDI	67.5	65.4	96.9
4.Hybrid seed development	FCRDI/ HORDI/ RRDI	9	8.17	90
5. Small scale projects	RRDI/ HORDI	15	15	100
6. Implementation of National Agricultural Research Plan (NARP)	DOA	80	53.58	67
7. Tissue culture technology	HORDI	25.3	25.28	99.9
8. Media programme	ETC	26.2	26.2	100
9. Annual Symposium of DOA	ETC	3	2.88	96
10. Agro technology park	ETC	4.5	3.46	77
11. Seed production and purchasing program	SPMDC	432	431.7	99.9
12. Implementation of seed act	SCPPC	17	13.97	82
13. Accelerated seed farm development programme	SPMDC	236.46	216.44	91.5
14. Strengthening of seed certification activities	SCPPC	53.12	11.32	21
Total		**1048**	**946**	**90**

Special Projects under Ministry votes

Progress of 18 special projects under Ministry of Agriculture votes were monitored and monthly reports including physical and financial progress were submitted to the Ministry. Financial progress of special projects under Ministry votes are given in Table 4.4.4.

Table 4.4.4: Progress of special projects under Ministry votes

Project	Institute	Allocation (Rs. Mn.)	Expenditure (Rs. Mn.)	Expenditure %
1. Land development	GLORDC	0.5	0.5	100
2. Bio diversity garden	FCRDC	6.4	5.9	92
3. Farm development	DOA	75.95	63.85	84
4. MR Sports complex	FCRDC	25	14.45	58
5. Community based seed production villages	SPMDC	6	5.26	88
6. Fruit production	FCRDC	10	8.43	84
7. Productivity improvement of LCWZ paddy	RRDI	5	2.1	42
8.Experiment on CO_2 enriched environment	HORDI	2.325	1.773	76
9. Minimize usage of pesticides	ROP	5.3	1.75	33
10. Increase productivity of mange and durian	FCRDS	1.116	0.53	47
11. Agriculture radio channel	FBS	5	0.655	13
12. Organic fertilizer production	RARDC - Makandura	9.87	8.798	89
13. Soil conservation act	NRMC	2.5	1.74	69
14. Micro irrigation	ETC	2.8	2.799	100
15. National farmer day	ETC	5	4.429	88.5
16. Deyata Kirula	ETC	10.5	10.499	100
	FCRDI	0.5	0.4	80.6
	HORDI	0.1	0.096	96
	ICC	19.898	8.595	43
17. Rice export program	ETC	7.858	0.345	4.4
18. Off season red onion production	FCRDI	0.555	0.471	84
Total		**202**	**143**	**71**

ACHIEVEMENTS OF DOA

Achievements of DOA in the year 2012 were compiled and submitted to the Ministry of Agriculture and the Central Bank for inclusion into 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 2011 was prepared and distributed to the Parliament, all relevant Ministries, Universities, libraries and other relevant institutions.

OTHER REPORTS

Progress reports of activities under 'Mahinda Chintanaya' and projects of which the total estimated cost exceeds Rs. 50 million were prepared and submitted to the Ministry of Agriculture.

PLAN FOR 2013

- Preparation of Action Plans for DOA programmes
- Monitoring progress of capital and recurrent work and special projects
- Conducting monthly physical and financial progress review meetings
- Compilation of the Annual Performance Report of the DOA
- Providing information for the Central Bank report and the budget speech.
- Compilation of progress reports for projects over 50 million

STAFF LIST

Designation	**No.**
Deputy Director	01
Translator	02
Programme Assistant	02
Agricultural Instructor	01
Public Management Assistant	02
Driver	03
KKS	01
Labourer	03
Watcher	01
Total	**16**

5. WEATHER REPORT

Meteorological data collected from 14 agro-meteorological stations representing different agro-ecological regions in Sri Lanka during 2011/2012 Maha (September – February) and 2012 Yala (March – August) seasons have been summarized in this report. This report has been compiled by the Climatology Division, Natural Resources Management Center (NRMC) of the Department of Agriculture.

The cumulative seasonal rainfall of both seasons is given in the Table 5.1. The monthly rainfall and corresponding 10-year averages of 14 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 2011/2012 Maha season was below the expectations in almost all regions of the country. It was mainly attributed to the weak intermonsoonal weather conditions in October and November followed by non-occurrence of weather systems in the Bay of Bengal during the season. Meanwhile, 2012 Yala season was also not conducive for a successful agricultural production due to poor intermonsoonal weather conditions prevailed in the months of March and April, followed by weak southwest monsoonal circulation in the vicinity of Sri Lanka. Cursory examinations of weather records reveal that rainfall of Yala season has not performed at its usual rhythm for the second consecutive time in a row. It also uncovers a situation of failure of southwest monsoon in two consecutive seasons signaling climate change is already taking its share from the southwest monsoon, the rainy season which was used to be the country's most reliable rainy season.

Low Country Wet Zone

Ratnapura (WL_{1a})

This area of the Wet zone experienced a 30% reduction of cumulative seasonal rainfall of 2011/2012 Maha season compared to its long term average of 1,651 mm. This negative anomaly was mainly attributed to the below normal rainfall experienced during the second intermonsoon rainy season (October and November) and in the month of December. This period of the year usually receives rains due to the formation of weather systems in the Bay of Bengal under the influence of Inter Tropical Convergence Zone (ITCZ). But, activity of ITCZ in the current season was substantially weak resulting below normal rains from October through December, the period usually known as the "Stormy Season" of the island.

Meanwhile, there was about 15% reduction of cumulative rainfall of the 2012 Yala season compared to its long-term average 2,148 mm, mainly due to the fact of weak southwest monsoonal activity prevailed over the area during the period of May through July. However, monthly cumulative potential evapotranspiration

values remained below the cumulative rainfall of respective months and, thus there was only a slim chance to develop soil moisture stress conditions in upland crops grown in the region.

Bombuwela (WL_{1b})

There was a 27% reduction of cumulative seasonal rainfall of this region during 2011/2012 Maha season compared to its long term average of 1,542 mm. Reasons given for the negative anomaly of WL1a region for the same season remained valid for this region too.

Even though anomaly of cumulative seasonal rainfall of 2012 Yala season was only about 10 per cent, its distribution within the season was highly erratic. Rainfall during April and May was far below the expected amounts due to weak convectional activity prevailed in the region. A similar situation was experienced in the month of July due to weak southwest monsoonal activity. However, an unusual rainy weather condition prevailed in August recording over 80% increase in the monthly cumulative rainfall. Nevertheless, monthly cumulative potential evapotranspiration values remained below the cumulative rainfall of respective months and, thus hardly any chance of developing soil moisture stress conditions in upland crops grown in the region.

Mid Country Wet Zone

Peradeniya (WM_{2b})

Cumulative seasonal rainfall of 2011/2012 Maha season in this region was only about 567 mm, which is about 47 per cent decrease compared to the long-term average. This negative anomaly in the Maha season rainfall is a result of below normal rainfall in every month of the season except in September due to the same reasons given for Low Country Wet Zone region. However, usual dry weather conditions during the period of mid January to late February prevailed as expected. Definitely, it may have been a conducing environment for flower setting in tree-fruit crops in the region.

Due to the weak intermonsoonal conditions and poor southwest monsoonal wind blow prevailed in the area, rainfall during 2012 Yala season was only about 66% of the expected amount. Each and every day in the month of May was a meteorologically dry day, a very rare weather phenomenon to experience in this part of the country. Rainfall during the June was also not even sufficient to meet the evaporative demand. August is the only month which received expected amount of rains in this region. A cursory examination of previous weather records revealed that a similar condition had prevailed in June and July in the previous Yala season (2011). However, other agro-metrological parameters recorded in this region, temperature in particular remained conducive for crop growth without approaching extreme high values despite dry weather conditions prevailed in the area.

Up Country Wet Zone

Sita Eliya (WU_3)

Cumulative seasonal rainfall of 2011/2012 Maha season in this region was about 1,125 mm, which is about 15% decrease compared to its long-term average. This decrease was mainly attributed to below normal rains experienced during the

month of September. Unlike, other regions of the Wet zone, negative anomaly of Maha rains was not so distinct in WU3 region and in fact it may have favored the conventional vegetable cultivation of this region.

The cumulative rainfall of 2012 Yala season in this region was about 449 mm, which is about 45% decrease over the long-term average. The decrease was mainly attributed to the extremely below normal rains received during May and June due to weak southwest monsoonal conditions prevailed over the Indian sub-continent. Cumulative potential evapotranspiration during May and June exceeded the total receipt of rainfall the same period while only merely meeting the requirement in June. Generally, this is an extremely rare agro-meteorological phenomenon to experience in this region; but, weather records reveal that it is a repetition of the situation in previous Yala season in 2011.

Low Country Intermediate Zone

Batalagoda (IL_{1a})

The recorded cumulative seasonal rainfall of 648 mm during 2011/2012 Maha season in this region is a 40% decrease compared to its long-term average. This significant negative anomaly of Maha season's rainfall was a result of weak intermonsoonal conditions and, non occurrence of weather systems in the Bay of Bengal. None of the month in the active growing season managed to receive expected amount of rains in this region resulting very low water levels in the minor irrigation tanks in the region. In spite of being major and reliable rainy season for the region, rainfed agriculture may have suffered heavily..

As this region does not lie directly under the effective region of the southwest monsoon, the reduction of Yala season rainfall was not severe as in the case of Wet zone. However, recorded cumulative seasonal rainfall of 600 mm, was about 20% decrease compared to its long-term average. This negative anomaly was mainly attributed to the significant reduction of rainfall in the month of May as in other regions of the country. Otherwise, all other months of the season managed to receive expected amount of rainfall in respective months. Cumulative rainfall was in excess of cumulative potential evapotranspiration in each month of the season except in May.

Monaragala (IL_{1c})

In contrary to other parts of the country, this region experienced a 15% increase in the cumulative seasonal rainfall of 2011/2012 Maha season over its long term average due to receipt of above normal rains during the period of October and November. The potential evapotranspiration remained well below the rainfall during each month of the season, assuring a favorable soil moisture condition for rainfed upland crops. The state of the other agro-meteorological parameters during the season was also conducive for a good crop growth. The nighttime minimum temperature regime continued to remain at a relatively lower level compared to other parts of the Low Country Intermediate and Dry zones favoring for citrus, sugarcane and other fruit crops.

The cumulative seasonal rainfall of the 2012 Yala season in this region was 482 mm, which was about 20% decrease compared to its long-term average. This decrease was mainly attributed to the below normal rains experienced in every month of the season except April. Meanwhile, cumulative potential evapotranspiration of each month of the season was in excess of the rainfall. Thus, cultivation of upland crops may not have been possible without supplementary irrigation. However, it can not be considered as an unusual weather condition for the region as this region hardly experience well distributed rainfall throughout the Yala season.

Maho (IL_3)

This region received 768 mm of cumulative seasonal rainfall during 2011/2012 Maha season which was about 20% reduction compared to its long-term average. This negative anomaly was mainly attributed to the 40% reduction of monthly rainfall in November. January was also unusually dry for the region receiving only a 3 mm of rainfall for the entire month. In contrast, an abnormal wet weather condition was experienced during the month of February with a cumulative rainfall of 153 mm as against to the 25 mm of long-term average in the region.

There was a 30% decrease of cumulative seasonal rainfall during 2012 Yala season in this region compared to its long-term average of 647 mm. This reduction was mainly attributed to the below normal rains experienced during the period of May through August. During this period, even a single day in the month of May did not receive any measurable amount of rainfall while the rainfall in other three months was very much below the evapotranspiration demand of the atmosphere. Thus, drought injuries may have been a common problem in the region during this season.

Mid Country Intermediate Zone

Kundasale (IM_{3a})

The cumulative rainfall of 2011/2012 Maha season was about 23% decrease compared to its long-term average of 881 mm. Recorded negative anomaly of Maha season rainfall was mainly attributed to the below normal rainfall received during November and December. However, potential evapotranspiration values recorded in this region reveal that if appropriate management practices were in place, soil moisture stress would not be a problem for crops grown in this region.

In contrast, rainfall regime during 2012 Yala season was not conducive to raise any rainfed crop due to lack of good rains during the months of March through June. The recorded cumulative seasonal rainfall of 358 mm was about 40% decrease compared to its long-term average. April was the only month during the season in which rainfall was in excess of potential evapotranspiration. Therefore, it may not have been possible to raise a successful rainfed upland crop in this region without supplementary irrigation.

Up Country Intermediate Zone

Bandarawela (IU_{3c})

Unlike other parts of the central highlands, this region experienced a near normal seasonal rainfall during 2011/2012 Maha season with a

quantum of 1,037 mm. Distribution of seasonal rainfall was also conducive for conventional agricultural practices in the region except a few showers in February. The potential evapotranspiration remained well below the rainfall of each month during the season. The maximum temperature during the season was ranged from 19 ^{0}C to 29 ^{0}C while the minimum temperature was in the range of 8 ^{0}C to 19 ^{0}C.

Cumulative rainfall of 2012 Yala season was about 40% decrease over its long-term average of 656 mm. Rainfall during May and June was not up to the expectation even though April and July managed to experience some good showers due to enhanced convectional activity in the area. Potential evapotranspiration values were far below the rainfall receipt during entire second half of the season with possible soil moisture stress conditions unless supplementary irrigation was provided. The maximum temperature during the season was ranged from 25 ^{0}C to 30 ^{0}C while the minimum temperature was in the range of 8 ^{0}C to 19 ^{0}C.

Dry Zone

Maha-Illuppallama (DL_{1b})

The cumulative Maha season rainfall in the north-central part of the DL1b agro-ecological region was 911 mm, a value which is just nine per cent below the expected amount. This slight decrease in cumulative rainfall was mainly attributed to the minor negative anomaly of rains during December and January. Potential evapotranspiration values remained well below the monthly rainfall during each month of the season except in September. Meanwhile, the sky was considerably overcast during November with above average humid condition of the atmosphere.

There was a 37% decrease of cumulative seasonal rainfall during 2012 Yala season compared to its long term average of 418 mm. This reduction was mainly attributed to the below normal rains experienced in each month of the season especially during April and early May where intermonsoonal weather conditions usually produces about 60% of the seasonal rainfall. Nevertheless, in the current season it was only about 35 per cent. As usual, April was the only month during the season which received rainfall in excess of the potential evapotranspiration. The rest of the season continued with usual föhn like winds, which is a common feature of the weather during this time of the year in this region.

Angunakolapelessa (DL_{1b})

The decrease of the cumulative seasonal rainfall of 2011/2012 Maha season in the southern part of the DL1b agro-ecological region was about 20 per cent compared to its long term average of 758 mm. The deficit was mainly attributed to the below normal rainfall experienced during November and December. Rainfall during December was only 80 mm which is about 52% decrease compared to its long term average. Unlike in other years, the cumulative monthly potential evapotranspiration of the current season remained only slightly below the monthly rainfall of each month. Thus, despite being the major rainy season, some degree of soil moisture

stress conditions in crops grown on well drained soils may have been occured.

The cumulative Yala season rainfall of 2012 in this region was almost equal to its long term average, receiving 464 mm of rainfall to which the contribution of April and August rains were substantial. However, the potential evapotranspiration remained well above the monthly rainfall during the rest of the months of the season. Hence, rainfed upland crops may have suffered soil moisture stress conditions during their maturity phase unless supplementary irrigation was not supplied.

Aralaganwila (DL_{2b})

Eastern part of the Dry zone has experienced a normal rainfall during 2011/2012 Maha season receiving about 1,593 mm cumulative rainfall with a favorable distribution. Evaporative demand of the atmosphere also remained well below the cumulative rainfall of each month during the season. Hence, there was hardly any chance of developing soil moisture stress conditions in crops grown on highlands.

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

Weerawila (DL_5)

Recorded cumulative seasonal rainfall of 674 mm was about 15% decrease compared to its long-term average of 807 mm. Nevertheless, cumulative potential evapotranspiration during the period of October through December remained well below the cumulative rainfall of respective months of the period. Unusually, this region experienced a fairly dry weather condition during December and it may have induced soil moisture stress conditions in crop grown well drained soils in higher catenary positions in the landscape.

Meanwhile, as expected the amount and distribution of Yala rains of 2012 in this region was not conducive to raise a successful crop. The cumulative seasonal rainfall of the season was 272 mm which is a 12% decrease compared to its long term average. None of the month in the season except April was able to record a rainfall of 100 mm or more, the threshold value to designate any month as a Wet month. The cumulative potential evapotranspiration of each month of the season except April was much in excess of the cumulative rainfall of respective months. A high temperature regime prevailed throughout the season along with intense radiation and high-speed winds. However, being the driest region of the country, it is not an exceptional weather condition for the region during this time of the year.

Table 5.1: Total rainfall (mm) of 2011/2012 M*aha*& 2012 *Yala* seasons

Agro-met Station	Agro Ecological Zone	Maha 2011/12 Sep-Feb	Maha Ten Year Average (2001-2010)	Yala 2012 Mar-Aug	Yala Ten Year Average (2001-2010)
Ratnapura	WL_{1a}	1177.3	1650.8	1846.6	2141.7
Bombuwela	WL_{1b}	1125.2	1541.8	1376.9	1524.7
Peradeniya	$WM_{2\,b}$	566.7	1065.2	661.0	996.8
Sita-Eliya	WU_3	954.4	1119.0	449.3	803.3
Bathalagoda	IL_{1a}	647.8	1103.3	599.8	745.9
Makandura	IL_{1a}	943.1	1075.2	807.5	953.3
Moneragala	IL_{1c}	1501.7	1303.4	482.4	606.9
Maho	IL_3	768.3	954.0	453.1	646.5
Kundasale	IM_{3a}	677.7	880.6	358.4	601.5
Bandarawela	IU_{3c}	1037.0	1080.0	420.3	656.2
Maha-Illuppallama	DL_{1b}	911.4	999.9	263.8	417.8
Angunakolapellessa	DL_{1b}	608.0	758.4	463.5	463.1
Aralaganwila	DL_{2b}	1592.7	1577.3	257.7	434.2
Weerawila	DL_5	674.0	806.6	272.4	309.8

Table 5.2: Monthly total rainfall 2011/12 (mm)

Agro-met station	2011				2012							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Ratnapura	349.2	163.1	276.6	169.7	72.2	146.5	363.9	391.2	170.4	284.2	226.7	410.2
Bombuwela	135.7	319.2	316.5	97.9	54.4	201.5	171.6	484.2	83.1	257.3	47.5	333.2
Peradeniya	134.2	162.0	105.1	75.7	15.3	74.4	154.5	156.2	0.5	67.7	173.5	108.6
Sita-Eliya	91.6	264.1	249.9	169.3	39.9	139.6	41.7	178.1	5.5	23.7	109.8	90.5
Bathalagoda	106.3	245.5	108.0	65.5	29.9	92.6	131.0	211.4	14.8	98.6	62.7	81.3
Makandura	159.1	455.6	117.6	42.3	24.9	143.6	96.5	282.8	72.0	161.9	54.0	140.3
Moneragala	120.4	436.7	531.0	233.3	41.3	139.0	68.1	339.9	27.3	0.0	37.8	9.3
Maho	38.4	274.3	136.0	163.6	3.0	153.0	161.2	254.0	0.0	15.4	13.8	8.7
Kundasale	50.6	230.6	182.3	103.2	27.3	83.7	51.8	157.6	2.0	27.5	77.5	42.0
Bandarawela	123.0	294.3	275.7	169.6	33.0	141.4	64.6	216.8	69.5	0.3	58.3	10.8
Maha-Illuppallama	14.9	299.8	339.8	137.7	9.1	110.1	73.8	151.4	0.0	1.3	36.9	0.4
Angunakolapellessa	38.3	138.4	175.0	79.5	81.0	95.8	123.0	176.0	9.6	37.3	16.9	100.7
Aralaganwila	3.5	469.2	489.7	394.9	36.1	199.3	25.1	126.1	2.8	0.0	76.7	27.0
Weerawila	10.5	164.7	220.4	159.5	35.8	83.1	64.4	172.5	0.5	19.0	3.7	12.3

Table 5.3: Monthly average Rainfall in mm (2001-2010)

Agro-met station	Month											
	Sep	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**
Ratnapura	359.4	480.8	383.1	193.1	140.2	108.0	260.1	396.7	446.3	416.9	331.7	290.1
Bombuwela	290.2	470.7	385.4	213.1	115.1	97.9	148.8	292.3	439.9	265.7	192.7	185.2
Peradeniya	135.5	256.7	311.9	203.5	76.1	42.3	163.1	303.6	119.8	150.2	151.8	108.3
Sita-Eliya	145.7	239.2	272.1	220.7	165.5	47.8	120.5	178.6	156.8	130.1	124.1	93.2
Bathalagoda	117.1	329.7	324.6	186.1	83.1	50.2	133.3	261.6	108.6	95.2	79.2	68.1
Makandura	166.7	368.8	307.6	117.8	70.4	58.6	152.8	258.3	209.4	163.7	89.9	79.1
Moneragala	108.7	296.2	376.6	261.8	172.2	70.1	95.9	248.6	104.8	26.1	52.4	79.1
Maho	81.3	290.4	310.3	170.5	65.4	25.1	159.3	260.0	83.3	46.3	45.5	52.1
Kundasale	83.3	177.1	241.2	199.3	88.2	52.4	120.4	191.0	77.3	79.6	66.1	67.2
Bandarawela	114.2	289.7	279.2	202.0	116.6	45.7	130.3	227.1	133.6	49.8	57.6	57.8
Maha-Illuppallama	98.4	261.0	278.6	186.8	90.7	62.9	97.3	193.3	53.8	21.1	25.0	27.3
Angunakolapellessa	91.9	148.7	241.9	151.5	75.4	44.6	100.1	116.0	97.2	47.7	47.7	54.5
Aralaganwila	60.3	251.8	383.2	421.5	259.1	120.2	91.1	154.8	67.4	27.6	38.3	55.1
Weerawila	46.0	154.6	283.6	178.9	87.4	43.4	68.5	134.2	50.4	14.7	17.6	24.4

Table 5.4: Monthly Potential Evapotranspiration (mm) - 2011/12

Agro-met station	2011				2012							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Ratnapura	74.4	67.0	52.8	57.0	74.4	55.7	84.3	43.2	81.8	57.6	57.0	52.1
Bombuwela	72.0	79.4	55.2	67.0	76.9	71.9	86.8	84.0	81.8	62.4	81.8	76.9
Peradeniya	67.2	74.4	64.8	62.0	89.3	83.5	94.2	62.4	89.3	74.4	71.9	81.8
Sita-Eliya	45.6	*	*	*	*	74.2	94.2	60.0	81.8	60.0	69.4	49.6
Bathalagoda	91.2	86.8	67.2	67.0	91.8	85.8	101.7	76.8	111.6	98.4	*	*
Makandura	91.2	81.8	96.0	84.3	116.6	113.7	99.2	96.0	96.7	81.6	89.3	94.2
Moneragala	98.4	74.4	62.4	57.0	81.8	76.6	94.2	74.4	114.1	122.4	111.6	136.4
Maho	84.0	81.8	43.2	42.2	57.0	69.6	99.2	76.8	91.8	96.0	111.6	116.6
Kundasale	93.6	99.2	62.4	57.0	76.9	83.5	96.7	72.0	99.2	96.0	96.7	101.7
Bandarawela	74.4	57.0	43.2	47.1	69.4	69.6	94.2	69.6	94.2	81.6	94.2	84.3
Maha-Illuppallama	112.8	86.8	55.2	49.6	64.5	58.0	86.8	74.4	114.1	112.8	121.5	133.9
Angunakolapellessa	117.6	114.1	79.2	81.8	111.6	99.8	124.0	98.4	129.0	108.0	138.9	109.1
Aralaganwila	153.6	94.2	64.8	57.0	71.9	*	*	*	*	*	*	146.3
Weerawila	139.2	106.6	67.2	62.0	86.8	88.2	104.2	81.6	126.5	103.2	143.8	124.0

* - Data Not Available

Table 5.5: Maximum and Minimum air temperature (^{O}C) – 2011/12

Agro-met station	2011												2012											
	Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		June		July		Aug	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Ratnapura	32.3	23.1	33.2	23.2	32.6	22.8	32.2	21.8	34.2	21.1	34.2	22.0	34.8	22.8	34.1	23.0	33.8	23.6	32.4	24.0	32.2	23.7	32.4	23.1
Bombuwela	30.5	24.7	31.1	24.1	31.1	23.6	30.7	23.1	30.7	21.7	31.1	23.1	31.6	23.5	31.7	23.9	31.7	25.7	30.6	25.2	30.6	25.3	30.4	24.3
Peradeniya	28.9	20.9	30.3	20.9	29.3	20.4	28.1	19.6	29.5	18.5	29.8	19.3	31.5	18.8	30.3	20.7	30.8	21.7	29.5	22.4	29.0	22.3	29.3	21.8
Sita-Eliya	19.9	13.1	20.4	13.3	*	*	*	*	*	*	19.4	*	21.5	*	21.0	13.1	22.4	13.3	19.5	13.9	19.3	13.3	19.5	13.1
Batalagoda	31.3	22.0	31.8	21.8	30.9	21.4	29.5	20.4	30.4	18.3	31.3	19.1	33.9	21.8	32.5	23.6	32.1	25.0	30.8	24.9	30.6	24.8	31.3	24.1
Makandura	31.3	23.8	32.5	23.3	32.2	22.1	31.1	22.0	32.7	21.0	33.6	21.6	33.2	22.6	32.7	23.0	32.3	25.0	31.1	24.7	31.3	25.0	31.9	24.0
Moneragala	35.2	22.0	33.3	22.2	30.9	22.2	29.9	21.4	31.0	21.0	31.2	20.4	33.5	20.8	33.6	21.8	35.2	21.3	36.2	19.8	36.5	21.1	36.7	22.8
Maho	33.9	19.8	34.5	19.1	32.1	18.2	30.7	17.1	32.9	14.8	33.2	16.4	35.6	19.3	34.7	21.1	34.1	23.7	34.1	24.0	35.5	24.1	35.5	23.8
Kundasale	30.4	20.2	31.3	20.3	28.2	19.6	28.3	19.1	29.1	17.6	29.6	19.4	32.2	18.7	31.2	20.8	31.7	21.4	30.9	22.6	30.0	22.3	31.0	21.7
Bandarawela	27.7	15.8	25.7	16.6	24.1	16.5	23.5	15.2	24.3	14.1	25.1	14.1	27.3	13.6	26.6	16.1	28.9	15.3	27.7	16.2	27.9	15.9	27.5	16.7
Maha-Illuppallama	33.9	24.3	33.4	23.7	30.5	22.6	29.8	21.7	31.1	19.8	31.4	21.5	34.0	22.2	33.3	23.4	33.4	25.2	33.2	25.1	33.5	24.7	34.0	24.7
Angunakolapellessa	33.0	24.2	33.3	24.0	31.7	23.4	30.9	22.6	31.7	22.2	32.1	22.3	33.0	23.2	32.5	23.6	34.2	25.0	32.8	25.2	33.8	24.9	32.9	24.2
Aralaganwila	35.9	22.3	33.3	22.4	30.7	22.1	29.8	21.5	30.4	20.4	30.5	21.1	33.8	20.7	34.3	21.9	35.9	22.8	35.3	22.8	34.6	22.5	35.3	*
Weeravila	34.3	23.1	33.7	22.3	31.9	22.2	31.4	21.7	32.1	21.4	32.3	21.8	33.7	22.3	33.4	23.1	33.9	23.9	33.0	24.0	34.5	24.4	33.7	24.4

* - Data Not Available

Table 5.6: Relative Humidity (%) – 2011/12

Agro-met Station	2011												2012											
	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
Ratnapura	87	65	87	62	86	65	86	67	86	60	86	60	88	60	90	61	86	60	86	66	85	68	85	67
Bombuwela	83	77	84	78	86	75	88	73	87	75	87	76	81	70	85	76	82	75	85	82	82	79	88	80
Peradeniya	85	82	84	79	81	78	82	72	82	70	79	67	80	59	85	78	78	67	81	77	79	69	77	68
Sita-Eliya	*	*	*	*	*	*	*	*	*	*	84	87	74	77	85	89	82	84	93	89	91	86	93	89
Batalagoda	82	73	84	72	88	77	87	79	86	70	86	69	86	58	86	72	79	64	81	70	82	69	76	66
Makandura	85	75	82	76	84	74	88	80	89	75	81	66	82	76	82	77	83	81	84	80	83	80	83	78
Moneragala	79	64	86	77	90	80	91	81	82	67	85	72	83	61	83	71	75	58	69	51	72	58	67	56
Maho	79	57	80	59	87	70	88	71	85	61	83	62	84	54	85	62	86	67	84	68	79	59	75	54
Kundasale	70	64	77	64	83	72	87	71	82	59	77	60	77	48	79	59	68	57	70	62	74	62	71	60
Bandarawela	64	68	82	82	85	79	84	80	81	72	79	68	71	60	78	80	67	63	64	58	63	59	63	60
Maha-Illuppallama	77	55	81	64	88	79	91	73	89	59	91	65	86	52	85	64	77	59	77	58	77	57	74	50
Angunakolapellessa	79	70	80	73	84	80	86	78	84	75	88	75	82	73	82	76	79	66	79	69	75	65	82	72
Aralaganwila	63	52	79	65	85	71	85	74	85	63	87	67	80	53	78	62	68	51	60	48	62	51	62	47
Weeravila	72	64	76	70	83	76	86	78	80	69	81	72	81	67	80	73	75	66	78	65	72	62	75	62

M - Reading at 8.30 hours

E - Reading at 15.30 hours

* - Data Not Available

Table 5.7: Bright Sunshine Hours – 2011/12

Agro-met station	2011				2012							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Ratnapura	*	*	*	*	*	*	*	*	*	*	4.4	4.1
Bombuwela	6.8	7.6	5.5	6.3	9.1	7.0	8.7	6.5	7.9	6.1	7.5	6.4
Peradeniya	5.6	6.2	4.8	4.4	7.8	6.8	*	5.7	8.4	5.7	6.3	6.3
Sita-Eliya	5.0	4.5	*	*	*	6.6	8.9	5.5	8.5	5.7	6.4	5.7
Batalagoda	7.3	6.4	5.5	5.4	9.0	7.3	8.9	7.0	8.5	6.4	7.3	7.2
Makandura	*	*	*	*	*	*	*	*	*	*	*	*
Moneragala	*	*	*	*	*	*	*	*	*	*	*	*
Maho	*	*	*	*	*	*	*	*	*	*	*	*
Kundasale	5.8	5.1	4.5	4.3	5.7	6.3	7.1	6.5	7.2	6.4	5.3	
Bandarawela	5.9	3.9	3.0	3.3	5.1	5.6	7.6	5.4	7.7	6.4	7.4	6.7
Maha-Illuppallama	8.9	6.4	5.0	5.5	8.6	7.4	9.1	7.4	10.0	8.8	8.5	9.3
Angunakolapellessa	*	*	*	*	*	*	*	*	*	*	*	*
Aralaganwila	8.5	6.6	5.1	4.6	8.1	6.4	8.7	7.2	9.2	8.7	8.9	8.9
Weeravila	7.0	8.4	*	*	*	6.7	8.4	7.0	8.8	7.2	8.4	7.9

* - Data Not Available

Table 5.8: Wind Velocity (Kmph) – 2011/12

Agro-met station	2011				2012							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Ratnapura	2.2	2.0	1.6	1.8	1.9	1.4	1.6	1.6	2.4	2.4	3.1	2.4
Bombuwela	3.4	2.5	2.0	2.2	2.4	2.2	2.6	2.6	4.2	3.9	4.1	2.8
Peradeniya	3.2	2.5	3.2	4.2	4.6	6.3	1.9	2.0	4.2	4.5	3.9	3.8
Sita-Eliya	*	*	*	*	*	6.3	4.5	4.3	7.4	16.5	15.2	14.5
Batalagoda	7.2	4.2	3.6	4.5	4.5	4.7	3.2	*	*	*	*	*
Makandura	3.3	4.1	4.4	4.1	*	*	*	3.6	4.9	5.0	5.4	4.7
Moneragala	1.6	1.0	0.9	1.1	1.4	1.5	1.1	1.0	2.0	2.9	1.7	3.2
Maho	*	*	*	*	*	*	*	*	*	*	*	*
Kundasale	*	*	*	*	*	*	*	*	*	*	*	4.8
Bandarawela	3.5	2.4	3.3	2.9	3.3	3.5	3.4	3.1	3.5	5.0	5.0	5.8
Maha-Illuppallama	*	*	*	*	4.0	4.5	2.7	3.3	8.3	10.1	9.1	9.4
Angunakolapellessa	6.0	5.5	5.2	5.1	5.8	6.1	4.9	4.6	7.0	6.9	7.3	5.8
Aralaganwila	4.6	2.2	1.8	2.1	2.2	2.2	2.2	2.2	3.3	5.9	5.2	4.9
Weeravila	7.1	3.2	2.2	2.2	2.9	3.2	1.9	2.3	6.1	6.5	7.4	6.5

* - Data Not Available

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B.J.S.S. Fernando M.Sc., ADA, Ag. Extension

PROVINCIAL DIRECTOR OF AGRICULTURE, NORTH CENTRAL PROVINCE

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D.P.D. Gunasinghe Dip. In Agric., ADA, Ag. Extension
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H.B.D.G.C. Ratnayake B.Sc., ADA, Ag. Extension
N.D.P.S. Gunathilake B.Sc., ADA, Ag. Extension
E.G.P.U. Jayasinghe B.Sc., ADA, Ag. Extension

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R.D. Siripala M.Sc., DD, Ag. Video production
T.L.D. Lalith Nishendra Dip. In Agric., ADA, Horticulture
H.L.P. Nilmini B.Sc., ADA, Field Crops
S.D. Rajapaksha B.Sc., ADA, Ag. Extension
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A. Selvaraja M.Sc., DD, Ag. Extension
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K. Sribalasundaram Dip. in Agc., DD, Ag. Extension
A. Saheela Banu B.Sc., ADA, Ag. Extension
T. Yogeswaran B.Sc., DD, Ag. Extension
P. Atputhachandran B.Sc., ADA, Ag. Extension
S. Anchanadevi B.Sc., ADA, Ag. Extension
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J.A. Joseph Dip. In Agric., ADA, Ag. Extension

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R. Kokulathasan B.Sc., DD, Ag. Extension
A.S.M. Haris B.Sc., DD, Ag. Extension
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R. Hariharan M.Sc., DD, Ag. Extension
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M.W.S.A. de Silva Dip. in Agric., DD, Ag. Extension
S.K.N. Rubasinghe B.Sc., DD, Ag. Extension
Mahesh Subasinha Dip. in Agric., ADA, Ag. Extension
C. Dahanayake Dip. in Agric., ADA, Ag. Extension
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W.G.M. Wickramasinghe B.Sc., ADA, Ag. Extension
R.H.U. Gunawardhana B.Sc., ADA, Ag. Extension
S.D.W. Gunasekera B.Sc., ADA, Soil & Water Mgt.
K.S. Pushpakanthi B.Sc., ADA, Ag. Extension
S.D.W. Gunasekara B.Sc., ADA, Ag. Extension

INFORMATION & COMMUNICATION CENTER

R.R.A. Wijekoon Ph.D., Actg. Director, Information & Communication

AUDIO VISUAL TRAINING CENTRE, GANNORUWA

W.A.G. Sisira Kumara M.A.., Actg. Addl. D., Information & Communication
J.K.A. Hettiarachchi M.Sc., SMS, Natural Resource Managment
I.S.M. Haleemdeen M.Sc., AO, Ag. Economics
S. Liyanage M.Sc., AO, Development Communication & Extension
S.A.S.K. Senadheera M.Sc., AO, Agronomy
I.J.K. Janaka B.Sc., AO, Agriculture

PUBLICATION CENTER, GANNORUWA

S. Periyasamy M.Sc., ADA, Communication

FARM BROADCASTING SERVICE

Hiran Peiris B.Sc., DD, Agriculture
Arundathi Valesivanadan B.Sc., Lecturer, Food & Nutrition
M.A. Chandanie Lecturer, M.Sc., Horticulture
G.G.D. Lalani M.Sc., AO, Development Communication & Extension

ADMINISTRATION DIVISION

H.P.D.M. Saratchandra B.A., Addl. DGA (Administration.)

K.G. Upali Ranawake BBA, Director (Administration.)

P.V.M.S.B. Udovita DD (Administration)

G.K.G.T.D. Gedarakumbura B.Sc., Asst. Director (Administration)

ENGINEERING DIVISION

M.H.M.A. Bandara C. Eng., Pg. Dip., B.Sc., Chief Engineer

C.L. Rajapakse B.Sc., C. Eng., M.Phil., MIESL, Mechanical Engineer

P. Rajapakse C. Eng, MIESL, B.Sc., Civil Engineer

B.M.W.L. Balasooriya AMIESL, B.Sc., Mechanical Engineer

A.K.S.P.S. Wijayasoma AMIESL B.Sc., Electrical Engineer

K.M.P. Sameera AMIESL, B.Sc., Civil Engineer

FARM MECHANIZATION RESEARCH CENTRE

B.M.C.P. Balasooriya AMIESL, B.Sc. (Mech.), DD, Ag. Engineering

H.M.A.P. Herath B.Sc. (Eng), Mechanical Engineer, Production Engineering

G.A.M.A. Wijetunga B.Sc. (Eng), Mechanical Engineer, Mechanical Engineering

M.H.J.J.H. Hemachandra B.Sc. (Eng), Mechanical Engineer, Production Engineering

FINANCE DIVISION

R.P. Premarathna B.Com.(Special),PGDAF, IPFDA, HNDC, Director (Finance)

C.K. Rajapathirana B.Com., PDA, HNDA, DD (Finance)

M.F.M. Faiz B.Com., PDAF, DD (Finance)

K.M. Kularathna PDPM, IPFDA, DEP, ICASL(Lic), DD (Finance)

W.A.G. Weerasinghe ICASL INTER, PGDA, DD (Finance)

K.L.P. Rajakaruna B.Sc.(Special), PGDAF, DD (Finance)

S.S.K. Liyanage HNDA, ICASL – Certificate Level, DD (Finance)

M. Sritharan PGDAF, Asst. D (Finance)

C.P. Ruwanpitiya B.Com. (Special), Asst. D (Finance)

PROGRESS MONITORING & EVALUATION UNIT, PERADENIYA

P.C. Peiris M.Sc., DD, Agricultural Systems

- On study leave

** On no pay leave

8. TECHNICAL STAFF QUALIFICATIONS

(As at 2012.12.31)

Institute/ Centre/ Division/ Unit		Diploma	B.A.\L.L.B.	B.Com./ B.Ed.	B.Sc.	C. Eng/ M.I.E.	Postgrad. Dip.	M.A./ MBA	M.Sc./ M.Ed.	M.Phil.	Ph.D.	TOTAL
FCRDI	FCRDI	16			17		01		22	04	04	**64**
	GLORDC	20	02		06				15		01	**44**
	RARDC/ ARL	09			03				05		01	**18**
	RARDC/ KIL	10			05				04		02	**21**
HORDI	HORDI	19		01	03				11	01	05	**40**
	FRU	05			01				02		02	**10**
	RARDC/BAN	05			12				04			**21**
	RARDC/MK	22			15				01	02	01	**41**
	ARS/SE	10			09				02		01	**22**
	ARS/TW	06			04				03			**13**
	ARS/GK	07			03				03			**13**
FCRDC	FCRDC	13	01	01	08				10	04	01	**38**
	PVIC	14			08				03		02	**27**
	FCRDS	03							01		01	**05**
RRDI	RRDI	40			19				18	06	04	**87**
	RARDC/BW	27			15				09	01	01	**53**
NRMC		09			02		04		07	01	04	**27**
SCPPC	SCPPC				01				06	01		**08**
	SCS	104			19				02		02	**127**
	PPS	08			07				02	01		**18**
	NPQS	42	01		11				11		02	**67**
	ROP	09			09				03	01	02	**24**
	PGRC	07			02		01		05	02	03	**20**
SPMDC		124			29				11		01	**165**
SEPC		02	13		06			01	05	01	03	**31**
ETC		214	02		75	01	02	01	70	03	01	**369**
ICC		40	03		10			01	08		01	**63**
ADMN		04	23		09				01	01		**38**
ENG	ENG	06			03	03						**12**
	FMRC	06			05							**11**
FIN		04	02	04	02							**12**
PMEU		01							03			**04**
TOTAL		**806**	**47**	**06**	**318**	**04**	**08**	**03**	**247**	**29**	**45**	**1513**