



பொலீ கலரீடல னா சீலலா லலு கலரீடல ஶலாலலல
தெலு அலலலருத்தல ஡ற்றல ஡க்கள் தோட்ட அலலலருத்தல அலலச்சு
Ministry of Coconut Development and Janatha Estate Development

பொலீ சரீயேஜலு ஡தூலல தெலு ஆராலச்சல சபை Coconut Research Board



லாரீஜல லாரீலால - 2012
ஆண்டறலக்கை - 2012
Annual Report - 2012



**பேரீ பரீயேஜது இன்ஸ்திடியூட்
தெங்கு ஆராய்ச்சி சபை
Coconut Research Board**

**வாரீஜை வாரீவை - 2012
ஆண்டறிககை - 2012
Annual Report - 2012**

Vision of the CRI

Our vision is to be the center of excellence Coconut Research, Technology Development and Technology Transfer.

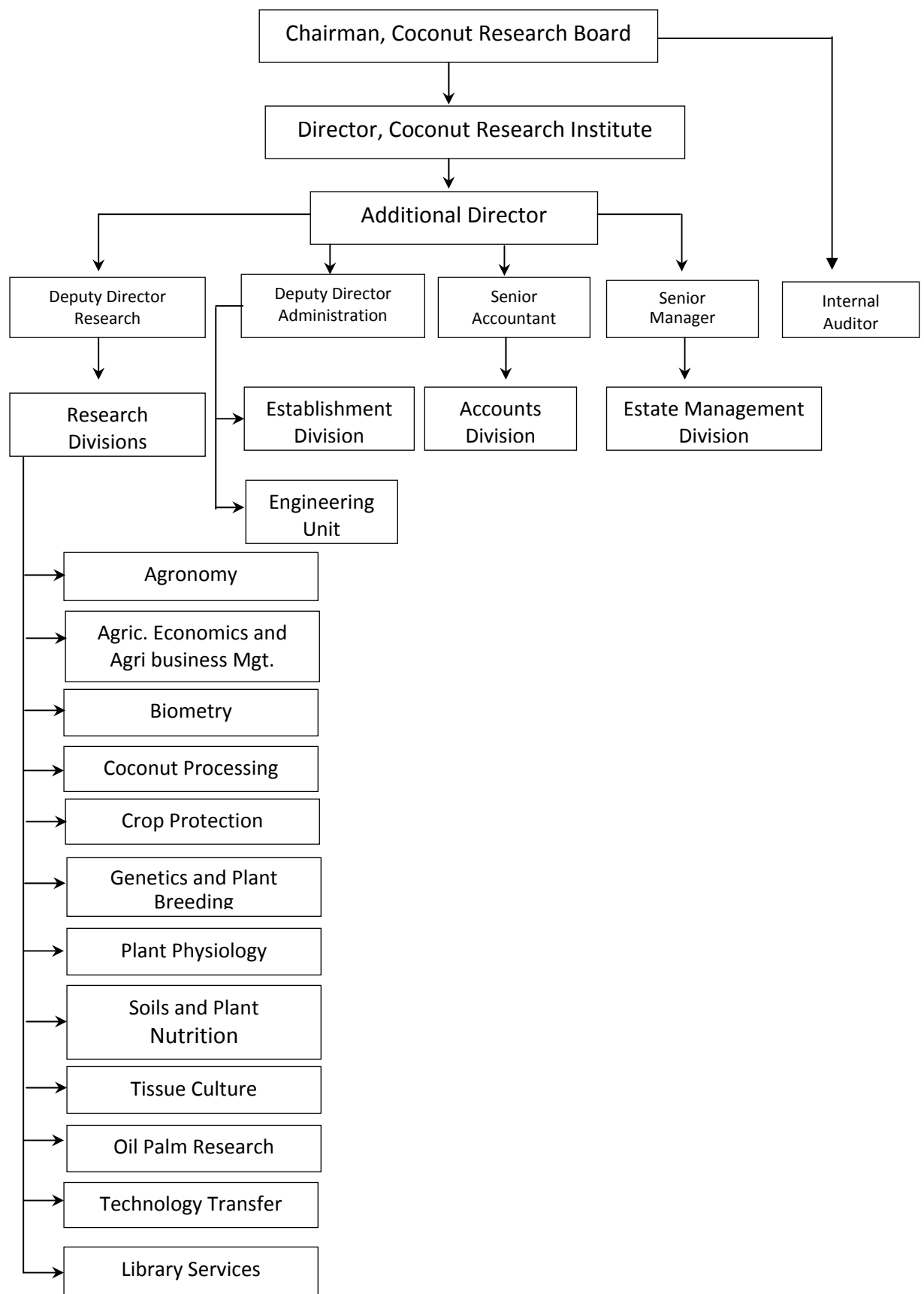
Mission of the CRI

Our mission is to generate knowledge and technology through excellence in research towards increasing productivity and profitability of coconut. In the pursuit of this mission, we endeavour to nurture motivate our staff to excel

Mandate

- 1. Conduct and further scientific research on growth and cultivation of coconut palm. Growing other crops and engage in animal husbandry in coconut plantations and prevent and cure of diseases and pests**
- 2. Conduct and further scientific research on processing and utilization of coconut products and value addition**
- 3. Establish and maintain pilot plants for processing of coconut products and fabricate coconut processing equipment**
- 4. Establish and maintain institutes' seed gardens and experimental stations**
- 5. Train advisory and extension workers to assist the coconut industry**
- 6. Guide and advise coconut industry on all matters of technical nature.**

ORGANOGRAMME OF THE INSTITUTE



**MINISTRY OF COCONUT DEVELOPMENT
AND JANATHA ESTATE DEVELOPMENT
THE COCONUT RESEARCH INSTITUTE
LUNUWILA**

SHORT ANNUAL REPORT – 2012

THE BOARD AND THE INSTITUTE

The Coconut Research Institute was founded in 1929 as the Coconut Research Scheme under the Coconut Research Ordinance NO.24 of 1928. The scheme established its headquarters at Bandirippuwa Estate, Lunuwila with three Technical Divisions namely Genetics, Chemistry, and Soil Chemistry. Following the enactment of the Coconut Research act No.37 in 1950, it was renamed as the Coconut Research Institute of Ceylon. The Coconut Development Act, No.46 promulgated in 1971, the Coconut Research Board was set up in 1972 to function as the Board of Management of the Coconut Research Institute.

The Coconut Research Board

The governing body of the Institute is the Coconut Research Board. In terms of the Coconut Development Act, the Board consists of 11 members, appointed by the Minister-in-charge. One member is appointed as the Chairman of the Board. The members hold office for three years and are eligible for reappointment.

The Members of the Board

Chairman Prof. H.P.M. Gunasena, B.Sc. (Agric, P'deniya, PhD (Reading, UK), D.Sc. (R'ajarata, Sabaragamuwa and Wayamba)

Director Dr. H.A.J.Gunathillake, B.Sc. Agric, PhD (Wales, UK),

Members

Dr. J.D.Samarasinghe, Ph.D. (Teesside, UK), Chairman, Sri Lanka Council for Agric. Research Policy

Dr. D. Seevaratnam, D.Sc. (WUSL), CEO, Watawala Plantations

Mr. K. G. Sriyapala, DG/Agriculture

Mr. Sarath Keerthiratna, Chairman, Coconut Cultivation Board

Mr. H S P Perera, BA (Attorney at Law), Chairman, Coconut Development Authority

Ms. A. Munasinghe, B.Sc. Agric., Treasury representative

Mr. P. W. Kumara, L.L.B., Executive Director, Sri Lanka Council for Agricultural Research

Mr. W R A N S Wijayasinghe, Senior Assistant Secretary, Ministry Representative

Mr. J.V.R.Dias, Past President, Coconut Grower's Association of Sri Lanka
Convener Dr. L C P Fernando, BSc Agric, PhD (Queensland, Aus)

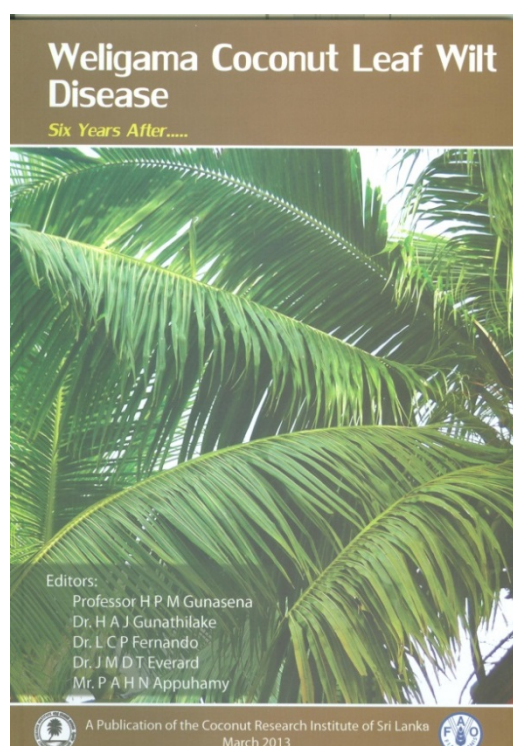
The Audit and Management Committee

Altogether five meetings were held during the year to discuss the Audit & Management Plan of the Institute.

Name	Record of Attendance
Dr. J D Samarasinghe	5/5
Mr. D M L Bandaranayake/Mr. W R A N S Wijayasinghe	5/5
Ms Anoja Munansinghe	5/5
Dr. H A J Gunathilaka, Director	5/5
Dr. L C P Fernando, Additional Director	3/5
Ms. Lalani Gunatileke, Observer/Superintendent of Audit	5/5
Mr. P W A Fernando, Convener	5/5

Chairman's Message

The annual report 2012 reflects the achievement of the institute in various activities that has been undertaken in the year under review. In the current year a major achievement has been the recruitment of new officers to various categories which were vacant for several years. The institute is proud to report that most of the positions have been filled with the best available recruits; particularly in the research officer cadre a complete staff is currently available. These new recruitments have introduced new blood to the institute and the expectation is that the future will be bright for the coconut industry.



Several breakthroughs in research have been made in the year under review. The implementation of a research *cum* field programme to manage the Weligama coconut leaf wilt disease took a prominent place in the research agenda. Institute's research programme was reinforced by the FAO-TCP project which brought in new thinking through a series of consultancies on disease diagnosis and surveillance, vector studies, resistance breeding and field oriented training for the coconut growers. In this programme the identification of a resistance variety of coconut named the Sri Lankan Green Dwarf has been the major breakthrough. Using this variety and the tall palms showing resistance in disease hotspots are being used to produce hybrids

suitable for the Southern province. FAO-TCP project also improved the staff capacity training relevant officers in reputed research centers in India. Other outstanding achievements in pest management are the identification of a predator mite that feeds on the coconut mite. This predator is being bred in mite laboratories established in 20 locations by the CRI and the CCB. The release of the predator mite has been able to reduce the damage by 65% in many locations. The use of bio agents for the control of other pests is being investigated as a means to reduce the use of chemical pesticides. The improvement coconut varieties by breeding have also produced outstanding results. During the current years two new coconut varieties have been released to the growers named CRISL 2012 (Kasuwaaya) and CRISL2013 (Kapsetha). These two varieties were release on the Coconut Day 2012, celebrated on 12th October under the distinguished patronage of HE. President Mahinda Rajapakse. Several other varietal combinations, mostly crosses between dwarf varieties are in the pipeline for release. The drought was a major problem for coconut growers in the year under review. Studies on drought showed a yield reduction mainly due to pollination failure due to high temperature at

the canopy level. These studies are being continued further to identify coconut varieties tolerant to drought. Oil palm research was also mandated to the CRI and a research programme was developed with the assistance of the oil palm growers.

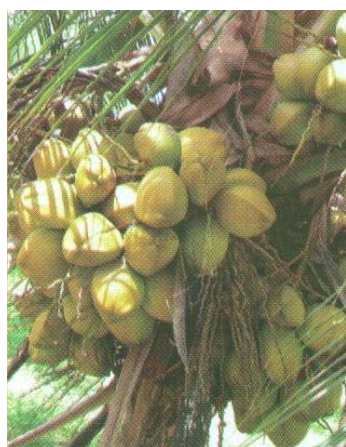


Plate 2- CRISL 2012 - Kapsuwaya



CRISL 2013 - Kapsetha

The partnership with international research centers was continued. The World Agroforestry Centre supported the travel of several scientists and policy makers to the Central Plantation Crop Research (CPCRI), India to observe the management of the root wilt disease. The COGENT project was very active in developing germplasm connected programmes where the CRI staff played a prominent role. CRI also developed other Memoranda of Understanding with the coconut entrepreneurs; a MOU was developed with the Medical Faculty of the Kelaniya University to study the health benefits of coconut oil, MOU with Haycarb conducts research on making environment -safe charcoal, University of Colombo provided valuable research information on phytoplasma diseases diagnosis through serological techniques. All throughout the year Asian-Pacific Coconut Community (APCC) provided excellent information on coconut growing and processing and also afforded opportunities for a few research officers to attend overseas conferences.

CRI also provided the highest cooperation to the Ministry of Coconut Development and Janatha Estate Development in its programmes to develop the coconut industry. CRI staff took part in all “Kapruka Navoda” programmes and “Dayata Kiruka” exhibition, mainly in promoting recommended technologies to the coconut growers. It is expected that the research programmes of the CRI will be more effective in the future years to support of the coconut industry of Sri Lanka.

Prof. H.P.M. Gunasena
Chairman/Coconut Research Board

Review of Director

The year, 2012 was an eventful year for CRI. Most noteworthy event was the release of two new coconut cultivars viz. 'Kapsuvaya', (Sri Lanka Brown Dwarf x Sri Lanka Tall) and 'Kapsetha' (Sri Lanka Brown Dwarf x San Ramon Tall). The two varieties were officially released at the world coconut day celebration. Both these cultivars comes into bearing in 3-4 years after planting, capable of giving high nut and copra yields and better adapted to drought stress. This makes the tally of improved coconut cultivars to six with earlier released CRIC60 (Sri Lanka Tall x Sri Lanka Tall), CRIC65 (Sri Lanka Green Dwarf x Sri Lanka Tall), CRISL98 (Sri Lanka Tall x San Ramon Tall) and 'kapruwana' (Sri Lanka Green Dwarf x San Ramon Tall).

World Coconut Day: CRI actively participated in celebrating World Coconut Day (2012) organized by the Ministry of Coconut Development and Janata Estate Development on 12th October 2012 at Temple Trees under the distinguished patronage of His Excellency, the President Mahinda Rajapakse. The objective of the event was to create awareness and build a strong national programme to develop the coconut industry. About 6000 coconut growers, processors and marketers participated in this ceremony.



Hon Jagatha Pushpakumara, Minister of Coconut Development and Janatha Estate Development pronounced the novel initiatives and achievements of the new ministry since its inception three years ago. The most noteworthy were: launching of Kapruka Purawara and Kaprukai-Sipnanai programs, managing Weligama Coconut Leaf Disease,

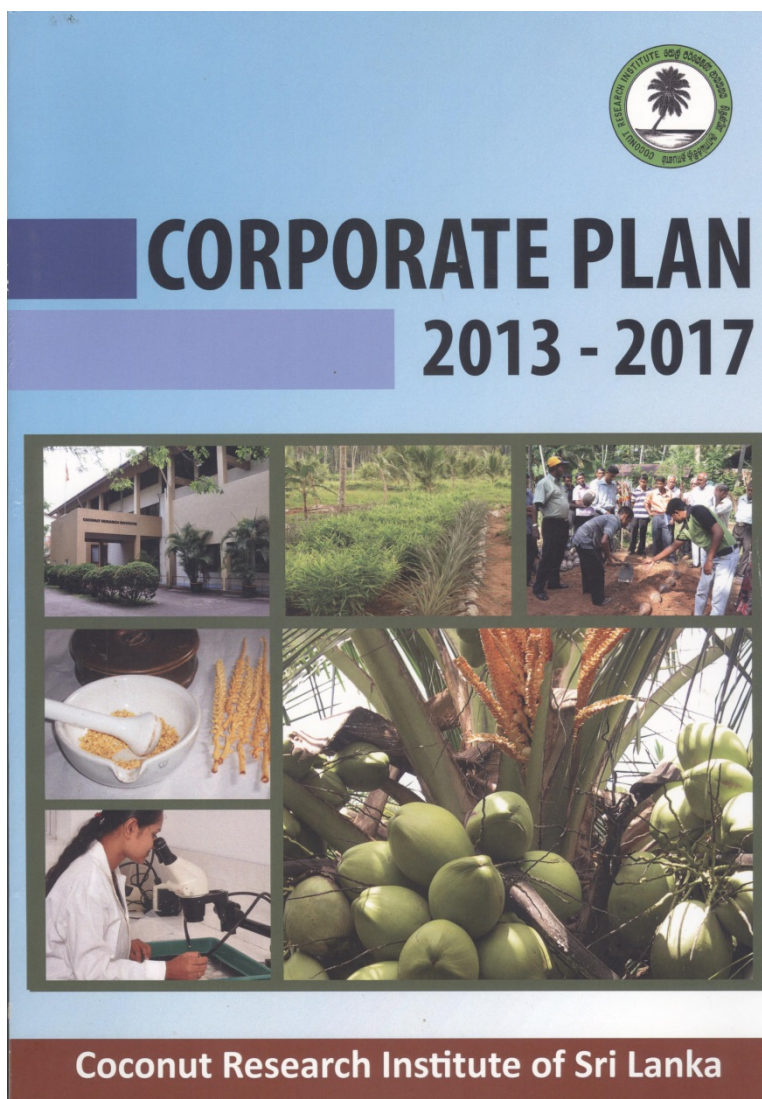
promoting integrated disease and pest management, and planting of 4 million and 9 million good quality seedlings nationwide in 2011 and 2012 respectively.

During the event, distinguished scientists, Mr. Romulo, N. Arancon Jr, Executive Director, Asian Pacific Coconut Community (APCC), Dr. V.P. Singh, Regional Director, and Dr. Ravindranath Prabhu, Deputy Director General, Research, of World Agroforestry Centre, were felicitated on recommendation of CRI for their outstanding contribution to the world's coconut industry.



The new research division established in August 2011 to carry out R & D activities to promote oil palm in Sri Lanka commenced its activities mainly in areas of pest and disease control, nutrition and agronomy and tissue culture. It is expected to increase country's oil palm extent up to 20,000 ha to produce 60,000 Mt of palm oil annually. Benefits of oil palm cultivation in Sri Lanka was presented at the District Development Council held on 17 July 2012 chaired by the H E the President and consequently the presidential Secretariat issued a directive mandating oil palm R & D to the CRI.

Institute prepared its corporate plan for 2013-2017 highlighting the research priorities on breeding, cultivation, protection, processing and socio-economics aligning with the 'Kapruka Navoda' coconut development strategy of the Ministry of Coconut Development and Janatha Estate Development.



The entire research program was restructured by giving higher weights for project based interdisciplinary studies such as research programs on WCLWD, climate change impacts, soil fertility aspects, organic coconut farming, coconut agro forestry, health benefits of coconut oil and oil palm. FAO TCP for improvement of the WCLWD management program, MOU signed with ICRAF of World Forestry Centre to develop agroforestry in coconut lands, MOU signed with Medical Faculty of the Kelaniya University to validate health benefits of coconut oil and coconut based products, MOU signed with Industrial Service Bureau and Hayleys to

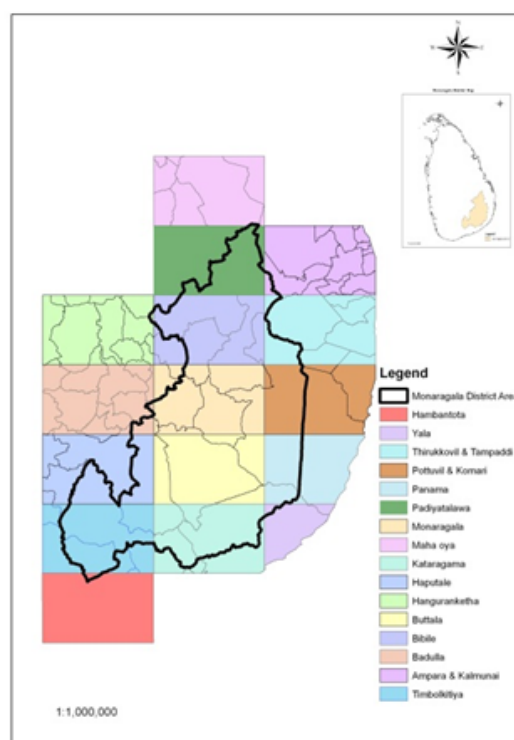
develop an eco-friendly charcoal kiln were noteworthy events during the year. CRI also made an important directional change by handing over the responsibility of collecting and maintaining met data base to Plant Physiology Division where climate are studies are currently undertaken. Establishment of 10 predator mite breeding laboratories collaboratively with Coconut Cultivation Board (CCB), Chilaw Plantation Ltd (CPL) and Kurunegala Plantation Ltd (KPL) and agreeing with CPL for establishing a seed garden for mass production of Kapruwana in their Kinyama Estate are also significant milestones of the year, 2012.

Construction of Predator Mite Labs: With the firm advice of Hon. Jagath Pushpakumara, Minister of Coconut Development and Janatha Estate Development CRI undertook measures to build 11 predator mite breeding laboratories in various locations belonging to CRI, CCB, KPL and CPL. The number of predator mite sachets issued to growers during

the year was 48,850. It is encouraging to note that the demand for predator mites is increasing as the growers were convinced even with limited experience they had with biological control of coconut mite (*Aceria guerreronis*) by releasing the predator mite (*Neoseiulus baraki*).



Soil Map of Moneragala District: CRI completed the phase 1 of mapping soil for suitability for planting coconuts in the Northern and Eastern Provinces by completing the map for Moneragala District. The map indicates that the Moneragala district has 33 different soil types under 8 Great Soil Groups. In this district there are no lands in the soil suitability class S_1 (potential nut yield over 15,000 nuts/ha/yr.) but there are 17,000 ha with S_2 class (potential yield 12,500-15,000 nuts /ha/yr.), and 90,000 ha with S_3 class (10,000-12,500 nuts/ha/yr.). S_4 and S_5 classes comprise 116,000 ha and 28,300 ha. This indicates that the Moneragala district has a great potential for expanding coconut into non-traditional coconut growing areas.



Map of Moneragala District

Sri Lanka Cuba Collaboration on Coconut Development: Assuring the support to the initiatives taken by the Ministry of Coconut Development and Janatha Estate Development for technical cooperation with the Republic of Cuba on developing



HE Indira Lopez, Ambassador to the Republic of Cuba, Mr. Nihal Somaweera, Secretary, MCDJED, Prof. H.P.M. Gunasena, Chairman, CRB at Ambakelle Genetic Resources Centre, during her visit to CRI on 4th December

coconut, CRI had discussions with HE Mrs. Indira Lopez, the new Ambassador to the Republic of Cuba on possible areas of cooperation for the mutual benefit of both countries. Sri Lanka has decided to provide improved varieties of coconut to Cuba and to train Cuban coconut growers and processors on coconut cultivation and processing practices. Cuban scientists will support the implementation of the research program of the CRI, particularly in the use of advanced biotechnologies in tissue culture and plant breeding.

Research on Health Benefits of Coconut Oil with Kelaniya University: CRI and the Faculty of Medicine of the University of Kelaniya entered into a Memorandum of Agreement (MOA) on 14th May 2012 to undertake collaborative research on the health benefits of coconut oil. Prof. H.P.M. Gunasena, Chairman, CRI and Prof. Sarath Amunugama, Vice Chancellor, University of Kelaniya signed the MOU on behalf of the two institutes. CRI proposed this initiative in view of the strategies of the Ministry



Prof. H.P.M. Gunasena, Chairman, CRI and Prof. Sarath Amunugama, Vice Chancellor, University of Kelniya at occasion signing the MOA

of Coconut Development and Janatha Estate Development to increase the production from the current level of 2,800 million nuts to 3,650 nuts annually by 2016. At that stage there will be adequate production of nuts to meet the domestic demand which is around 2,000 million nuts and the balance for the requirement of industries. Therefore, considering the increasing population and escalating demand for vegetable oils, it is important to promote the use of coconut oil as the major vegetable oil in Sri Lanka.

FAO Assistance for Managing Weligama Coconut Leaf Disease (WCLWD): The Food and Agriculture Organization (FAO) granted US \$ 309,000 for a two-year Technical Cooperation Project (TCP) from 2012 to 2013 to develop capacities for integrated management of Weligama Coconut Leaf Wilt Disease (WCLWD). The project expects to develop capacities for identification of the disease by rapid and sensitive molecular/serological techniques, assessment of vectors, development of tolerant/resistant varieties, disease surveillance by GIS/GPS tools, awareness programmes and development of management strategies to minimize disease incidence



and spread. The inception meeting of the project was held on 8th June 2012 at the CRI with the participation of Dr. Piao Yongfan, Senior Plant Protection Officer, FAO, Bangkok, Thailand and Dr. P Kuruppuarachchi, Assistant Representative (Programmes), FAO, Sri Lanka, Dr. P Rethinam, Lead Consultant of the Project.

4th Symposium on Plantation Crop Research: Scientists of the CRI actively participated in the 4th Symposium on Plantation Crop Research held on 20-21 October at Taj Samudra Hotel, Colombo. Mr. Nihal Somaweera, Secretary, Ministry of Coconut Development and Janatha Estate Development represented the Ministry at the inauguration. The Technical Sessions followed with papers on Plant Breeding and Propagation, Land and Crop Management, Soils and Environment, Value Addition and Process Development and Socioeconomics and Technology Dissemination. CRI scientists made six presentations on recent research and development in coconut.



CRI continued to strengthen its staff following the approval of the scheme of recruitment in April 2011. This year 83 positions were filled increasing the current permanent staff strength to 302. The new staff cadres were distributed by giving emphasis on actual needs of research, administrative and estate divisions. Staff was also allocated for the newly established oil palm division. Since a good proportion of the staff is new a number of training programs were conducted to motivate the new staff to serve responsibly to achieve goals of the institute. Every effort was made to provide housing facilities and other welfare benefits for the new staff to settle in the novel environment.

Total budgetary allocation for the year was Rs.210.391 million and of which Rs.159.691 million recurrent and Rs.50.70 million Capital. The government grant was Rs.188.53 million and CRI contributed 21.861 million. The financial progress during the year was around 95% for recurrent expenditure but was only 38% for capital although the committed expenditure was 55%. The poor financial progress for capital expenditure was mainly due to delays in releasing funds in the latter months of the year. Nevertheless CRI has been able to complete a several noteworthy infrastructure developments viz. construction of three predator mite breeding laboratories, agro-meteorological station at Middeniya Station, and laboratory for coir processing research. Further Laboratory premises of Agronomy, Crop Protection, Physiology divisions, insect rearing laboratory, and guest house were renovated /up graded and colour washed.

Constructing a fence of the CRI frontage of the main premises and fixing street lamps were also worthy of mentioning.

CRI continued to provide the regular services. During the year the Genetic Resource Centers of the institute produced 1,538,174 seed coconuts of improved cultivars for the national coconut planting program, collected 143,200 green dwarf seed coconuts for supplying coconut growers affected by the Weligama coconut leaf wilt disease (WCLWD, embryo cultured 65 seedlings of 'dikiri' coconuts (high value) were given to interested growers, certified 414,778 poly bagged seedlings, established 20 adaptive trials in farmer's fields to demonstrate appropriate coconut cultivation technologies to coconut growers, produced and issued 3,998 pheromone vials to coconut growers for control of Red Weevil, produced and distributed 48,850 sachets of predatory mite, provided differential fertilizer recommendations after leaf analysis to 110 growers covering a coconut extent of 9,372 ac, analyzed 343 fertilizer samples and 124 organic manure samples for quality assurance, issued 47 export certificates for coir pith and king coconut, bred and issued 22 animals (goat and sheep) to promote animal husbandry in coconut lands, supplied climate data of all its stations to Department of Meteorology, Divisional Secretariats, scientists, students and growers, demonstrated the protocol for shelf-life improvement tender king coconut for export purposes was demonstrated to 15 exporters, and more than 200,000 tender king coconuts were sent by the exporters to many countries during the year and developed/improved coconut based products and transferred the technologies to SME's, produced .

The research program was uninterruptedly continued despite the delays in financial disbursements.

1. RESEARCH ACHIEVEMENTS AND HIGHLIGHTS

Major research achievements and highlights during the year are summarized as follows under six main thrusts; crop improvement, crop production crop protection, coconut processing, socio-economics and technology transfer.

1.1 CROP IMPROVEMENT

Genetics and Plant Breeding: Two new high yielding coconut hybrids, "Kapsuwaya" (CRISL 2012) and "Kapsetha" (CRISL 2013) were released during the year. This is eight years after the release of the hybrid; "Kaprwana" in year 2004. A block of 83 ha at Kinyama Estate, Chilaw Plantation Limited (CPL) was identified for establishment of a Seed Garden for mass production of Kapruwana hybrid seeds. The land preparation was completed during the year and arrangements were made to sign an MOU between CRI and the CPL to commence planting in January 2013.

A new concept of CRIC65 hybrid seed production approach in the farmer's field as an additional method for hybrid seed production was introduced to the growers in view of the increasing demand for hybrid seeds from the growers. Under this new concept, farmers would be supported by giving dwarf yellow seedlings and the technical knowhow to produce their own Sri Lanka yellow dwarf x Sri Lankan tall hybrid seeds.

During the year all the research fields were maintained satisfactorily and data collections were made as scheduled. Two crosses aimed at producing coconut cultivars resistant to mite were established at Wanathawilluwa and Mundalam in the dry zone. A total of 580 seedlings were planted. Further 122 seedlings of same crosses were planted at Walpita Estate as an Observational trial. Vacancies in all research plots, observational trials and adaptive trials were filled with the onset of Maha. National Research Council (NRC) grant was received for conducting a research study on "Determination of the Genetic structure of Sri Lanka yellow dwarf population in Ambakelle by using morphological and DNA markers. The objective of this study is to find true to type dwarf yellow in Ambakelle for further expansion of the seed garden for producing genetically more uniform hybrid seeds.

The anticipated germplasm importation did not take place due to delays in getting permission from Governments of India and the Philippines. However, six Malayan Red Dwarf and five Malayan Yellow Dwarf seedlings raised imported as embryos from Ivory Coast under the COGENT assisted International project on "Embryo Culture Protocol Optimization for Germplasm Transportation" were planted at the exotic gene bank at the Bandirippuwa Estate. More new coconut varieties obtained from the same project will become ready for planting in the next year.

More adaptive trials were established for evaluation of Tall x Dwarf Brown (7 trials) and San Ramon x Dwarf Brown (7 trials) crosses in five coconut growing districts; Puttlam, Kurunegala, Jaffna, Mannar and Gampaha. The evaluation of dwarf brown crosses, evaluation of exotic crosses, screening of coconut cultivars/varieties for WCLWD, evaluation of coconut cultivars for *Aceria* mite, evaluation of dwarf x dwarf crosses, in research fields and in farmers' fields and evaluation of segregating mapping population for tagging QTLs for tolerance to *Aceria* mite and resistance breeding programmes for WCLWD in Matara in Southern Province and expansion of existing gene banks were continued successfully during the year.

Fifty Ran thembili polybagged seedlings raised under the Crop Diversity Trust Project concluded last year were distributed among farmers free of charge to go as *In-situ* conserved accessions because the value of this as an indigenous genetic material. Several other indigenous materials and more of Ran thembili seedlings screened for

drought tolerance under embryo culture conditions will become ready for field planting in *ex-situ* gene banks in 2012.

Under the development and services functions of the Genetics and Plant Breeding Division 94,161 dwarf green nuts were collected and raised in nurseries for planting in the WCLWD affected areas in the Southern Province as a resistant variety. By hand pollination 2148 San Ramon seedlings were produced from 97 San Ramon palms at the Pallama Seed Garden. Among them, 1397 seedlings were planted at the Pallama Seed Garden while



Plate 3 - Kinyama Seed Garden Planting of BD and San Raman



Plate 4- A Brown Dwarf Palm

750 seedlings were kept for the proposed Kapruwana Seed Garden, Kinyama. In addition 2729 T x DB, 1509 SR x DB and 2038 SR were harvested by hand pollinating 100 tall palms and 23 SR palms. Total of 349 T x DB and 503 SR x DB were released to the growers. In addition 11 San Ramon pollen tubes for Ambakelle Seed Garden and 40 SR pollen tubes for Palugaswewa estate of CPL were also provided for their hand pollination programme for production of TT and TSR respectively in their estates from Pallama Seed Garden. During the year total of 24,997 TSR seeds were harvested and 24,419 seedlings were distributed among estates of CRI for seedling production. Kehelhena block of Pallama Seed Garden identified in 2011 as a suitable block for establishment for a small scale seed garden for production of Tall x Brown Dwarf (Kap Suwaya) by hand pollination until Isolated Seed garden is establish for mass production this variety by assisted pollination was planted with 810 tall seedlings and 40 Dwarf Brown seedlings in this block during the year. Another 1029 seed holes were prepared for planting tall planting material this year, but could not be completed the task of planting due to the prevailing drought condition during 2012.

The hand pollination programme for production of Tall x Tall seedlings by hand pollination among selected talls in the Fields 11A at ISG was continued for production of planting material for replanting the old plantations of the Isolated Seed Garden. The first batch of seedling was harvested in November 2012. These

seedlings will be used to under plant the field no. 4 of the ISG during Maha 2013. Altogether, 696 Yellow Dwarf seedlings were also under planted at field no. 9 of the ISG as a measure to replace the senile dwarf palms in the field. Further 450 dwarf green were supplied in the field 11A of the ISG as filling vacancies.

During the year four training programmes were conducted by the division staff to train Seed Selection Officers of the Coconut Cultivation Board, newly recruited Coconut Development Officers and Superintendents of CRI and Prison Officers on Seed palm and seed nut selection, and nursery management. Further division staff involved in the other training programmes organized by the Technology Transfer Division. As usual, the division staff successfully completed the one day training programme on “Coconut Replanting” at the Isolated Seed Garden, Ambakelle, which was attended by more than 250 coconut growers. Many postgraduate and undergraduate students obtained training and conducted their research projects at the division as well in the molecular biology laboratory. Many primary and secondary school students from agricultural colleges visited the division for familiarization programmes.

Tissue Culture: Studies on unfertilized ovary culture were continued with the aim of selecting elite mother palms of different varieties of coconut with good response to *in vitro* culture. Due to increasing demand planting of improved varieties, ovary cultures were initiated with explants obtained from CRIC 65, CRISL 98 and Kapruwana and good responses were obtained from CRISL 98 and CRIC 65 to culture conditions initially developed for Sri Lanka Tall. Fairly high clonal shoot regeneration was observed in cultures of some of the mother palms of these two cultivars. About 300 shoots were obtained and few were transferred to soil for acclimatization. Culture development of cultivar, Kapruwana was not optimum under present culture conditions.

The embryo culture project ‘Validation of a coconut embryo culture protocol for the international exchange of germplasm’ (funded by the Bioversity International) was continued. During the year seedlings raised from embryos of exotic varieties Palu Tall (PT), Solomon Island Tall (SIT), Panama Tall Monagre (PNT) and Thailand Tall Sawi (THT) were maintained and some of the fully grown plants were acclimatized. A total of 214 plants were transferred to soil with minimum of 40 plants from a tall accession (46 PT, 53 THT, 43 SIT, and 44 PNT). Some of the plants which showed slow growth are still maintained *in-vitro* until they are ready for weaning. Plants rose from embryos of dwarf varieties Malayan Red Dwarf (MRD) and Malayan Yellow Dwarf (MYD) were field planted. A further two varieties (MRD and San Ramon) were received from Philippines through courier. Contamination of embryos was still higher than accepted levels but percentage of embryo germination was better compared to embryos received from Ivory Coast. Vigorous early growth of embryos was also observed. Information and experience gathered from the project was discussed at the ‘End of project workshop’

held at CRISL with the participation of collaborative scientists from France, Ivory Coast, Philippines. A manual on international embryo exchange will be prepared based on the project outcome.

Screening of five coconut varieties which are indigenous to Sri Lanka viz. Ran thembili, Gon thembili, Porapol, Red dwarf and Bodiri for their response to *in vitro* growth and drought tolerance using PEG 6000 was successful and seedlings survived at different stress levels were acclimatized. Experiments were initiated using anthers collected from several responsive mother palms of the variety Sri Lanka Tall to test the effect of Butanol on microspore culture. Some of the embryos produced were sub-cultured to induce plant regeneration. Few plants raised from cultures were maintained *in vitro*.

1.2 CROP PRODUCTION

Agronomy: The aim of the agronomy research program was to develop technologies to increase coconut production, productivity of lands and maximize profitability of coconut farming. The ongoing research projects are fall under soil moisture conservation, rehabilitation of low yielding coconut plantations, bio-energy generation, green manuring, weed management, vermi – compost production, intercropping, animal husbandry and coconut based farming systems. During the year 15 field experiments and 20 field demonstrations were successfully maintained. Further a few miscellaneous studies were also conducted to support major experiments.



Plate 5 - A Grafted Cashew Tree

Field assessment of intercropping cashew with coconut continued to show good results as observed in the previous year suggesting that cashew has good potential to intercrop under coconut. Grafted cashew reached early flowering and yielded within two years of planting followed by air-layered cashew plants. At the age of eight, both vegetative propagated cashew produced cashew yields of over 8.0 kg tree⁻¹year⁻¹. Three improved varieties of cashew; WUCC -5, WUCC- 8 and WUCC- 13 that are being evaluated reached flowering at the second year of planting and in this year several trees started to produce nuts, however, no yield differences were observed among varieties due to their early stages in production.

Research on gliricidia to optimize yield of foliage and fuel wood in coconut lands continued and results revealed that plant density had a significant effect on the wood and foliage biomass yield of gliricidia after five years of planting. The highest wood and foliage biomass was recorded in plots; three rows and two rows of gliricidia respectively while the lowest was in plots with single gliricidia row. However, plots with higher plant



Plate 6 - Gliricidia 2 row an avenue of Coconut

densities had a low wood and foliage biomass yield per tree. Although treatments (Gliricidia planting two row system(1mx1m) and three row system (1mx1mx1m) had equal plant densities, the wider spacing gave higher wood and foliage biomass yields. However, spacing and pruning height had no significant effect on the foliage and wood biomass.

Bio-energy generation was studied in a model designed in one hectare of coconut land comprising 150 coconut palms, 2500 gliricidia trees, and externally supplied paddy straw fed to six buffaloes. Wood of gliricidia was used for gasification and buffalo dung was used to generate bio-gas. During the year the model produced 4 buffalo calves, 4200 lts of buffalo's milk, 1.2 m³ of biogas /day and 12,000 kg fuel wood. The total income of the model was Rs. 260,000/- Application of biogas residue to coconut palms increased the nut yield by 106%.

A demonstration project on development of a dedicated energy plantation by gliricidia under coconut at Pallama encouraged coconut growers for fuel wood farming on commercial scale. The plantation produced 8.0 kg of wood per tree during the year. Foliar analysis of coconut palms showed elevated levels of N, P, Mg, and Ca over the sufficiency range of coconut while K level was below due to removal of wood. Hence, it is required to return wood ash from the point of gassifier to the coconut lands.

The research project on "Improvement of Soil Fertility in Coconut Lands through Vermiculture" showed promise for adapting the technology to recycle farm land waste biomass in coconut plantations. In this technology, the waste biomass (weed and plantation residues and animal wastes) can be converted to compost fertilizer within 5 to 6 weeks by the mediation of worms. There is a burning need for paying attention to low cost environmental friendly nutrient replenishment systems and soil improvement methods in our current coconut farming systems. Under this project, four compost production units were established to multiply worms in the coconut triangle. Worms were distributed among twenty coconut growers and five farmers who opted to produce

vermi-compost at commercial level. This is important as it reduces the costs for chemical fertilizers. Three field experiments were established to evaluate the effect of vermi-compost on the growth of coconut seedlings and nut yield of adult plantations. The results revealed application of vermi-compost based fertilizer mixtures significantly enhance seedling girth. In another experiment raising coconut seedlings with 100% organic inputs proved that *Gliricidia* goat manure and vermin-compost based organic fertilizer mixtures perform equally well as the young palm mixture.

A new field experiment was commenced to rehabilitate coconut grown soils. Three different plant species and their combinations; *Gliricidia sepium*, *Panicum maximum* + *Gliricidia sepium*, *Thitonia diversifolia* and *Gliricidia sepium*+ *Thitonia diversifolia* were evaluated. The highest biomass production was given in *Gliricidia sepium* and *G. sepium* + *T. diversifolia* treatments. During the year nut yield of coconut showed significant difference among treatments. The highest nut yield was recorded in *Gliricidia sepium* and *Pueraria phasioloides* planted plots. Soil samples were collected and analyzed to evaluate the biological, physical and chemical properties.



Plate 7 - Goat farming in Coconut Land

To develop the animal husbandry sector in coconut plantations, an animal breeding project was started in 1999 to develop a smallholder goat and buffalo farming systems under coconut with the objective of increasing the profitability and fertility in coconut lands. Goat breeding program and demonstration farm at Pottukulama and Ratmalagara

were also continued with successful progress. During the year 120 male and female goats and 30 sheep were sold to farmers to improve herds in their estates and five Mura stud buffaloes were sold to buffalo farming units in Batticaloa district to improve the herd quality and production at a concession of price. Sheep farming is a very effective method to control problematic weeds and improve soil fertility in coconut lands. Thus to develop and popularize sheep farming in coconut plantations, one field demonstration was established at Ratmalagara estate.

To develop a green manure based fertilizer mixture to replace (N) Urea and (K) MOP requirements for organic coconut farming systems, a new green manure field experiment was initiated in 2012. Both green tender stems and leaves of *Tithonia diversifolia* improved soil fertility. The biomass production of *Tithonia* was influenced by

the establishment method, frequency of cuttings, stand density and site conditions. The green biomass production of *Tithonia* (green tender stem + green leaves) was 2.0-3.9 mt dry matter per hectare of a 8-month old pure stand of *Tithonia*. The biomass nutrient content of *Tithonia*, as compared to green biomass of other shrubs and trees, is relatively high. Average nutrient concentration of green leaves of *Tithonia* was 3.5% N, 0.35%P and 4.1% K on a dry weight basis.

A foreign funded project was started on “Assessment of soil erosion in coconut agro forestry systems under different leguminous cover crop species with agronomic practices using ^{137}Cs Technique” with the objectives of determining the soil erosion using ^{137}Cs technique. The environmental isotope ^{137}Cs has been widely used to trace the movement of soil and sediment particles within the landscape. This technique is a rapid, reliable and direct technique for the assessment of soil erosion. The ^{137}Cs measurements afford valuable means of estimating medium-term rates of soil loss and sediment deposition which possess many advantages over the conventional monitoring techniques. It is a collaborative project with Atomic Energy Authority, Sri Lanka and some facilities will be provided by International Atomic Energy Agency.

Soils and Plant Nutrition: The emphasis on studying soils and plant nutrients were to refine technologies on nutrient management particularly with respect to inorganic fertilizer, locally available organic sources, soil quality maintenance, nutrient levels of different types of coconut growing soils and coconut palms, soil fertility enhancement in coconut lands, irrigation/fertigation techniques, micronutrients and finding suitable lands in non-traditional areas for coconut cultivation.

During the year, the Division successfully maintained 22 field experiments, 3 green house experiments and 5 laboratory experiments and has also conducted few miscellaneous studies to support ongoing major experiments.

The experiment on residual effect of long-term (20 years) application of different P sources viz. Triple Super Phosphate, Imported Rock Phosphate and Eppawela Rock Phosphate at RE did not reveal significant difference in nut yield after one year after suspending P application. P content in leaf was also not affected. The experiment conducted in Southern Province to evaluate the effect of different P sources to coconut in southern soils (Middeniya) did not show a significant difference in the P content in leafs even at the age of 5 ½ years followed by giving P either as IRP or ERP. This indicates application of ERP can be recommended as P source instead of IRP to the southern soils of Sri Lanka, which is very important because this can save several million rupees of foreign exchange per annum.

Experiment on residual effect of long-term (15 years) application of different types of organic manures and inorganic fertilizers have shown significant difference ($p \leq 0.001$) in nut yield among the treatments however, leaf nutrients have not shown such significant differences. The yield increase with organic manure (poultry manure) was 118% more than no fertilizer application. The yield increase by inorganic fertilizer was 6%. Nut yield of poultry manure treated palms increased by 105% over inorganic fertilizer treated palms. The nut yield increase in other organic sources such as cattle manure, goat manure and green manure (gliricidia) was 6%, 29% and 38% respectively than without application of fertilizer. The female flower production has also shown the same trend i.e. highest number was observed in organic manure (poultry manure) treated palms.

The experiment on studies on different methods of kieserite application with NPK mixture for coconut palms for minimizing K and Mg interaction revealed that during the past 10 years, the nut yields were lowest in the treatments which were not included magnesium sources. The highest nut yield was obtained from the coconut palms, having kieserite application at $\frac{1}{2}$ of the manure circle and NPK mixture application at other $\frac{1}{2}$ of the manure circle (Treatment 4). The female flowers were also increased in the palms treated with treatment 4 (T_4). The experimental results confirm that the best way to apply kieserite to overcome the magnesium deficiency is broadcast kieserite $\frac{1}{2}$ of the manure circle and NPK on the other $\frac{1}{2}$. However, this is recommended only for magnesium deficient palms.

The experiment on evaluating the effect of fertigation on coconut revealed that both fertigation treatments (equal amount of recommended fertilizer application as 12 split doses) along with either drip or hose irrigation (T_5 and T_6) have given the highest nut yield compared annual applications of only fertilizer or only irrigation or both fertilizer and irrigation or the control (no fertigation). The yield increases in T_5 and T_6 compared with the above treatments of annual applications and control were 32%, 16%, 11% and 13% respectively.

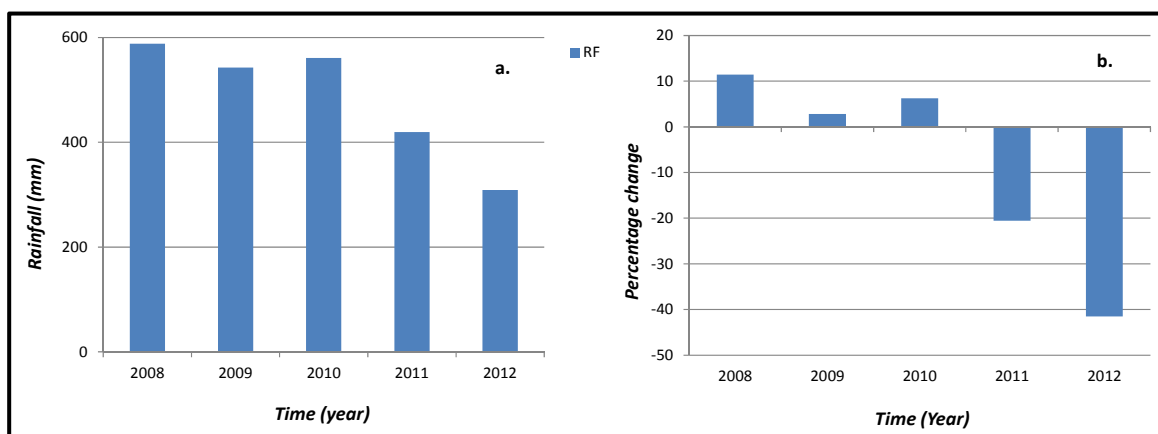
The project on Land suitability assessment in Moneragala, Ampara, Batticaloa, Trincomalee, Anuradhapura, Polonnaruwa Districts and Jaffna Peninsula has been commenced in August 2011. Soil survey investigation studies and land suitability assessment were completed in Moneragala District in this year. According to the soil survey and land suitability assessment in Moneragala District, 33 different soil series were identified under major 9 Great Soil Groups. Land suitability class S_1 (potential nut yield $> 15,000$ nuts/ha/yr) areas were not identified in Moneragala District. But S_2 soils (12,500 - 15,000 nuts/ha/yr) were identified in RBL, RYP, BSG, NCB and Alluvial Great Soil Groups. The total area of S_2 in Moneragala District was 17,800 ha. Land suitability class S_3 soils (10,000 - 12,500 nuts/ha/yr) have been identified as 90,500 ha in Moneragala District. Land suitability class S_4 and S_5 have also identified in Moneragala District as

116,550 ha and 28,300 ha in S₄ and S₅ soils respectively. Not suitable areas (N₁) were identified in Sittarama soils series under Great Soil Group Solodized Solonetz (SS) soils in Timbolketiya topographical sheet. The area of N₁ was 100 ha.

As service functions, the Division provided Differential Fertilizer Recommendation (DFR) to 114 growers covering 3,794.33 ha during the year. For quality testing i.e. inorganic fertilizer 343, organic manure 124 and coir pith samples 575 were analyzed. In addition, soil survey and land suitability tests were completed for 38 growers covering a total extent of 1,047 ha.

Plant Physiology: The research studies on physiological aspects mainly focused on identifying factors controlling yield fluctuation in coconut, developing methodologies for forecasting monthly coconut yield, assessing impact of climate change on coconut, identifying adaptation and mitigation strategies to climate change, managing soil moisture in the coconut mini triangle, evaluating root distribution pattern and physiological performance of different varieties under different growth conditions and identifying WCLWD incidence using remote sensing based satellite images.

The study on identifying plant processes and climatic factors that govern yield fluctuation in coconut was continued in WL₃ (Gampaha district) and IL_{1a} (Kurunegala District) with 27-28 years old Tall x Tall palms. Early fruit setting was identified as the main yield determining factor and this in a bunch varied with the climatic conditions of inflorescence opening month. During the year, the number of set fruits per palm was highest in March, April and May in WL₃ and March and April in IL_{1a}. Therefore, higher yields can be predicted from January to March in WL₃ and January to February in IL_{1a} compared to other months in 2013 in the investigated areas. The Jan/ Feb yield in WL₃ will be 50% higher than the same in 2012. However, due to severe droughts prevailed in August and September 2012, there will be a reduction in annual yield of 2013 (12% in WL₃ and 34% in IL_{1a}) compared to the annual yield of 2012. The highest reduction in yield (number of fruits per palm) will be experienced in May/June period in 2013 compared to 2012 (50% reduction compared to 2012). The survival pattern of bunches (female flowers/ fruits) opened from January to December during 2009-2012 and the contribution of climatic factors (heat and water stress) and plant processes (female flower production and competition for assimilates) to these variations in survival of fruits are being analyzed for developing a climate driven process-based yield prediction model for coconut. In addition to above experimental sites, 120 palms each from Puttalam, Kurunegala, Gampaha and Kuliapitiya CDO ranges were selected and data collection will be started from January 2013 to predict 2014 coconut yield. The development of canopy photosynthesis models for different varieties of coconut using photosynthesis light response curves was continued.



The parameters of the best fit model (asymptotic exponential model) for determining the total canopy photosynthesis of T x T and DG x T varieties were developed. This sub-model will be used to determine the contribution of source strength (assimilate supply) to yield variation in coconut under different growth conditions.

Maintenance of a climate database was started to monitor the climate variability and climate change in main coconut growing areas. According to the Agro-meteorological data collected from four CRI stations, Ratmalagara Research Station (RE), Ambakelle Genetic Resource Centre (ISG), Bandirippuwa Research Station (BE)(Puttlam District) and Maduruoya Genetic Resource Centre (MOSG) (Polonnaruwa District), recorded annual rainfalls of 1710 mm, 1449 mm, 2020 mm and 1948 mm during the year and 65%, 64%, 54% and 71% of the total annual rainfall of RE, ISG, BE and MOSG were recorded during October, November and December. A new experiment was started to assess the impact of climate change on the water balance within the Puttalam district. Potential evapotranspiration and the water balance were calculated using two meteorological parameters rainfall and air temperature. The effect of heat stress and vapour pressure deficit (VPD) during pollen development and pollination on pollen quality and fruit set was evaluated in the Maduruoya Research Station (Dry Zone) (under irrigation). Heat stress and high VPD did not affect pollen quality in the absence of water stress but it reduced pollen germination and fruit set irrespective of the water supply by irrigation.

Reproductive survivability of new hybrids was evaluated under different environment conditions to identify cultivars that can adapt to climate change. Evaluation of Tall x Tall (CRIC60, TT), Tall x San Ramon (CRISL98, TSR), Dwarf Green x San Ramon (Kapruwana, DGSR), Dwarf Green x Tall (CRIC65, DGT), Tall x Dwarf Brown (TDB), Dwarf Brown x Tall (DBT) and Dwarf Brown x San Ramon (DBSR) crosses were continued at Wanathawilluwa (Dry zone, DL₃) and Raddegoda (Intermediate Dry, IL_{1a}) for their reproductive performance at early stages of bearing (seven to eight years after planting and four to five years after flowering commenced). *In vitro*-pollen germination of the above cultivars under different temperature regimes is also being tested to confirm their

tolerance to heat stress. A new experiment was started during the year to evaluate existing mixed cropping systems in the dry zone for their potential in changing micro-climatic condition of plantations during heat stressed periods and improving yield determining parameters of coconut. One mixed cropping system in Puttalam (DL₃)(coconut and cashew) and two mixed cropping systems in the Anuradapura (DL_{1b}) (coconut and guava, coconut and banana) are being evaluated. The most significant observation during the year was that when coconut was intercropped with cashew, the micro-climatic condition of the mixed plantation (soil temperature and soil moisture in the manure circle at 25 cm depth and air temperature at canopy height) and fruit setting of coconut were improved under moderate stress levels (6-10% soil moisture). However, if severe moisture stress (2%) prolonged for a period greater than three months, cashew trees competed with coconut palm for soil moisture. Consequently there was a very high mature and immature nut fall in August and September of the year in both mono crop and mixed cropping sites and the reduction was greater in cashew and coconut mixed cropping site (50%) compared to that of coconut only site (20%). This reduction will be reflected in the coconut yield in the Puttalam District in 2013, most probably during May /June period.

Having quantified the Carbon sequestration and C storage potential in coconut plantations (monocrop), site selection was commenced to estimate carbon sequestration potential of coconut-based mixed cropping systems in Wet, Intermediate and dry zones. The data collection will be started from January 2013.

The evaluation of a model drought management system at Middeniya Research station was continued with the objective of identifying the most suitable cultivars for the region out of improved coconut cultivars released by CRI and to establish a model coconut plantation as a live demonstration to encourage and induce growers in the area for adopting appropriate moisture management practices for successful coconut cultivation in the mini-triangle. Both hybrids, CRIC65 and Kapruwana achieved more than 80 % flowering within first 3 years of planting while tall forms (CRIC60, CRISL98 and the accession from Rumassala) showed only about 30% flowering within the period. At the end of four years hybrids showed 100% flowering and tall forms achieved about 80% flowering. By the end of five years all palms came into flower except infillings. Treatment with all moisture conservation practices showed the highest flowering throughout the period compared to the control while irrigated plots showed intermediate performance as the irrigation was interrupted in some instances due to the problems with the deep tube well. Both hybrids maintained significantly higher rate of photosynthesis during favourable weather conditions but the differences were only marginal during dry spells. Out of the flowering palms Kapruwana and DT achieved average per palm yield of 25 and 15 nuts per annum respectively while all tall forms

showed around 5 nuts because all the palms were not yet in the picking stage since they came into flower relatively late.

Physiological evaluation of new crosses developed by pollinating Sri Lankan varieties with pollen from exotic varieties was started in the trial established by the GPB Division at Middeniya Research Station. The field experiment consisted of four new crosses (Tall x Malayan Red Dwarf, Tall x Rennel Island Tall, Tall x Tagnanan Tall, Tall x Brazilian Dwarf) with 3 local crosses (Kapruwana, SRISL 98 & CRIC 65).

A new experiment was designed to evaluate the pattern of root distribution of seedlings of different varieties under different agro ecological regions and land suitability classes. Two varieties (CRISL 98 and Kapruwana) are scheduled to test under two LSC (S2 & S4) and two AERs (IZ and DZ). Experiment is scheduled to implement in 2013.

The experiment to identify WCLWD affected palms using remote sensing based satellite images was in progress with the assistance of University of Peradeniya and the funding assistance of FAO of the United Nations. Preliminary studies revealed the possibility of developing computer based model to run on the satellite image to identify affected palms based on the colour reflection indicated in the image. Equipment was purchased and fresh images are being purchased.

The responsibility of maintenance and data collection of Agro-meteorological and rainfall stations of CRI was transferred to Plant Physiology Division. Meteorological data were submitted to the national database at the Meteorology Department, several Divisional Secretariats, scientists, students and growers (on their request). Establishment of Agro-meteorological station at the Middeniya Research Station is nearly completed and meteorological data collection will be started from February 2013. The protocol for shelf-life improvement of tender king coconut for export purposes was demonstrated to more than 15 exporters, and more than 200,000 tender king coconuts were sent by the exporters to many countries during the year.

Biometry: The computer Network system with 28 workstations was administrated efficiently. Island wide data capture survey on national coconut yield was carried out during the year collaboration with the regional managers and coconut development officers of coconut cultivation board. Data collection of ongoing research projects were continued during the year. A committee, headed by the Research Officer of the Biometry Unit was appointed to forecast the national coconut production for year 2013. The predicted coconut production for year 2013 is 2853 Mn nuts. National per palm coconut yield for the period from January to October has increased from 35 nuts in 2011 to 48 nuts in 2012. It was a 39.8% increase compared to year 2011. The average per palm yield for the above period ranged from a minimum of 32 in Ratnapura CDO region

to a maximum of 62 in Ampara. A substantial increase in per palm yield compared to year 2011 was seen in all CDO regions.

1.3 CROP PROTECTION

Crop protection studies had given equal emphasis on research and development activities during the year. A grant of US \$ 307,000 was received from the Food and Agriculture Organization for Development of capacities for early diagnosis, surveillance, spread prevention and integrated management of Weligama Coconut Leaf Wilt Disease (TCP/SRL/3303). Three interim recommendations were made: a) release of predatory mites to control the coconut mite, b) use pheromone-baited traps controlling black beetle by mass trapping and c) use of the insecticide, phentoate as an alternative for monocrotophos to control red weevil. The parasitoid *Tetrastichus brontispae* was imported from Thailand to develop a biological control programme for *Plesispa* beetle. Maintaining



Plate 8 - Plesispa infected coconut seedling

the buffer zone free of diseased palms was continued. The Division established two predator breeding laboratories at Ambekelle Genetic Resource Centre and Makandura Research Station and continued to provide technical advice to establish and maintain predator breeding laboratories by other Institutions.

Several experiments on Weligama Coconut Leaf Wilt disease (WCLWD) were undertaken. Polyclonal antibodies were prepared for use in preparation of monoclonal antibodies for detection of WCLWD phytoplasma. These antibodies differentiated healthy and affected coconut samples with a considerable reliability. Perfection of PCR methods with universal 16Sr phytoplasma specific primers continued, however it was revealed that improvement of detection with those primer is rather remote. Standardization of reaction conditions for real time PCR was commenced. LAMP primers specific for WCLWD phytoplasma were designed. Diseased samples tested with *Sec A* primer pairs did not produce positive results. Studies to determine the vectors were continued, but none of the palms fed by putative vectors, *Proutista moesta*, *Proutista* sp. and *Stephanitis typica* produced symptoms so far. Out of the 14 crosses planted to screen for WCLWD resistance/ tolerance seedlings of 6 crosses showed symptoms of WCLWD. The artificial hand pollination was carried out on 70 palms to produce 3 hybrids.

A total of 20,406 lands in the buffer zone were inspected and 250 diseased palms have been found in 96 lands. Two check points at Walasmulla and Akuressa were established to check transport of prohibited items. Three demonstrations planted with cash crops were established in 3 lands in which diseased coconut palms have been removed with the aim of convincing the growers that their lost income could be recovered by the income from cash crops. Several awareness programmes were carried out in diseased and outside areas.

The pilot scale study to evaluate the effectiveness of releasing the predatory mite *Neoseiulus baraki* against the coconut mite was continued in 2 estates. Release of the predatory mite at the rate of 5000 mites per palm at 3-4 months interval on quarter of the randomly selected palms of the estate resulted in higher percentage of large-sized nuts (85-90%) in released palms than in control palms (79-81%). Percentage of small-sized nuts was also lower in the released palms (10-13%) than in the control palms (17-20%).

Establishment of 6 predatory mite mass producing laboratories was completed. At the end of the year 2012, eleven laboratories (3 by the Coconut Research Institute, 1 by Kurunegala Plantation Ltd, 2 by Chilaw Plantation Ltd. and 5 by Coconut Cultivation Board) were functioning successfully. During the year a total of 48850 predatory mites were issued to the growers.

Tetrastichus brontispae, a pupal parasitoid of *Brontispa* and *Plesispa* beetles was imported from Thailand and experiments commenced in the laboratory. It was observed that initially the parasitism rates were 75 -85% with production of more females, but in the latter part of the year female: male ratio drastically reduced.

Installation of pheromone baited traps significantly reduced the percentage of black beetle damage in spear leaf, first and second leaves compared to pre damage level. A 50% damage reduction was observed in severely affected palms after 32 months of installing traps. Release of *Oryctes* virus infected beetles continued and gradual reduction of damage along with increase of disease incidence among black beetle population was observed.

A total of 574,250 parasitoids were released to coconut caterpillar infested coconut plantations. A total of 3996 red weevil pheromone vials were sold to growers and 6000 vials were provided to Coconut Cultivation Board for area wide mass trapping programmes. A total of 12503 coconut mite predator sachets were issued to growers.

Advice was given to coconut growers to manage pests and diseases in their plantations. Students from various universities, agriculture schools visited the Division and they were educated with the activities of the Division.

1.4 COCONUT PROCESSING

Coconut processing research studies mainly focused on development/improvement of coconut products and processes and during the much focus was on development of coconut milk-based ice cream, spray drying coconut sweet toddy and treacle, improvement of coconut paste, preservation of tender coconut water for exports, quality evaluation of pol sambol, determination of the quality of coconut oil and health effects of selected coconut products, determination of the shelf life of osmotically dehydrated value added kernel based coconut chips, develop and install an eco-friendly high quality charcoal processing plant, performance analysis of a Flash Dryer for reducing moisture content of coir pith.



Ice cream by definition is a frozen sweetened product made from a heat treated mix of edible fat and milk solids with or without other ingredients and permitted additives. Coconut milk based ice cream was prepared in two flavours, vanilla and cocoa. The vanilla ice cream comprised 37.3% total solid, 9.32 % fat, 30.6% sugar and 0.27% protein and the cocoa flavoured ice cream comprised 38.1% total solid, 9.42% fat, 30.6% sugar and 0.27% protein. Sensory evaluation of both types of ice cream revealed high (95%) on liking of the products based on a 5-point hedonic scale. The technology was given to small and medium scale entrepreneurs and is now reaching the market. These non-dairy based ice creams are ideal for people who suffer from lactose intolerance. This coconut based ice cream is the first of its kind in Sri Lanka.

Sweet toddy undergoes fermentation almost immediately by a group of heterogeneous micro-organisms, probably originating from the indigenous flora of palm trees, the atmosphere or the tapping equipment. Therefore, if sweet toddy is preserved for prolonged periods, it can be used to make treacle, jaggery and golden syrup at any period of time. Technology was developed to convert coconut sweet toddy into an amorphous powder by spray drying. The spray-dried sweet toddy powder was characterized for moisture content, water activity, sugar profile and particle morphology. The powder recovery was 56.35 ± 2.90 %. The moisture content and water activity value of the spray-dried coconut sweet toddy powder were $1.24 \pm 0.01\%$ and 0.29 ± 0.00 , respectively. The sugar profile of this sweet toddy powder showed that it had a total sugar content of $66.1 \pm 0.04\%$ out of which $32.7 \pm 0.02\%$ was sucrose, $22.4 \pm 0.01\%$ was glucose and $11.0 \pm 0.01\%$ was fructose. Particle morphology was determined by



scanning electron microscopy. The scanning electron micrograph of spray-dried coconut sweet toddy powder showed that the particles were amorphous. The changes in moisture and water activity were not significant and they were well within the range of spray-dried food powders. This spray-dried sweet toddy powder can be stored for more than 5 months. More studies to improve shelf life studies are in progress. Spray-dried coconut sweet toddy is a novel product which has the advantages such as convenience, ease of handling, high solubility, reduced storage space, sanitation and storage for a long period. Patent is pending for this innovation.

Coconut treacle which is made out of coconut inflorescence juice or the sap is a sugar-rich food where sugars predominate in the composition. Coconut treacle poses multiple problems in handling during processes involving mass production due to its viscous and sticky nature thereby leading to a growing demand for dried treacle powder by both consumers and the food industry. Technology was developed to produce amorphous coconut treacle powder by spray drying using a drying aid and was characterized for parameters such as moisture content, water activity, sugar profile and particle morphology. This spray-dried coconut treacle is a novel product which can be used as a sugar alternative which can be easily blended with other ingredients apart from other advantages including convenience, ease of handling, high solubility, reduced storage space, sanitation and storage for a long period. A patent is pending for this innovation.

In many households, coconut milk is used in curries and the residue is thrown away. With the residue most of the nutrients and fiber are wasted. To overcome the wastage coconut paste from whole coconut was developed but it was observed that during storage the paste separate into the layers. A study is in progress to overcome this by treating with different types of stabilizers and concentration levels and further by homogenization.

Coconut water is currently gaining very high acceptance in US and European markets preferred as a natural beverage to alternate artificial sports drink Gatorade. Coconut water is believed to possess anti-carcinogenic properties. It can be used as a dehydrating solution administered in oral and intravenous form in instances of severe dehydration. Potassium, sodium, magnesium, calcium, phosphorus and chloride are the main minerals found in coconut water, besides vitamin C and sugars. It is recognized as an isotonic beverage due to the presence of balanced electrolytes viz. Potassium and sodium that help restore losses of electrolytes through skin and urinary pathways. Wholesome beverage that nature



has provided for people of the tropics and is consumed fresh, largely because once exposed to air and warm temperatures, it rapidly deteriorates. Sterilization of coconut water using high temperature (more than 100 °C) destroys some of the nutrients and the flavour. The major problem with the export of tender coconut water is the physico-chemical changes that take place after harvest, during processing and transport up to the point of sale. Tender coconuts cannot be stored for more than a week at ambient temperature due to shrinkage and discoloration of the outer skin, the fall of perianth, microbial attack on the perianth region and decomposition of the nut water. Preservation methods was developed to overcome the above problems by pasteurization (90 °C for 10 minutes and 100 °C for 10 minutes) and adding accepted preservatives (100 ppm KMS and 0.05 % CMC). This can be bottled and stored at both ambient temperature (30±2 °C) and refrigerated temperature (4±2 °C) for a period of 6 months. Chemical and microbiological quality parameters of preserved tender coconut water and the overall acceptance of processed and preserved tender coconut water (sensory evaluation) was high. CRI is planning a joint venture private sector to scale up the technology.

‘Pol sambol’ is one of the most popular food products in Sri Lanka which is made from scraped coconut. Preserved ‘pol sambol’ is more convenient and time saving since it is a ready to eat product. A technology was developed to preserved ‘pol sambol’ under two

different storage conditions viz. refrigeration and freezing with a shelf of three months. More studies are in progress to increase the shelf life.

Coconut oil sold at the market is adulterated with other vegetable oils, mainly palm oil which is imported as a cheap unrefined crude oil. In the food chain, coconut oil can be contaminated with many unwanted substances due to bad manufacturing and handling practices. Information on health benefits of coconut oil, particularly on its effect on atherosclerosis, antioxidant and other properties are not mostly researched in Sri Lanka. CRI has entered in to MOU with Faculty of Medicine, University of Kelaniya to carry out a joint research program to generate authentic information on health benefits of coconut oil. This study intends to investigate the quality and the effect of some coconut products for the atherosclerotic changes, body weight and their antioxidant properties to get an overview of the health benefits of the coconut oil. Main objective is to determine the quality of coconut oils made under different conditions and their effects on health using an experimental rat model. Specific objectives are to identify and describe adulterants of coconut oil in commercially available coconut oil samples, to identify and describe contaminants of coconut oil processed in different mills by different methods of production, to determine anti-oxidant activity of white coconut oil, virgin coconut oil and commercially available RBD (refine, bleach and deodorized) coconut oil and to determine the effect of these and scraped coconut on body weight, blood lipid profiles and anti-oxidant activity and atherosclerotic changes in the proposed rat model. This study will analyze samples of coconut oil for adulterants and contaminants to determine the quality and will focus on determining the effect of white coconut oil, virgin coconut oil, commercially available RBD (refined, bleached and deodorized) coconut oil and scraped coconut on body weight, blood lipid profiles, anti-oxidant activity and atherosclerotic changes in a rat model. During the year a review on the coconut oil and health benefits of coconut oil was completed and studies started on analyzing samples collected from mills and shops for moisture, FFA, colour, RI and relative density. This research effort will ultimately help reveal scientifically validated information on health benefits against risks of so called risks of consuming coconut oil.

Osmotically dehydrated sweet coconut chips are crispy in nature and in ready-to-eat form. No frying is required before the consumption. Rancidity is one of the major problems associated with coconut chips. Rancidity can be considered to be based on the subjective organoleptic appraisal of the off-flavor quality. It is associated with characteristic, unpalatable odour and flavour of the oils. Other problem associated with coconut chip is loss of crispiness with the time. Both of these issues lower the product's shelf life. Study was commenced to develop a technology for osmotically dehydrated value added kernel based coconut chips in the presence of antioxidant and by the type of packaging material overcoming above mentioned constraints.

Coconut shell has a great potential as the base material for gasification and to produce charcoal as the main product which is used in many industries worldwide. The coconut shell charcoal is mainly used as the raw material for production of activated carbon. The overall production of coconut shell charcoal in Sri Lanka is about 40,000 MT. The current demand in the country is 70,000 MT. In traditional charcoal kilns a large volume of obnoxious smoke is evolved to the atmosphere causing severe environmental pollution and health hazards to the people living in charcoal producing area. Generally, charcoal makers suffer from breathing problems, irritation and eye diseases due to the release of pollutants and harmful chemicals. Therefore, the operation of traditional pit is either restricted or not permitted at all in several areas in Sri Lanka to prevent environmental pollution and to minimize health hazards to people. CRI has entered into an MOU with ISB and Haycarb in partnership with a small scale charcoal manufacturer to develop a small scale low cost environmental friendly charcoal making kiln to produce high quality coconut shell charcoal for local use and export. This work is now in progress.

Sri Lanka is the 2nd major coir exporting country in the world. Coir pith is a by-product in the coir fiber extraction process from coconut husks. The extraction of 1 kg of fiber generates more than 2 kg of coir pith which contain 53.3% of lignin, 19.9% of cellulose, 11.9% of hemicellulose, 7% of pectin and 0.3% of extractives. This is an important constituent of coir exports earning more than 15 % of the total export earnings of coconut products. The main products based on coir pith include bale, briquettes, discs and grow bags. Currently sun dried coir pith is used to make these products. However, it causes low production rate which is inadequate to meet the required demand due to drying difficulties in rainy days. Therefore, flash drying is considered as an alternative to sun drying to overcome this problem. A flash dryer is a pneumatic system which comprise continuous convective dryer where hot air is the drying energy. However, coir pith dried using a flash dryer may not give required quality due to the high heat application in the system. It is of practical importance to determine the optimum parameters to be applied for coir pith drying in the flash dryer to achieve high quality coir pith. CRI is currently collaborating with the Engineering Faculty of the Moratuwa University to improve this technique and studies are now in progress.

1.5 SOCIO-ECONOMICS

Socio-economic studies of Coconut Research Institute focused its research program to cater the needs of the coconut sector. During the year research studies mainly focused on Policy impacts, value chain analysis of king-coconut sub-sector, impact assessment of D1 coir decorticating machine, protection and competitiveness of coconut industry, socio-economic impact of WCLWD, cost of production (COP) of coconut and coconut based products, integration of edible oil market, evaluation of fertilizer subsidy program, and impact assessment of the drought prevailed in 2012 in the Puttalam and Kurunegala

Districts. In addition to that CRI involved in the planning process of National Agriculture Census-2013, Revising Custom Duties – 2012. Regular supply of information to the Coconut Development and Janatha Estate Development Ministry, National Planning Department, Sri Lanka Treasury and the Central Bank of Sri Lanka.

Trade protection is a common global practice especially in the agriculture sector. It is debatable in the global context, since global concern is focusing on free trade. However, both of these concepts are practiced by all the countries at different degrees. Sri Lanka has implemented these policies since its independence in an alternative manner with the changing policies of the governing political party. A study was conducted with the objective of identifying how protectionism has worked in the Sri Lankan context, considering coconut sector as a case study taking into consideration of the two major product sectors viz. kernel products and non kernel products. Coconut oil, desiccated coconut, copra, coconut cream and coconut milk powder are the kernel products while non-kernel products are fiber products, shell products and sap products. Protection and comparative advantage were estimated for these product subsectors by calculating the NPC (Nominal Protection Coefficient), EPC (Effective Protection Coefficient) and DRC (Domestic Resource Cost). NPC captured the protection in the output market since it is the ratio between domestic market price and border price while the EPC captured the protection in both output and input markets. DRC describes the relative efficiency of producing the concerned commodity domestically. The outcome of the estimates were interpreted in the context of existing policy framework. NPC values showed that all the products were under negative protection except copra and coconut oil. EPCs indicated the same behaviour showing that both output and input markets for these products were negatively protected. However, the protection provided for coconut oil industry has not been worked empirically due to the frequent relaxation of tariffs on substitute edible oil imports which are cheaper compared to coconut oil in general. It is practiced by the government as a tool of controlling nut prices during lean crops. For this reason, coconut oil industry was unspeculative over the period and not well developed. DRC values indicated that the domestic production of these products was comparatively efficient except copra. The comparative advantage of fiber production using traditional drum-pair method was declined over the time and the industry had sustained with technological shifts. Further, the industry improved by value addition especially in the fiber sector.

Coconut oil (CNO) and desiccated coconut (DC) are the two main coconut kernel based industries in Sri Lanka. CNO is the main edible oil consumed and produced domestically. DC industry is export oriented and domestic consumption of DC is negligible. These two industries compete with each other for raw material, the surplus coconuts available after domestic culinary consumption. When nuts are in short supply and domestic price of coconut oil is high government tends to open the edible oil market for other edible

oils through the reduction of import tariff on edible oils. In addition, the government aims to increase coconut supply for the DC industry by discouraging CNO production since DC industry is the most important player in the coconut kernel product sector as a foreign exchange earner, employment provider and government revenue. On the other hand, DC millers lobby for reduction of import tariffs on edible oils. Tariff on edible oil is the main and most important trade policy in the coconut sector of Sri Lanka. However, estimated elasticity of price transmission, which is necessary in analyzing impacts of changing import tariffs on edible oils on coconut sector is lacking. On the other hand, the extent to which the tariff on edible oils is determined by the DC industry which is again important in analyzing impacts of this policy change has not attempted. Therefore, a study was conducted to estimate elasticity of price transmission between world prices (CNO, DC and substitute oils) and domestic prices (CNO and fresh coconuts) and to assess the extent to which import tariff on edible oil is determined by the world market DC.

Two different methodologies were used to achieve the two objectives. The elasticities of price transmission were estimated using co-integration technique and multivariate vector error correction model while the extent to which import tariff on edible oil was determined by the DC market using Seemingly Unrelated regression. Monthly price data related to supply and demand for the period of 1990-2009 were used for the analysis. The data to be used in the co-integration analysis were integrated in the same order. Individual price series are integrated in order one. The results revealed that prices are not pair wise co-integrated in spatial market but in the vertical market. When the prices are co-integrated they are in equilibrium in the long run. World price of CNO, world price of palm oil and world price of DC are the prices that drive price movement. The speed of adjustment to world price of palm oil and palm kernel oil is slow and this may be due to import tax policies in the domestic market. All adjustments in vertical market are done by farm-gate price of fresh coconuts and FOB price of DC. Long run causality runs both directions between price series in spatial market. In vertical market causality is found only between farm-gate price of fresh coconuts and FOB price of DC. Coconut growers are integrated to market process. Domestic price of CNO is adjusting fully to changes in world price of CNO, substitute oils and DC within around two months even under the interventional policy environment. Tariff on edible oil imports showed significant inverse relation with FOB (Sri Lanka) price of DC. Further it was revealed that import tariff on edible oil is mainly determined by the FOB (Sri Lanka) price of DC.

Global beverage market is growing towards natural and healthy drinks. In the next 8 years, global market in the developed world, an ageing population and general health consciousness is driving the development of healthy and functional foods and beverages and food safety concerns will come into effect. In this context, there is a growing demand for tender coconut as a health drink. Packaged tender coconut has a demand as

a thirst drink in USA, EU and in the Asian region (CDB, India). The emerging markets are Latin America, South America, Caribbean islands, Canada, Germany and Africa. Malaysia, Singapore, Vietnam and Thailand are the leading exporters of canned tender coconut water dominating the American and European markets. Coconut water has rising popularity as a sports drink and a lifestyle beverage in the USA beverage market. This shift was marked in leading carbonated beverages companies. For example, Pepsi acquired Brazilian coconut-water manufacturer and Coca Cola acquired a California based company. In Sri Lankan context, King Coconut is mainly produced for drinking purpose. There are number of varieties in Sri Lanka with the common names of “Ran thembili” , “Kahathembili” and “Gonthembili” often grown in home gardens and roadside marketing is the common way of selling as a thirst aid. The number of king coconut palms in Sri Lanka is around 2,208,834 (around 36,266 acres) and main growing districts are Gampaha and Kalutara. In 2011, export volume was 139,849 nuts which valued 9.97 rupees million and it was 9725 nuts at the value of Rs. million 1.24 in 2010. This increase was observed after the removal of export CESS for King Coconut. A study was conducted in Gampaha district, to understand the existing production and marketing system for king coconut and to find out its opportunities and constraints to suggest where any intervention is needed. Gampaha district was selected because the king coconut is highly grown in this district. The actors in the chain are input suppliers, growers, collectors, roadside sellers and exporters. The number of farmers interviewed was 37 and from other actors covered 6 exporters and 4 road side sellers. Plant production, input supply, production, harvesting and postharvest treatment, nut collection and distribution, transport, end markets, inter-firm cooperation and subsector map were the concern of the study in data collection. Majority of the growers had less than 10 king coconut trees. Around 68% sell their produce to intermediaries, 16% do not sell the produce and none of the growers sell directly to exporters. They were not aware of information on exporters. Out of the growers, nearly 84% of the growers were aware for which their produce is used for. According to them 57% of it goes for fresh consumption while 19% for processing. According to the growers, price setting is mainly one sided and hold is on buyer’s side. Around 66% of the growers said buyers decide the price and 24% bargain with buyer and 10% decide their own.

Demand trends in coir fiber industry are showing volatile behavior though coir fiber exports have increased significantly during last decade. World coir fiber imports have also increased in significant amounts from 2000. In 2000, 63% of the world coir fiber was imported to the Europe. China import share of world coir fiber was less than 0.5%. However in 2009 China coir import share is 62% of the total world coir imports. Sri Lanka has benefited from China's growing import demand. In year 2000 Sri Lanka's major export destination was UK with 22% of total mattress fiber exports while that of China was only 0.62%. In 2010 nearly 77% of the Sri Lanka's mattress fiber was exported to China. This growing demand for mattress fiber and where the mattress coir fiber market is almost competitive market where free entry is possible and this lead to installation of D1 fiber extraction machines in clusters in some areas. Even though this extraction technology expanded into many areas in the country, impact on bristle fiber manufacturing industry and other related operations have not been worked out. Socio-economic impact assessment (SEIA) methodology was employed for this purpose. Data were collected through a survey in coconut triangle i.e. Kurunegala, Puttalm and Gampaha districts. Fiber extraction using D1 machines is concentrated in Hettipola, Bingiriya and Panduwasnuwara Pradeshiya Sabas. When the functional status is considered, 60% of the D1 machines and above 50% of the traditional fiber mills are regularly functioning. In traditional mills, 25% of the mills are completely closed down. Main reason for irregular functioning and close down is shortage of husks, which is the basic raw material. However, not more than 25% of the husks are used for fiber extraction in Sri Lanka. Therefore, the problem is not the shortage but the unavailability. A proper mechanism to collect husks that used in domestic culinary preparation is needed.



A systematic assessment of socio-economic impact of WCLWD is needed to develop a more farmer oriented disease management package. It can help in identifying the potential range of impacts (income level, employment, downstream processors) and the likely responses of those affected. As the first step it is expected to quantify the losses which directly affected the income of the farmers. This being a new disease its impact on coconut is not well understood. Therefore, continuous observations of impact on the yield and other activities are needed as the situation progresses. In par with this income loss, economic viability of suggested disease management measures as well as the farmer acceptance of these measures also needs to be identified since disease management measures or legal restrictions may distort the existing market for their

produce as well as the value of coconut lands. Apart from that there will be pitfalls in practicability of suggested measures other than the cost due to the nature of available labour and other socio-economic aspects. Therefore, a study was formulated to identify the socio-economic issues related with the WCLWD on coconut stakeholders, to quantify the economic loss caused by the WCLWD and to find out the economic viability and farmer acceptance of disease management measures suggested by the CRI. For the study 200 lands were selected from the sample which we conducted situation analysis in 2009-2010. Data collection started and already 50% data collection completed.

Data collection for estimating COP in the coconut triangle was continued during the year. The objective of this study was to identify the differences in major cost components and variation of COP in different agro-climatic zones, land sizes, land suitability classes and levels of management. The cost components identified were cost for fertilizer application, labour, weeding, agrochemicals and harvesting. In general the average COP of coconuts in the coconut triangle was Rs 13.00/nut in 2012 (variable cost). In addition to general cost of production, cost of production for different land suitability classes were calculated. Cost of production of a nut in land suitability classes S1-S2, S3, S4 are Rs. 8.00, Rs. 9.00 and Rs. 13.00 respectively.

The coconut production was more or less stagnated during the last several years and as a result per capita availability of coconut has declined over the years raising doubts about the sustainability of the industry. Farm-gate price was not remunerative to encourage people to invest on coconut cultivation. Coconut fertilizer usage pattern has shown declining trend over the years as the result of increasing fertilizer prices as well as low returns generated from the coconut lands because of the in-appropriate management levels. Government practiced many fertilizer subsidy schemes over the years and the recent experience was on subsidizing fertilizer for paddy cultivation. This has become success story by reaching the self sufficiency of paddy production in Sri Lanka. Government started fertilizer subsidy scheme for coconut in year 2010 with the intention of promoting fertilizer application for coconut and to reach to the target of 60% of coconut growers apply fertilizer by year 2016. Even though these targets fixed less experience has gained in this sector related to these types of operations. Therefore a study was initiated to identify the pros and cons of implemented fertilizer subsidy scheme. Objectives of the study were to identify the level of implementation of this program, to identify the shortcomings of the program and to propose the improvements for the program. It was revealed that objectives of the subsidy program are to increase agricultural productivity, improve food security and to provide income support for poor farmers. Theory implies two types of subsidies namely fixed and variable subsidy. When fixed level of subsidy program is in operation, retail prices vary with the changes of fertilizer prices in the international market but if variable subsidy scheme is in practice, fertilizer prices will keep constant irrespective of price changes in local and international

markets. As implemented for paddy, fertilizer subsidy program, coconut fertilizer subsidy scheme implemented on the base of variable subsidy scheme. According to the statistics of Central Bank of Sri Lanka, in year 1998 government spend Rs. 2152.00 million on fertilizer subsidy and this counts 0.8% to the total government expenditure. In year 2011 this amount has increased up to Rs. 29,802 million counting 2.13% to total government expenditure. As the result of new fertilizer subsidy schemes this amount will be increased further because study revealed that percentage of fertilizer application in the districts of Puttalam, Kurunegala and Gampaha have increased by 36.59, 61.54 and 33.33 per cent respectively. Study results further revealed that majority (67%) of growers apply fertilizer once a year for their cultivations and the awareness about fertilizer subsidy program is very high in Puttalam district (53%) while less people were aware in Kurunegala district (20%). Belief of the people is very important in agriculture as it will lead to adoption of technologies properly. Among respondents more than 97% believe that fertilizer subsidy will improve coconut yield and 84% growers were aware about the fertilizer recommendation while 69% growers were aware about dolomite application. Even though organic fertilizer application has more advantages still majority of growers (68%) do not apply organic fertilizer for their coconut cultivations. As growers beliefs are positive, respond for this fertilizer subsidy program will be increased further with the good weather condition in this year.

Research findings of the CRI has revealed that major factors that determine the annual national coconut production are climate, use of fertilizer, recommended agronomic practices, intensity of pest and disease control and area cultivated. Among those factors, research evidences have proved that rainfall intensity and its distribution contributes mainly for national coconut production. According to the observations of the growers as well as the researchers, drought prevailed in the initial seven months of 2011 had badly influenced the national coconut production in the country and the drought effect reflected in the latter part of the year 2011 and in year 2012. CRI initiated a study to assess the impact of the drought prevailed in the Puttalam and Kurunegala districts in year 2011 and 2012. Study was conducted in two stages. First study covered the affected areas in year 2011 and the second study covered the affected areas in year 2012 in Puttalam and Kurunegala Districts. Data showed the increasing trend of daily maximum temperature during the period of September to December, 2011. This increase has shown around 5% increase in maximum temperature. Similarly in both districts from 2005 to 2012 annual average rainfall has declined significantly. This selected sample represented land suitability classes S2-S4. Drought effects were detected using the indicators of leaf appearance and button nut falls. Survey results showed that around 70% lands in surveyed areas had been affected due to drought. This was indicated through droopy laves. Another indicator to identify the drought is button nut falls and immature nut falls. Growth stages of button nuts categorized into four categories namely one month to three months, four to five months, six to seven months and eight

to nine months. According to the results highest nut falls recorded in four to five months category and months one to three and most affected land –suitability class was S3 category. When considering the age groups, highest rate of deaths recorded in age group of 3-4 years and 10-25 years. Further this study identified that activities suspended due to this prevailed drought. Among the suspended operations, results recorded 14% growers who are regular fertilizer appliers have suspended their operations. During the study, it was observed that most of drought affected areas ground water level has gone down drastically. This drought mostly damaged perennial and semi-perennial cultivations in those areas. Drought effect was severe in the poorly managed lands with weeds, shrubs and lands covered in perennial tree crops. Study concluded that well managed lands can tolerate drought to a higher extent and it is necessary to re-consider recommendations related to the intercropping in intermediate and dry zones. In Puttlam district, most affected areas are Anamaduwa, Arachchikattuwa, Kalpitiya, Karuwalagaswewa, Mahakumbukadawala, Mundel, Pallama, Puttlam, and Wanathavilluwa. This covered an extent of 45,073 acre and number of affected trees were around 180,000 (2,817 acre). In Kurunegala district highly affected areas are Bingiriya, Galgamuwa, Ganewatta, Giribawa, Katupotha, Kotawehera, Maho, Nikaweratiya, Polpithigama and Rasnayakapura. The area covered was 80,183 acres and the total number of affected trees were 133,905 (2,092 acre).

1.6 OIL PALM RESEARCH AND DEVELOPMENT

A new research division was established in August 2011 to promote R & D activities on oil palm in Sri Lanka with the mandate of undertaking R & D activities in oil palm with the view of expanding country's oil palm cultivated extent to 20,000 ha in order to produce 60,000 Mt annually. The research program includes studies on environmental impact, land suitability assessment, land management, soil and plant nutrition, clonal propagation and socio-economics of oil palm cultivation. During the year priority was given for soil and plant nutrition and land suitability assessment studies.

In order to assess the feasibility of growth and yield performance of oil palm outside the Southern Province, two plots of oil palm (35 seedlings each) were planted in intermediate zone (Bandirippuwa Estate, Lunuwila) and dry zone (Maduru Oya Seed Garden). Under palm nutrition studies, quantification of nutrition removal, evaluation of soil available K and P extraction methods to determine the critical soil K & P levels for oil palm growing soils are in progress in several locations in the Southern Province. Under clonal propagation four media protocols are being tested for efficiency in callogensis. Regular extension services were provided for RPC's having oil palm plantations on import of oil palm seeds, nursery inspection, fertilizer recommendation, control of pests and diseases and other issues related to plantation management. During the year, 850 soil samples and 475 oil palm leaf samples were analyzed for site-specific fertilizer

recommendations. Twelve DFR reports were given to Watawala, Agalawatta, Namunukula and Elpitiya RPC's. Eight demonstrations were held in several estates (eg. Homodola, Thalangaha, Nakiyadeniya, Eladunne, Citms, Hulanune, Akuressa, Culloden estates) on leaf and soil sampling for fertilizer recommendations.

As a means of managing pests and diseases, four (4) nurseries were visited by the scientists from CRI to inspect and recommend the release of seedlings from 1st stage nursery to the 2nd stage nursery. In all four nurseries, mild infestations of spider mites (*Tetranychus* sp and *Eutetranychus* sp.) were observed and necessary recommendations were made to control them by using acaricides. It was found that the incidence of algal disease caused by *Cephaleurus* sp. could be reduced by the application of Muriate of Potash. Therefore, application of 3.2 kg of MOP per palm was made as an interim recommendation. At Pallegoda nursery of Namunukula Plantation, a severe infection of multiple fungi was observed and they were brought under control by spraying the fungicide Follicur. A sudden collapse of germinated seeds imported from Papua New Guinea was reported by Agalawatte Plantation PLC. The whole seed stock was kept under quarantine and instructions were given to destroy the seed stock by burning. Economic benefits of oil palm cultivation in Sri Lanka was presented at the District Development Council held on 17 July 2012 chaired by the H E the President and as a result of the discussion, Presidential Secretariat issued a directive mandating oil palm R & D to the CRI. Possibility to explore the importation of pre-heated oil palm seeds from Costa Rica is also in progress. Considerable number of small holders are also interested in growing oil palm and all they were advised and data base is maintained.

1.7 TECHNOLOGY TRANSFER

In addition to technology transfer activities mentioned below a research study was completed to assess the attitudes and Perceptions of Organic and Non-organic Coconut Growers towards Organic Farming. The study revealed non-organic growers did not have strong motivation to practice organic farming as they were of the view that yields in organic farming is low, even though organic coconut gets slightly higher price. Further, they were reluctant to shift from chemical fertilizer and pesticides as they have been in the habit of using it for a long period of time. Conversely organic growers practice organic farming mainly because of the marketing assistance and the inputs such as organic fertilizer and technical knowledge provided by the Serandipol Company and also their favorable attitudes towards environment. Knowledge on organic farming and extension of worker contacts, greatly influence motivation towards adopting organic farming. Therefore, participatory extension programmes and better extension approaches like farmer field schools could be used to change growers' attitude, knowledge and skills towards organic farming. Further involvement of a third party like

government, NGO or a private company to assist organic growers would also increase the adoptability rate of organic farming.

Technology Transfer Activities: Twenty two estate advisory field visits were made as response to requests from growers. The six one day educational programme series for coconut growers was conducted with participation (see table below)

Date	Venue	Topic	Participants	
			External	Supportive staff
31 May	ISG, Ambakele	Replanting of coconut	142	48
29 June	Ratmalagara	Soil and moisture conservation	128	43
27 July	Head Office, CRI	Fertilizer recommendations	127	38
24 August	Makandura	Intercropping / animal keeping	119	40
28 September	Head Office, CRI	Pest and diseases of coconut	112	42
25 October	Ratmalagara	Rehabilitation of palms	97	45
30 November	Head Office, CRI	Estates Management	102	50

During the year 17 crop Clinics seminars and workshops were conducted jointly with CCB. The Number of exhibitions participated was 8. Three Research and extension dialogs were held. Following farmer field schools were conducted for Kapruka Purawara Society leaders

Venue	Date	Subject area
Welpalla (Pannala) Kapruka Society	8 May	Varieties and planting
Welpalla (Pannala) Kapruka Society	19 June	Identification and control of Black Beetle and Red Weevil
Welpalla (Pannala) Kapruka Society	30 July	Identification and control of Plesispa, Mite, Termite and diseases
Welpalla (Pannala) Kapruka Society	16 August	Organic manure preparation, application, Nutrient deficiency identification and inorganic fertilizer application
Welpalla (Pannala) Kapruka Society	22 November	Videos on all aspects of coconut cultivation, rewarding and certificate giving to the growers

Fifteen Educational programs for officers from other Institutions, two media programs for general awareness building and 12 educational programs for teachers and students were held during the year. Among publications issue each of Technology Update and CRI News were released. Advisory Circulars A, B, and C were translated to Tamil A, B, C and B series to Sinhala and published.

Technology Park: Technology Park was well maintained and attracted a large number of visitors who come in search of information on coconut cultivation and products during the year and the sale of publications and other items were also increased (see Table below)

Income summary (2012)

Type	Amount (Rs.)
Polybagged Seedlings	1,948,625.00
Different products	
From Technology Park	366,004.00
From others	751,827.00
Books /Publications	220,655.00
Miscellaneous	19,015.00
Total	3,306,126.00

Other Technology transfer / information dissemination activities:

1. The staff of the Genetics & Plant Breeding Division delivered lectures for many groups of students, farmers, and growers who visited CRI and Isolated Seed Garden.
2. Many school children, students of technical colleges, undergraduates and graduates visited the Genetics & Plant Breeding Division, Molecular Biology Laboratory and the Isolated Seed Garden at Ambakelle had exposure to coconut breeding, molecular tools and coconut seed production.
3. Dr. L Perera, Mr. R Jayathillaka and staff of the Seed & Seedling Certification unit conducted separate training sessions for Seed Selection Officers of the CCB, newly recruited Coconut Development Officers of the CCB, Prison Officers and Superintendents of CRI at Ibbagamuwa on various aspects of coconut seed production; mother/plus palm selection, pollen processing and storage, pollination, seed garden maintenance, nursery management etc.,
4. Agriculture Economics and Agribusiness Management Division provided valuation reports of coconut trees to stakeholders, economic evaluations of technical recommendations of CRI, statistical information for Coconut Development and

Janatha Estate Development Ministry, Central Bank, National Planning Department and assisted to the research divisions for economic analysis of research findings

5. Dr. (Mrs.) D.M.D.I. Wijebandara served as a resource person in training programme on “Coconut Growing Soils and Land Suitability Classification for Coconut” was conducted by Coconut Research Institute.
6. Dr. N.A. Tennakoon and Dr. (Mrs.) D.M.D.I. Wijebandara arranged suitable programmes and delivered lectures on Divisional activities to the students, teachers, scientists, officers and students from universities, technical colleges and other countries.
7. Mr. D.P. Panditharatne and Mr. K.L. Ranasinghe served as resource persons in training programmes on Irrigation on coconut and Rehabilitation of coconut lands conducted by Coconut Research Institute.
8. Dr. N.A. Tennakoon served as a resource person in training programmes on Fertilizer for coconut, Irrigation for coconut and Rehabilitation of coconut lands conducted by Coconut Research Institute.
9. Dr. N.A. Tennakoon and Dr. (Mrs.) D.M.D.I. Wijebandara served as resource persons in training programme on Diploma Students of National Institute of Plantation Management.
10. Dr. N.A. Tennakoon conducted awareness programmes on fertilizer application and coconut soils to the managers in Chilaw Plantations Ltd.
11. Dr. S.C. Ranasinghe and Dr. A. Nainayake conducted lectures on ‘Physiology of coconut palm and Effect of environmental factors on coconut palm productivity’ were conducted to undergraduates, NIPM diploma students, coconut growers and Coconut Development Officers. Information on physiological aspects of coconut palm was disseminated to general public at the exhibitions.
12. Dr. L C P Fernando presented an invited paper on “Integrated management of major pests and diseases of coconut in Sri Lanka” at the XLV COCOTECH meeting held during 01.07.12 - 06.07.12.
13. I M S K Idirisinghe, served as a resource persons in many technical evaluation committees on purchasing capital items for the institute.

14. Coconut Processing Research Division conducted a number of training sessions on coconut product technologies and value addition; oil, paste and milk (2) on Nata de coco (1), virgin coconut oil (4), coconut water bottling (1) and five demonstrations to students from Universities, technical colleges, schools and industrialists and also trained coconut development officers, members of the Mahaweli Development authority, and Jail Officers. Five demonstrations were made on coconut based products to the members of coconut cultivation board. Conducted demonstrations to promote coconut products at Vidatha Centre, Kuliyaipitiya and participated in participated in the Health Fest Exhibition held at Vihara Maha Devi Park

2. Other major activities carried out by CRI for development of the coconut in 2012

1. CRI entered into an agreement with Chilaw Plantation Company Ltd for establishing a seed garden for mass production of Kapruwana in their Kiniyama Estate. The total extent of the seed garden would be 100 ac
2. Completed coconut land suitability assessment in the Moneragala district and maps were prepared
3. CRI in its seed gardens produced 1,538,174 seed coconuts improved cultivars; 1,051,128 of CRIC60, 47,953 of CRIC65, 21,063 of CRISL98 and 3,252 of Kapruwana.
4. CRI seed certification service certified 414,778 poly bagged seedlings of improved coconut cultivars mostly in nurseries of CCB
5. CRI has established 20 adaptive trials to demonstrate appropriate coconut cultivation technologies in farmer's fields
6. CRI has collected and nursery laid 143,200 green dwarf seed coconuts for supplying coconut growers affected by the Weligama coconut leaf wilt disease (WCLWD) as relatively tolerant variety of WCLWD.
7. CRI established three predator mite culturing laboratories for mass production of *N. baraki* for biological control of coconut mite. Further assistance was provided for establishment of 7 more laboratories to CCB (5), Kurunegala Plantation Ltd (1), and Chilaw Plantation Ltd (2). All these laboratories are now in functioning and large numbers of predator mites are produced and released coconut mite infested areas

8. CRI has developed/improved coconut based products and transferred the technologies to SME's directly and via Vidhatha Centres

3. Estate Management Activities

The three Genetic Resource Centers (GRC) and seven Sub Research Stations (SRS) that come under the Estate Management Division was maintained satisfactorily by self-financing except the newly started Middeniya SRS. Total acreage of the genetic resource centers is 1,980 acres and research substations are 1,093 acres. The primary objective



of the division is to maintain the GRCs to provide high quality seed nuts for nurseries in main coconut growing areas of the country. Further, this division provides facilities for the research divisions to carry out their research under various agro ecological regions, different soil types, with different coconut cultivars. Moreover, facilities such as labor, land, materials, crop protection for research blocks are provided by the staff of the estates. Further, dissemination of new technologies through demonstrations is conducted successfully under different topics in different estates for scientists, plantation managers, coconut growers, university students, and school children and for others interested parties. These stations also provide facilities for conducting one day training sessions for growers.

The new research station established at Middeniya in an extent of 75 acres in 2005 is still under developing. A total of 2839 coconut seedlings of different cultivars were planted and to date and 65% reached flowering. This substation is mainly dedicated for conducting research to develop cultivation practices specific to southern province. Further the substation in Middeniya is important to conduct various demonstrations and extension programs for the growers in the southern part of Sri Lanka.

Ambakelle, Maduru oya and Pallama GRCs were maintained for seed nut production. Makandura RC provides facilities to multidisciplinary research programs on improving soil fertility, agroforestry demonstrations and other research studies. In Ambakele GRC, special block was maintained to produce CRIC65 (DT) to cater the extensive home garden development program. In year 2012 these GRCs produced 1,538,174 seed coconuts improved cultivars; 1,051,128 of CRIC60, 47,953 of CRIC65, 21,063 of CRISL98 and 3,252 of Kapruwana. Further Plus palms identified in Pallama GRC, Ratmalagara and

Walpita RC produced 249,735 Plus palm seed nuts for the National Coconut Replanting Program.

The rest of the estates were also maintained properly for research. Majority of these nuts were sold through the Coconut Development Authority auction. Chemical fertilizer was applied during the year 2012 for all the sub stations and GRC's and the 90% of coconut palms were fertilized.

During the year in all estates a total of 13,000 meters of fence were repaired and 3200 meters newly built at the cost of Rs. 8.67 million. Three rounds of weeding in 2087 ac and mulching 97,783 palms were attended at the cost of Rs. 8.706 and 97,783 palms were manured at the cost of Rs. 8.79 million. The cost for harvesting was Rs. 8.514 million and the total nuts harvested were 4.987 million. The cost for wages and running expenses were Rs. 35.796 million. The total expenditure including all other expenses was Rs. 79.248 million. The overall income in 2012 was Rs. 10,416million. The Table below provides a statement expenditure and income of estates during 2012.

GRCs* and Research Centres	BE	RE	ISG	PRS	WE	MKSG	MOSG	PSG	DE	EM	TOTAL 2012	Total 2011
	Rs. (000)	Rs. (000)	Rs. (000)	Rs. (000)	Rs. (000)	Rs. (000)	Rs. (000)	Rs. (000)	Rs. (000)	Rs. (000)	Rs.	Rs.
GC*	3,016	3,773	6,476	3,377	983	3,115	3,435	3,751	642	14,242	42,813	35,603
Wages	3,937	2,803	4,359	1,770	349	1,329	1,282	3,050	571	1,846	21,300	22,037
Upkeep	1,550	1,267	7,085	1,156	466	1,429	1,465	3,567	1,615		19,605	19,223
CP*	1,643	1,593	3,120	1,223	220	812	675	368	133		9,789	15,510
Pick*	2,149	964	1,885	1,163	315	460	952	1,043	79		9,013	7,673
Copra*	381	174	174	308	19	121	47	229	16		1,472	981
Animal*	1,356	629	615	490		534	338	612	157		4,734	4,340
TOTAL (E)*	14,031	11,208	23,717	9,491	2,354	7,802	8,195,682	12,623	3,216	16,088	108	105,371
Copra sales	796	254	96	340	16, 3	38	56	556		304	2,460	1,074
Coconut sales	13,838	10,673	29,832	17,264	3,063	8,744	16,743	12,335	1,010	-571	113,505	100,662
Seedling sales	81	303	1,274		498	456	89	1,289	1,518	677	6,188	5,491
Sundries	1,711	520	296	246	215	349	11	477	14	1,558	5,400	7,450
Sale of A & AP*	1,915	337	614	882		1,091	217	640	67		5,768	4,594
Total (S)*	18,342	12,088	32,113	18,734	3,794	10,680	17,118	15,299	2,611	2,539	133,323	119,274
S/D*	4,037	1,768	4,638	3,958	1,292	4,256	9,792	1,940	-1,400	-14,122	16,162	33,674
S/D (N)*	2,761	1,408	3,897	3,624	1,192	4,047	9,544	790	-1,608	-15,242	10,416	29,496

* GRCs, Genetic Resources Center (GRC), GC, General charges, CP, Cultural practices, Pick, Cost for harvesting nuts, * Total (E), Sale of animals and animal produce, Total (S), Total sales, S/D, surplus/deficit, S/D (N), surplus/deficit (Net)

4. Development Activities undertaken

1. The responsibility of maintenance and data collection of Agro-meteorological and rainfall stations of CRI was transferred to Plant Physiology Division.
2. Establishment of Agro-meteorological station at the Middeniya Research Station was nearly completed and meteorological data collection will be started from February 2013.
3. A laboratory was constructed for coir processing research
4. Laboratory premises of Agronomy, Crop Protection, Physiology divisions were renovated and colour washed.
5. Insect rearing laboratory was renovated
6. Guest house was renovated and up graded
7. Fence of the CRI frontage of the main premises of CRI was completed.
8. Street lamps were fixed in the frontage of the main premises of CRI

5. Services provided to stakeholders

1. The predatory mite mass producing laboratories established in 12 locations functioned successfully and produced 48,850 sachets of predatory mites and issued to the growers.
2. CRI has provided differential fertilizer recommendation after leaf analysis to 110 growers covering a coconut extent of 9,372 ac
3. CRI has analyzed 343 fertilizer samples and 124 organic manure samples for quality assurance.
4. CRI has produced and issued 3,998 pheromone vials to coconut growers for control of Red Weevil
5. CRI has provided given 47 export certificates for coir pith and king coconut

6. CRI bred and issued 22 animals (goat and sheep) to promote animal husbandry in coconut lands
7. CRI has given climate data of all its station to Department of Meteorology regularly by submitting meteorological data to the national database at the Meteorology Department. More than 80 comprising Divisional Secretariats, scientists, students and growers obtained climate information from CRI by request).
8. The protocol for shelf-life improvement of tender king coconut for export purposes was demonstrated to more than 15 exporters, and more than 200,000 tender king coconuts were sent by the exporters to many countries during the year.
9. Embryo cultured 65 seedlings of 'dikiri' coconuts (high value) were given to interested growers

6. Seminars, workshops, consultations

Scientists of CRI participated in the 4th Symposium on Plantation Crops held at Taj Samudra on 30 September to 1 October. Six scientists made presentations.

Dr. S.H.S.Senarathne participated in the first coordination meeting of the RCA Project RAS 5/055 "Improving Soil Fertility, Land Productivity and Land Degradation Mitigation" organized by International Atomic energy Agency, Colombo from 27th to 31st August 2012.

Jayalath, K V N N Conducted in-house seminar on the Effects of World Market Prices on the Coconut Sector in Sri Lanka: An Analysis of Price Transmission Elasticities and Endogenous Trade Policy, 2012.

P M E K Pathiraja (2012). Conducted in-house seminar on Trade Protection and Comparative Advantage of Coconut Products Over Time, December, 2012

Dr. N.A. Tennakoon participated in the first Coordination Meeting of the RCP Project on Improving Productivity and Land Degradation Mitigation from 27th - 31st August 2012 at Hotel Galadari, Colombo, Sri Lanka.

Dr. N.A. Tennakoon participated in a Training Programme on Governance and Leadership on 25th September 2012 at Foundation Institute of Sri Lanka, Colombo.

Dr. N.A. Tennakoon participated in the National Stakeholder Consultation for Identification of Organic Agriculture Research Projects on 6th December 2012 HRTI, Colombo, Sri Lanka.

Mr. V.G.D. Nayanaka participated in a Work shop on Inventions & Innovations on 26th June 2012 organized by Young Scientist Forum (YSF), National Science and Technology Commission of Sri Lanka.

Mr. V.G.D. Nayanaka participated in a Work shop on Empowering Researchers with Information on 12th August 2012 Organized by National Science Foundation, Colombo.

Mr. V.G.D. Nayanaka participated in Annual Research Forum on 23rd November 2012 at Coconut Research Institute Organized by Sri Lanka Agricultural Economics Association.

Mr. V.G.D. Nayanaka participated in the Fertilizer day on 14th December 2012 held at Batalagoda Rice Research Institute Organized by Soil Science Society of Sri Lanka.

Mr. A.R. Kulathunga attended a seminar on Agilent Spectroscopy on 24.04.2012 at Techno Instrument (Pvt) Limited

Mr. A.R. Kulathunga attended a seminar on Enhancement of quality of productivity in Laboratories on 18.10.2012 at Institute of Chemistry Ceylon

Ms.Ganga Weerasinghe attended a seminar on Enhancement of quality of productivity in Laboratories on 18.10.2012 at Institute of Chemistry Ceylon

Ms. H.A.E. Samaranayake attended a training workshop on Toxicology Clinical, Industrial and Environmental Application held by National Authority for the Implementation of Chemical Weapon Convention on 20.01.2012

Ms. H.A.E. Samaranayake attended a training workshop on Social Science Research and Comprehensive Research Proposal Development held by National Science Foundation on 24.02.2012.

Ms. H.A.E. Samaranayake participated in the seminar on “Food Additives, Contaminants and Safety” held by Institute of Chemistry Ceylon, Rajagiriya on 21.03.2012.

Ms. H.A.E. Samaranayake participated in the seminar on “Ethics in Research” at National Science and Technology Commission on 20.04.2012

Ms. H.A.E. Samaranayake attended a training workshop on Accreditation: Supporting Safe Food and Clean Drinking Water held by Sri Lanka Accreditation Board for Conformity Assessment on 12.06. 2012.

Ms. H.A.E. Samaranayake participated in the training on “Empowering Researches with Information” held by National Science Foundation, Colombo

Ms. W.P.K.K Fernando underwent Assessor Training for accreditation of testing and calibration laboratories at Sri Lanka Accreditation Board from 14th May to 18th May 2012.

Overseas Visits

Dr. N.A. Tennakoon participated International Consultation on Sustainable Development; Twenty years after RIO on 15th - 17th February 2012 at M.S. Swaminathan Research Foundation, Chennai, India.

Mrs. N I Suwandhrathne obtained a training on mass rearing of the parasitoid *Tetrastichus brontispae* at the Department of Agriculture, Bangkok, Thailand from 10-26 January, 2012

Dr. L C P Fernando presented a paper on integrated management of coconut caterpillar *Opsina arenosella* at the National Coconut Seminar in Thailand during 16-18 February, 2012.

Dr. L Perera visited CPCRI, India on a Mission on “Evaluation of status of International and Local Coconut Gene Bank of India” Coconut Genetic Resource Network, from 13 January to 22 January 2012

Dr. L Perera participated in 16th COGENT Steering Committee in 8-10 July 2012 Cochin, India.

Dr. L Perera visited Albay Research Station and Zamboanga Research Station of the Philippine for a scientific familiarization visit from 9 April to 24 April 2012.

Ms. Kumudu Fernando participated in Asian Regional Symposium of Global Natural Fibers forum held at Bangalore, India from 25/09/2012 to 26/09/2012.

7. Collaborations/partnerships

CRI entered into an agreement with Faculty of Medicine University of Kelaniya to carry out collaborative research on health benefits of coconut oil and other coconut based products. Memorandum of Agreement (MOU) was signed on 14th May 2012 at the Vice Chancellor's Office, University of Kelaniya.

Coconut Research Institute (CRI) and the Faculty of Agriculture, University of Peradeniya established a collaborative coconut demonstration at the University Farm, Dodangolla to support undergraduate training and research on coconut cultivation. Several varieties of improved hybrid coconut seedlings for this demonstration were provided by the CRI

CRI entered into an agreement with Haycarb, ISB to develop an eco-friendly charcoal kiln

8. Foreign collaborations (FAO, COGENT, WFC etc.)

CRI signed a MOU with ICRAF of the World Agro-forestry Centre to develop agroforestry in coconut lands

CRI received financial and technical assistance amounting to US \$ 307,000 from the Food and Agriculture Organization (FAO) under its Technical Cooperation Programmes to develop methods for early diagnosis and spread prevention of the Weligama Coconut Leaf Wilt Disease (WCLWD) which is currently prevailing in the Southern Province

Dr. L Perera, Head, Genetics and Plant Breeding Division was appointed to as a member for the Steering Committee the COGENT.

HE Mrs. Indira Lopez, the new Ambassador to the Republic of Cuba in Sri Lanka visited the Coconut Research Institute on 4th December and met the Directorate and staff to discuss the proposed cooperation with Cuba on development of its coconut industry

The following delegates visited CRI during the year:

Paio Yongfan, Senior Plant Protection Officer, FAO Regional Office, Bangkok, Thailand

Dr. Rethinam Ponniah, Lead Consultant, FAO-TEC Project on Weligama Coconut Leaf Wilt Disease (WCWLD)

Prof. Toyoki Kozai, Emeritus Professor, Chiba University, Japan

Mr. Keita Iwase, Second Secretary, Embassy of Japan, Colombo

Dr. Manimekalai, FAO Consultant, Central Plantation Crop Research Institute, Kasaragod, Kerala, India

Dr. Roland Bourdex the COGENT coordinator

Mr. Patrick Evans, FAO Representative in Sri Lanka

Dr. Mathew Jacob, Principal Coconut Breeder, CPCRI

Dr. O R Reddy, Pathologist, Former Joint Director (Plant Pathology), Department of Agriculture and Cooperation, Government of India

Dr. R J Rabindra, Entomologist, Former Director, National Bureau of Agriculturally Important Insects, Bangalore, India

9. Any other noteworthy developments

9.1 New Publications

1. A Guide to the Preparation of Research Proposals by Prof. H.P.M. Gunasena, Chairman, Coconut Research Board (ISBN 978-955-9013-11-2)
2. Weligama Coconut Leaf Wilt Disease: Six Years After (ISBN 978-955-9013-10-5)
Weligama Coconut Leaf Wilt Disease was reported in Sri Lanka in 2006 from the Southern province. It is an incurable disease caused by a phytoplasma. Ministry of Coconut Development and Janatha Estate Development has taken several policy decisions to manage the disease. This book comprehensively documents all events that took place from 2006-2012 to manage the disease and the progress made up to now. This information will be useful for the scientists to continue further research to eradicate the disease completely and as a guide to the policy makers in managing similar diseases that may occur in the future.

9.2 Workshops/ consultations organized by CRI

1. Agriculture Economics and Agribusiness Management Division in collaboration with the other divisions in the institute organized the Sixth Annual Research Forum of Sri Lanka Agricultural Economics Association. The theme of the forum was Greening the Economy: Challenges from Rio+20 to Sri Lankan Agriculture/Plantation Sector
2. Plant Physiology Division in collaboration with the Meteorological Department, organized a one-day training workshop for staff of the CRI who are directly involved in data collection

3. Coconut Processing Research Division in collaboration with Switch Asia organized a workshop to promote cleaner DC production in the Sri Lanka

9.3 Supervision of postgraduate, undergraduate and diploma students by the staff

Dr. C.S. Ranasinghe supervised the M.Sc. project of Ms Jayaranjanie Sivasubramaniam, a student of Postgraduate Institute of Agriculture (PGIA), Peradeniya, and continued for M Phil. Title, 'Estimation of canopy photosynthesis of adult coconut palms of different varieties and its variation with soil moisture availability'

Dr. (Ms) S A C N Perera supervised the M Phil research project of Miss. L. C. J. Kamaral, University of Sri Jayawardenepura. Title 'Determination of yellow dwarf coconut population structure in Sri Lanka'

Dr. C S Ranasinghe supervised in-plant research training of Ms G M N Sanjeewani, B.Sc. (Agric), Faculty of Agriculture, University of Peradeniya

Dr. S.H.S. Senarathne supervised the final year research project of Miss. I.M.P.S. Illangamudali's, an undergraduate student of Rajarata University

Dr. S.H.S. Senarathne supervised a B.Sc. (Agriculture) final year research project of Miss. Nishamani Ratnayake of Uwa Wellassa University of Sri Lanka.

Dr. (Mrs.) D.M.D.I. Wijebandara supervised the B.Sc. (Agriculture) final year research project of Mr. D'heer Jeron of Faculty of Bioscience Engineering, Ghent University, Belgium.

Dr. H T R Wijesekara and N S Aratchige supervised the supervised the B.Sc. (Agriculture) final year research project of Ms H M P C Kumarihamy of Sabaragamuwa University

Dr N S Aratchige and N I Suwandarathne supervised the supervised the B.Sc. (Agriculture) final year research project of Ms. B D C D Benthara of Uwa Wellassa University

Dr N S Aratchige supervised the supervised the B.Sc. (Agriculture) final year research project of Ms E A N Kaushala of Uwa Wellassa University.

Dr. H T R Wijesekara and N S Aratchige supervised the supervised the B.Sc. (Agriculture) final year research project of M.S.N. Premarathna of Rajarata University

Dr. J. M. M.A Jayasundera supervised undergraduate research project of Ms. Supeshala Oshani, Department of Food Science and Technology, Faculty of Livestock, Fisheries and Nutrition, Wayamba University of Sri Lanka

Mrs. E. Samaranayake supervised undergraduate research project Ms. Gamlath Department of Food Science and Technology, Faculty of Livestock, Fisheries and Nutrition, Wayamba University of Sri Lanka

Mr R M N A Rathnayake, an Agriculture diploma student of HNDT Apprentices completed his practical training under the supervision of Dr C S Ranasinghe at the Plant Physiology Division from March to July 2012.

Dr. (Mrs.) D.M.D.I. Wijebandara supervised a Higher National Diploma in Technology research project of Miss. Udari of National Apprentice & Industrial Training Authority , Naiwala, Sri Lanka. The title of the study was “Soil and leaf nutrient status of oil palm growing soils of wet zone of Sri Lanka”.

10. Staff Matters

10.1 Short-term (> 7 days) and long term trainings received

Mr. K A S C N Fernando participated in four months certificate course in offset printing conducted by Ingrin Institute of Prining and Graphics Sri Lanka Ltd.

10.2 Postgraduate trainings received

Mr H C Mendis, Research Officer, Plant Physiology Division continued his postgraduate studies leading to Ph. D. degree at the Florida State University, USA from 11th August 2009

Mrs. Indika Herath is continuing her PhD studies in New Zealand

Mrs. Pramuditha Waidyaratne is continuing her PhD studies in New Zealand

Miss. M.K.F. Nadheesha is on study leave for postgraduate studies in University of Illinoise, USA with effect from 2nd January 2012.

Mr. A D N T Kumara, Research Officer was awarded an Indian Commonwealth Scholarship leading to PhD at the University of Agricultural Sciences, Bangalore, India

Mrs. N I Suwandhrathne continued postgraduate studies leading to MSc degree at the Post Graduate Institute of Science, Peradeniya

Mr. M G M K Meegahakumbura, Research Officer went on overseas study leave to Kuming University, China with effect from 5 September 2012.

10.3 Postgraduate Degrees Completed

Mrs. K.V.N.N. Jayalath completed the M Phil degree in Agricultural Economics at Postgraduate Institute of Agriculture, University of Peradeniya, under the supervision of Prof. J. Weerahewa and Prof. L.H.P Gunarathe, Department of Agricultural Economics and Business Management, Faculty of Agriculture, University of Peradeniya, Sri Lanka

Mrs. P.M.E.K. Pathiraja completed the M Phil degree in Agricultural Economics at Postgraduate Institute of Agriculture, University of Peradeniya, under the supervision of Prof. J. Weerahewa and Dr. Fedrick Abeyrathne, Department of Agricultural Economics and Business Management, Faculty of Agriculture, University of Peradeniya, Sri Lanka

10.4 Appointments

1.	Dr. R P B S H S Senaratne	Head/Agronomy
2.	Dr. I M S K Idirisinghe	Head/Econ
3.	Dr. V R M Vidhanaarachchi	Head/TCD
4.	Dr. H T R Wijesekera	Principal Research Officer
5.	Dr. S A C N Perera	Principal Research Officer
6.	Dr. N S Aratchige	Principal Research Officer
7.	Dr. J M M A Jayasundara	Senior Research Officer
8.	Dr. H D D Bandupriya	Senior Research Officer
9.	Mr. V G D Nayanaka	Research Officer
10.	Mr. D B Wijesinghe	Research Officer
11.	Ms. K W K I Silva	Research Officer
12.	Mr. D P Kumarathunga	Research Officer
13.	Mr. V P M Prasantha	Manager (Estates)
14.	Mr. A Seneviratne	Technological Officer (Electrical)
15.	Mr. P S Seneviratne	Technological Officer (Civil)

16.	Ms. R M L S Rathnayake	Management Assistant (Book Keeping)
17.	Mr. A H M J S Abeyratne	Management Assistant (Book Keeping)
18.	Ms. J M S V Perera	Management Assistant (Book Keeping)
19.	Ms. N M Piyasena	Technical Officer
20.	Ms. G I D T Pupika	Technical Officer
21.	Ms. R M I Ivan	Technical Officer
22.	Ms. R D S U Jayasekera	Technical Officer
23.	Ms. M H L S Malwana	Technical Officer
24.	Ms. G A M Samanthi	Technical Officer
25.	Ms. N A A D M Nissanka	Technical Officer
26.	Ms. W M S M Ratnayaka	Receptionist/Telephone Operator
27.	Ms. S M R I Samarathunga	Field Supervisor
28.	Ms.. E M A Seram	Field Supervisor
29.	Mr. S A N B Lakmal	Lab & Field Assistant
30.	Mr. D B H K Jayaratne	Lab & Field Assistant
31.	Mr. J A R T Jayasinghe	Lab & Field Assistant
32.	Ms. K K C K M Kodithuwakku	Lab & Field Assistant
33.	Mr. K E S P Fernando	Lab & Field Assistant
34.	Mr. K L S Karunaratne	Lab & Field Assistant
35.	Mr. M A N A Kumara	Lab & Field Assistant
36.	Ms. E G M U K Gamage	Lab & Field Assistant
37.	Mr. S N R M V B Herath	Lab & Field Assistant
38.	Ms. T D A A Keerthisinghe	Lab & Field Assistant
39.	Ms. W M N Fernando	Lab & Field Assistant
40.	Ms. K G A S Koralegedara	Lab & Field Assistant
41.	Mr. M A R P Kumara	Driver
42.	Mr. K D L Gunawardena	Driver
43.	Mr. E G N Bandara	Driver
44.	Mr. H M D N Herath	Driver
45.	Mr. A K Pemadasa	Driver
46.	Mr. E G A G Jinadasa	Driver
47.	Mr. T P J Chamendra	Driver
48.	Mr. C S Basnayaka	Driver
49.	Mr. A M P S Abeyweera	Driver
50.	Mr. W M Jayaratne Banda	Driver
51.	Mr. S A Marasinghe	Lab & Field Attendant
52.	Mr. L B P Niroshan	Lab & Field Attendant
53.	Mr. J A S L Jayasinghe	Lab & Field Attendant

54.	Mr. M A G Pathiraja	Lab & Field Attendant
55.	Ms. R M S S Ratnayaka	Lab & Field Attendant
56.	Ms. W S S Fernando	Lab & Field Attendant
57.	Ms. T S Abeyratne	Lab & Field Attendant
58.	Ms. S M A Chiranthi	Lab & Field Attendant
59.	Ms. R K K H J Jayasianghe	Lab & Field Attendant
60.	Mr. H A C P Hettiarachchi	Lab & Field Attendant
61.	Mr. R D A Lenard	Lab & Field Attendant
62.	Mr. H A A S Kumara	Lab & Field Attendant
63.	Mr. J M A S Kumara	Lab & Field Attendant
64.	Ms. M P Gayadari	Lab & Field Attendant
65.	Mr. K A K Kumara	General Worker
66.	Mr. D K S Senarath	General Worker
67.	Mr. M P S Fernando	General Worker
68.	Mr. E M U Nishantha	General Worker
69.	Mr. K M V C Kumarasinghe	General Worker
70.	Mr. J M C P Jayamanna	General Worker
71.	Ms. H A T Thilakumari	General Worker
72.	Ms. H D Susitha	General Worker

10.5 Transfers

Mr. D.P. Panditharatne, Experimental Officer was transferred to the Coconut Processing Research Division from Soils and Plant Nutrition Division.

Mr. A. A. Fernando, Technical Assistant transferred from ISG to Genetics and Plant Breeding Division

Mrs. D M Rupika Chandani, Office Attendant transferred from Accounts Division to Genetics and Plant Breeding Division

10.6 Resignations

Dr. L K weerakoon, Head of the Tissue Culture Division, Dr. S C Fernando, Principal Research Officer, Dr. P I P Perera, Senior Research Officer, Mr. R.Marasinghe, Senior Technical Officer, and Miss. A A D Manori Nissanka, Technical Officer resigned from the service.

10.7 Retirements

Mr. W. S.M.A. Fernando, Senior Laboratory and Field Assistant, Mr. W.A.Hemawardena, Laboratory and Field Attendant, Mr. U V M Fernando, Senior Lab & Field Assistant, Mr. R B Attanayake, Senior Technical Officer and Mr. A G Nandasena, Senior Office Attendant retired from service.

10.8 Other noteworthy human resource development activities

Dr. (Ms) S A C N Perera served as a visiting lecturer at the Department of Botany of the University of Sri Jayawardenepura for the course on Plant Breeding.

Dr. (Ms) S A C N Perera served as a visiting lecturer on coconut breeding at the Uwa Wellassa University.

Dr. A. Nainanayake served as a visiting lecturer on Plant Physiology at the Uwa Wellassa University.

Dr. C S Ranasinghe served as a member of Plant Biology Board of Study, Postgraduate Institute of Agriculture (PGIA), Peradeniya from January to December 2012.

Dr. D.M.D.I. Wijebandara served as the Chairman of the Technical Evaluation Committee of Coconut Development Authority for purchase of laboratory chemicals.

Dr. D.M.D.I. Wijebandara served as a member of the Executive Committee of Soil Science Society of Sri Lanka.

Dr. D.M.D.I. Wijebandara served as a member of the Organizing Committee of 10th International Conference of East and Southeast Asia Federation of Soil Science Societies held on 10th - 13th October 2012 in Sri Lanka.

Dr. I M S K Idirisinghe served as committee member of Sri Lanka Agricultural Economics Association.

Dr. I M S K Idirisinghe, served as a member of the panel of judges on the 7th In-Plant Training Symposium, 2012, Department of Agribusiness Management, Wayamba University of Sri Lanka.

Dr. J.M.D.T. Everard served as a member of the National Biotechnology Panel, NSF.

Dr. J.M.D.T. Everard served as a member of the Senate and Higher Education Committee, Wayamba University of Sri Lanka.

Dr. J.M.D.T. Everard served as external member of Faculty of Applied Science, University of Sri Jayawardenepura.

Dr. L Perera and Mr. R Jayathilake served as committee members for the National Seed Production Committee of the Ministry of Coconut Development and Janatha estate Development.

Dr. L Perera served as a co-chairman of the National Committee of Plant Breeding of the CARP.

Dr. L Perera served as a committee member of the National Committee on Biotechnology of the NSF.

Dr. L. Perera and Dr. S A C N Perera served as evaluators for the National Research Council to evaluate the research proposals for funding.

Dr. L. Perera served as an evaluator for the SLCARP to evaluate the research proposals for funding and for evaluation of project progress reports and presentations.

Dr. L. Perera served as member of the research panel of the National Science Foundation to evaluate research proposals and progress reports submitted for the NSF research grants.

Dr. N.A. Tennakoon served as a Chairman of nine (09) Technical Evaluation Committees in Coconut Research Institute and Coconut Cultivation Board.

Dr. N.A. Tennakoon served as a Chairman of the committee of Production of Organic Coconut in Coconut Research Institute of Sri Lanka.

Dr. N.A. Tennakoon served as a member of the Advisory Committee on Fertilizer, appointed by the Honorable Minister of Agriculture.

Dr. N.A. Tennakoon served as a member of the committee of Development & Assess the Usage of Bio Effluent in Sri Lanka appointed by the Environment Ministry.

Dr. N.A. Tennakoon served as a member of the committee of Organic Agriculture appointed by Export Development Board, Colombo.

Dr. N.A. Tennakoon served as a member of the committee of subsidy programme on organic fertilizer for coconut appointed by Ministry of Coconut Development & Janatha Estates Development.

Dr. N.A. Tennakoon served as a member of the committee on upgrade the laboratories in Agriculture Department, Ministry of Agrarian Services and Wildlife appointed by National Fertilizer Secretariat.

Dr. N.A. Tennakoon served as a member of the National Committee on Organic Fertilizer, Ministry of Agriculture, Battaramulla.

Dr. N.A. Tennakoon served as a member of the National Project Team for IAEA/RCA Project on Improving Soil Fertility, Land Productivity and Land Degradation Mitigation coordinated by Atomic Energy Authority of Sri Lanka.

Dr. N.A. Tennakoon served as a member of the National Working Group of Sustainable Organic Farming Technology, Department of Agriculture.

Dr. V Vidhanaarachchi and Dr. H D D Bandupriya served as visiting lecturers at the Department of Biotechnology, Wayamba University of Sri Lanka.

Dr. V Vidhanaarachchi served as a member of the National committee on Agricultural Biotechnology, established by CARP.

Dr. I M S K Idirisinghe was appointed as the vice-president of Sri Lanka Agricultural Economics Association.

Dr. I M S K Idirisinghe, served as a committee member for preparation of questionnaire, instruction and training manual for Agriculture Census, 2013, Department of Census and Statistics.

Dr. S H S Senarathne participated as a committee member of the National Committee on Kitul Production Development Program (Developed a research program to improve the production).

Dr. S H S Senarathne participated as a Committee member of the National Committee on Agriculture Machinery & Equipment (Develop a policy).

Ms. K V N N Jayalath act as member of the HS code revision committee representing the Coconut Research Institute, conducted by the Ministry of Finance.

11. Other achievements

11.1 Publications/recommendations

Aratchige N.S., Fernando L.C.P., Kumara A.D.N.T., Jayalath K.V.N.N., Perera K.F.G. and Suwandarathne N.I (2012). Biological control of coconut mite: Effect of inundative release of the predatory mite, *Neoseiulus baraki* (Acari: Phytoseiidae). In: L.S.K. Hettiarachchi and I.S.B. Abeysinghe (Eds.) Proceedings of the 4th Symposium on Plantation Crop Research – Technological Innovations for Sustainable Plantation Economy. Tea Research Institute of Sri Lanka, St. Coombs, Talawakelle, 22100, Sri Lanka. pp. 125-133.

Aratchige N.S., Fernando L.C.P., Waidyaratne K.P. and Chandrasiri K.A.S (2012). Population dynamics of *Aceria guerreronis* (Acari: Eriophyidae) and its predatory mite, *Neoseiulus baraki* (Acari: Phytoseiidae) in two coconut growing areas in Sri Lanka. *Experimental and Applied Acarology*. 56:319-325. ISSN 0168-8162. DOI: 10.1007/s10493-012-9519-z.

Bandupriya, H. D. D. and Dunwell, J. M (2012). Analysis and functional annotation of expressed sequence tags from coconut (*Cocos nucifera* L.) mature embryo. In: Hettiarachchi L. S. K. and Abeysinghe I. S. B. (eds.) Proceedings of the Fourth Symposium on Plantation Crop Research. September 20-21 Colombo, Sri Lanka.

Bandupriya, H.D.D. and Dunwell, J. M (2012) Sequencing Coconut (*Cocos nucifera* L.) expressed sequenced tags (EST) using 454 Life Sciences technology. 2012 World Congress on *In Vitro* Biology, June 3-7, Bellevue, Washington, USA.

Bandupriya, H.D.D. and Dunwell, J.M (2012). Overexpression of *CnANT*, coconut *BABYBOOM* homologue alters plant growth and morphology in transgenic *Arabidopsis* plants. *Tropical Agricultural Research* 23 (3): 249-260.

Dissanayake H.M.D.A, Attanayake, R.B., Fernando, A.A., Jayathilake, R., Padmasiri, M.H.L., Herath, N.B., Chandrasiri, S.A.S., Perera, S.A.C.N. Meegahakumbura, M.G.M.K. and Perera, L (2012). Development of promising coconut hybrids utilizing novel brown dwarf coconut variety, 4th Plantation Crop Research Symposium 20-21 September at BMICH, Colombo.

- Fernando S. C., Santha, E. S., Perera, S. A. C. N., Dissanayake, H. D. M. A., Meegahakumbura, M.G. M. K. and Perera, L (2012). *In vitro* characterization of indigenous coconut varieties (*Cocos nucifera* L.) of Sri Lanka for water stress tolerance. CORD 28 (2) 55-63.
- Gunasena, H.P.M and Idirisinghe, I.M.S.K (2012). Coconut Industry in the Kurunegala District, (Submitted for publish in book to be published in Wayamba Provincial Council).
- Gunathilake, H.A.J and Gunasena, H.P.M (2012). Enhancement of biodiversity of coconut plantations for livelihood improvement in Sri Lanka. Paper presentation at the International Consultation on Sustainable Development: Twenty years after RIO. February 15-17, Chennai, India.
- Gunathilake, H.A.J (2012). Future of the coconut industry. Sri Lanka exporter, Issue 79. A Publication of the National Chamber of Exporters of Sri Lanka.
- Gunathilake, H.A.J (2012). Technological development on coconut crop improvement, coconut agronomy/nutrition and coconut based farming systems in Sri Lanka. Paper presentation at the ZLV Cocotech Meeting, Kochi, India.
- Gunathilake, H.A.J. and Gunasena, H.P.M. (2012). Enhancement of biodiversity of coconut plantations for livelihood improvement in Sri Lanka. Paper presented at the conference on International Consultation on Sustainable Development, Twenty Years after Rio, MSSRF, Chennai, India. 15-17 February 2012.
- Herath, C. S. (2012). Do Belief Differences Lead to Change in Behavior? A Study of Sri Lankan Coconut Farmers. International Journal of Coconut Research and Development (CORD). Asian and Pacific Coconut Community P.O. Box 1343, Jakarta, Indonesia, 2012, Vol. 28, no.1. ISSN: 0215-1162.
- Jayalath, K.V.N.N (2012). Effects of World Market Prices on the Coconut Sector in Sri Lanka: An Analysis of Price Transmission Elasticities and Endogenous Trade Policy. Thesis submitted to the Postgraduate Institute of Agriculture, University of Peradeniya, Sri Lanka for the partial fulfillment of the degree in MPhil.
- Nainanayake, A. D. and Wijesekara, H. T. R (2012). Spreading pattern and GIS mapping In: Weligama coconut leaf wilt disease. (Ed. Gunasena, H.P.M). Occasional Publications, Coconut Research Institute, Lunuwila, Sri Lanka. pp.

- Nainanayake, A.D. and Ranasinghe, C. S (2012). Physiological and Biochemical effects of palm and on production In: Weligama coconut leaf wilt disease. (Ed. Gunasena, H.P.M). Occasional Publications. Coconut Research Institute, Lunuwila, Sri Lanka. pp.
- Nayanaka, V.G.D (2012). Paper presented a seminar on Digital Mapping of Soil Properties Using Soil Landscape Relationships at the midyear technical sessions of Soil Science Society of Sri Lanka on 27th September 2012.
- Pathiraja, P.M.E.K (2012). Trade Protection and Comparative Advantage of Coconut Products Over Time, Thesis submitted to the Postgraduate Institute of Agriculture, University of Peradeniya, Sri Lanka for the partial fulfillment of the degree in MPhil.
- Pathiraja, P.M.E.K., Jayasinghe-Mudalige, J.M.U.K., Wijesekera, H.T.R., Henry Nimal Appuhamy, P.A. and Fernando, L.C.P. Socio- economic survey on Incidence of Weligama Coconut Leaf Wilt and Leaf Rot Diseases, Bock Chapter, CRI.
- Perera, L., Meegahakumbura, M.G.M.K., Wijesekara, H.T.R., Fernando, W.B.S., and Dickinson, M.J (2012). A Phytoplasma is associated with the Weligama Coconut Leaf Disease in Sri Lanka. *Journal of Plant Pathology* 94(1):205-209.
- Perera, L, Meegahakumbura, M.K., Wijesekara, H.T.R., Fernando, W.B.S. and Dickinson, M.J (2012). A Phytoplasma is associated with the Weligama coconut leaf wilt disease in Sri Lanka. *Plant Pathology* 94 (1): 205-209.
- Ranasinghe, C.S (2012). Impact of climate change on reproductive Survivability of Coconut' International consultation workshop on 'Sustainable development: twenty years of Rio: Biodiversity,-development – Livelihoods' at the M S Swaminathan Research Foundation (MSSRF), Chennai, India, 15-17 February.
- Ranasinghe, C.S (2012). Impacts of climate change on coconut. In: Institute of Policy Studies (IPS) CLIMATEnet Blog.
- Ranasinghe, C.S (2012). Implications of Climate Change on Coconut Sector and Agroforestry Systems in Sri Lanka and livelihoods, 6th Annual Research Forum, Sri Lanka Agricultural economics Association, on 23rd November. CRI, Sri Lanka.

- Ranasinghe, C.S. and Thimothias, K.K.S.H (2012). Estimation of carbon sequestration potential in coconut plantations under different growth conditions. *Journal of National Science Foundation* 40 (1):77-93.
- Ranasinghe, C.S., Nainanayake, N.P.A.D., Silva, L.R.S., Premasiri, R.D.N (2012). Quantifying the effect of climatic factors and competition for assimilates on survival rate of young nuts and its impact on yield fluctuation in coconut In: *Proceedings of the fourth Symposium on Plantation Crop Research – Technological Innovations for sustainable plantation economy* (Eds. L S K Hettiarachchi, I S B Abeysinghe), 20-21 September, Colombo, 265-282.
- Senarathne, S.H.S., Bandara, D.M.B.M and Sangakkara, U.R (2012). Germination characters of rhizomes of major monocotyledonous weeds in coconut plantations of Sri Lanka, *Korean Journal of Weed Science*, 32 (3): 180-187.
- Senarathne, S.H.S., Jayaneththi and Premarathna, K.P (2012). The effect of different concentration of glyphosate on the growth of coconut seedlings, *Korean Journal of Weed Science*, 32 (3): 230-239.
- Tennakoon, N.A (2012). Coconut meets sustainable livelihood needs of resource for poor people. Paper presented at the International consultation on sustainable development; twenty years after RIO on 15th - 17th February 2012 at M.S. Swamithurathan Research Foundation, Chennai, India.
- Tennakoon, N.A (2012). Correct fertilizer application to coconut Presented at the Seminar organized by the Ministry of Coconut Development and Janatha Estate Development to mark the 1st anniversary of Fertilizer Subsidy Programme at Divulapitiya and Pannala on 2nd June 2012.
- Tennakoon, N.A (2012). Drought effect coconut plantation in Puttalam District. Paper presented to the Coconut Grower Association at Coconut Research Institute on 9th November 2012.
- Tennakoon, N.A (2012). Fertility in coconut soils. Paper presented to the Coconut Growers organized by Coconut Research Institute and Coconut Growers Association on 10th June 2012 at Coconut Research Institute.

Tennakoon, N.A (2012). Nutrient status of coconut soils and palm and Differential Fertilizer Recommendation (DFR). Paper presented to the Board of Directors of Coconut Research Board on 20th August 2012 at Coconut Research Institute, Lunuwila,, Sri Lanka.

Tennakoon, N.A (2012). Role of Eppawela Rock Phosphate (ERP) in Coconut Cultivation. Paper presented at the seminar organized by Lanka Phosphate Ltd., Sri Lanka at Bingiriya and Nattandiya on 19th July and 20th September 2012.

Wijebandara, D.M.D.I (2012). Phosphorus the energizer in crop nutrition behavior in the soil plant system and management for crop production. Paper presented at the In-house Seminar at Coconut Research Institute, Lunuwila, Sri Lanka on 18th July 2012.

Wijebandara, D.M.D.I (2012). Can you apply urea based NPK fertilizer with dolomite to coconut? Coconut Technology Update, Publication of Coconut Research Institute, Issue 1, April 2012.

Wijebandara, D.M.D.I (2012). Micronutrients for coconut. Coconut Technology Update, publication of Coconut Research Institute, Issue 1, April 2012.

Wijebandara, D.M.D.I (2012). Weligama Coconut Leaf Wilt Disease (WCLWD); Is it due to nutrient deficiency? Coconut Technology Update, Publication of Coconut Research Institute, Issue 2, August 2012.

Wijebandara, D.M.D.I. and Tennakoon, N.A (2012). Integrated nutrient management in Weligama Coconut Leaf Wilt Disease, Chapter 3, Coconut Research Institute, Lunuwila.

Wijebandara, D.M.D.I. and Zanofer, A.A (2012). Distribution of Zn fractions with relation to soil properties in coconut lands. Proceedings of the 4th Symposium on Plantation Crop Research at Taj Samudra Hotel, Colombo, Sri Lanka on 20th - 21st September 2012. (PP 217 - 225).

11.2. Awards, Patents

Dr. N.S. Aratchige was awarded the silver medal for the best presentation of CRI at the 4th Plantation Crop Research Symposium in 2012.

Dr. H D D Bandupriya received a Merit Award for the best paper presented at Session A, First Symposium of the Young Scientist Forum, 2012.

Dr. H D D Bandupriya received the Prize for the best presentation in Molecular Biology and Gene Manipulation Session of the 23rd Annual Congress of PGIA.

12. Summary of Administration Functions and Fund Allocations

During the year, 83 positions were filled. As at 31 December 2012, the permanent staff strength of CRI was 302. Regular monthly staff meetings were held to discuss the implementation of the work programme for the year 2012. Committees had been set up consisting of Heads of Divisions in order to achieve various targets. Every attempt was made to maintain good employer-employee relationship and the Divisions continued to assist in all welfare activities.

Total budgetary allocation for the year 2012 was Rs.210.391 million and out of which Rs.159.691 million was recurrent and Rs.50.70 million was for Capital expenditure. The government grant was Rs.188.53 million and CRI Expenses were 21.861 million. The details of expenditure including salaries and major expenses are as follows:

(Rs. million)

- a) For staff salaries, over time and Board contribution for Medical Aid, Provident Fund, ETF 130.500
- b) Gratuity for 54 members who left the service of the Institute 12.145
- c) For welfare activities 1.321
- d) For the local training granted for 14 officers 0.512
- e) For the overseas seminars, workshops, trainings granted for officers (Excluding foreign grants) 0.885

Total income and expenditure report for the above 12 months is given in the report on accounts.

	Approved Budget	Received Budget	Actual Expenditure	Final Progress
	Rs. mln	Rs. mln	Rs. mln	(%)
Recurrent	166.90	159.69	158.91	99.5
Capital	136.50	50.70	51.81	102.2
Total	303.40	210.39	210.72	100.2

COCONUT RESEARCH BOARD

LUNUWILA

Our mission is to generate knowledge and technology through excellence in research towards increasing productivity and profitability of coconut. In the pursuit of this mission ,we endeavour to nurture motivate our staff of excel.



FINANCIAL STATEMENTS

FOR THE YEAR

ENDED 31st DECEMBER 2012

COCONUT RESEARCH INSTITUTE
ESTABLISHED UNDER COCONUT DEVELOPMENT ACT NO. 46 OF 1971
BALANCE SHEET AS AT 31st DECEMBER 2012

		YEAR 2012	YEAR 2012	YEAR 2011
		Rs.	Rs.	Rs.
<u>ASSETS</u>				
PROPERTY, PLANT & EQUIPMENT	NOTE-01	1,896,997,301.92		1,866,745,952.10
RESEARCH & DEVELOPMENT	NOTE-01.1	146,588,612.40		128,855,681.52
LIBRARY BOOKS		2,644,769.18		2,644,769.18
			2,046,230,683.50	1,998,246,402.80
CURRENT ASSETS				
STOCKS	NOTE-02	65,154,937.49		73,282,293.35
DEBTORS LESS PROVISION	NOTE-03	1,003,756.88		2,828,437.08
PURCHASE ADVANCES	NOTE-04	29,504,848.98		28,764,989.78
LOANS AND ADVANCES TO EMPLOYEES	NOTE-05	21,366,721.64		22,190,820.83
DEPOSITS RECEIVABLE	NOTE-05a	245,650.00		185,650.00
SAVING DIPOSIT/TREASURY BILLS	NOTE-06	13,251,880.00		46,692,187.46
PREPAYMENTS		322,005.90		229,850.13
CASH -IN -TRANSIT		46,068.00		0.00
CASH & CASH EQUIVALANTS	NOTE-07	14,927,487.45		48,063,514.96
			145,823,356.34	222,237,743.59
TOTAL ASSETS			2,192,054,039.84	2,220,484,146.39
<u>LIABILITIES</u>				
CURRENT LIABILITIES				
SUNDRY CREDITORS	NOTE-08	1,249,954.34		881,130.10
ACCRUED EXPENSES	NOTE-08a	4,262,199.63		17,304,705.13
EXPENCE CREDITORS	NOTE-08b	12,769,057.19		31,606,558.69
DEPOSITS PAYABLE	NOTE-09	1,814,715.15		1,394,047.41
ON GOING PROJECTS	NOTE-10	519,989.28		519,989.28
WORKING CAPITAL			20,615,915.59	51,706,430.61
NON CURRENT LIABILITIES				
PROVISION FOR GRATUTY	NOTE-11		99,654,344.55	93,820,125.78
			120,270,260.14	145,526,556.39
TOTAL NET ASSETS			2,071,783,779.70	2,074,957,590.00
<u>NET ASSETS/EQUITY</u>				
AUTHORISED CAPITAL			18,000,000.00	18,000,000.00
CONTRIBUTED CAPITAL CF	NOTE-12	758,165,966.77		707,465,966.77
COTRIBUTED CAPITAL-PROJECT		8,867,924.70		6,348,017.33
FOREIGN AID		634,078.78		634,078.78
LOCAL AID		5,982,748.19		5,982,748.19
REVALUATON RESERVE		1,689,612,302.64		1,689,612,302.64
REVENUE RESERVE	NOTE-13	(391,479,241.38)		(335,085,523.71)
			2,071,783,779.70	2,074,957,590.00
			2,071,783,779.70	2,074,957,590.00
.....				
CHAIRMAN	DIRECTOR		ADDITIONAL DIRECTOR	
COCONUT RESEARCH BOARD	COCONUT RESEARCH BOARD		COCONUT RESEARCH BOARD	

COCONUT RESEARCH INSTITUTE
STATEMENT OF FINANCEIAL PERFORMANCE
FOR THE YEAR ENDED 31st DECEMBER 2012

	YEAR 2012	YEAR 2011
	Rs.	Rs
OPERATING REVENUE		
RECURRENT GRANT	151,830,000.00	137,250,000.00
ESTATE INCOME	126,330,708.56	139,046,067.93
INTEREST ON LOAN & INVESTMENT	847,605.47	849,674.71
INCOME FROM MORTOR VEHICLES	643,922.05	612,815.95
SUNDRY INCOME	11,361,273.30	7,040,982.30
SALES CENTER INCOME	1,659,795.70	1,914,254.48
SALES OF PHEROMONE	198,350.00	189,800.00
SALES OF MONOCROTOPHOSE	25,200.00	49,579.48
INCOME PROJECTS	840,673.00	1,959,969.08
INCOME CESS		410,159.40
	293,737,528.08	289,323,303.33
OPERATING EXPENSES		
SALARIES ALLOWANCES & OVER TIME	93,721,356.73	79,437,107.50
BOARDS CONTRIBUTION TO ETF/EPF	15,306,676.55	14,326,358.43
BOARDS CONTRIBUTION TO MEDICAL AID	4,892,888.99	4,459,655.51
COCONUT ALLOWANCES	221,518.14	672,571.09
ESTATE GENERAL CHARGES/UPKEEP/CULTIVATION & HARVESTING	113,731,314.99	109,550,066.38
TRAVELLING	1,102,707.21	1,222,509.51
SUPPLIERS & CONSUMABLE	13,419,350.99	16,577,419.44
MAINTAINNANCE	16,328,348.50	19,735,399.93
CONTRACTUAL SERVICES	8,505,217.11	9,073,600.98
DEPRECIATION & AMORTISATION EXPENSES	51,298,028.02	20,590,461.95
EXPENSES - PROJECTS	3,835,764.90	1,707,815.82
EXPENSES - CESS	5,797,541.10	6,316,927.29
BOARD MEMBERS FEES	316,985.00	249,437.77
GRATUITY	18,159,282.87	9,608,008.17
OTHER OPERATING EXPENSES	6,638,305.27	7,716,867.76
TOTAL OPERATING EXPENSES:	353,275,286.37	301,244,207.53
SURPLUS/(DEFICET) FROM OPERATING ACTIVITIES	(59,537,758.29)	(11,920,904.20)
GAIN ON SALES OF PROPERTY PLANT & EQUIPMENTS		3,922,223.72
TOTAL NON OPERATING REVENUE (EXPENSES)	(59,537,758.29)	(7,998,680.48)

COCONUT RESEARCH BOARD
CASH FLOW STATEMENT FOR YEAR ENDED
31st DECEMBER 2012

Description	2012 Rs.	2011 Rs.
<u>CASH FLOW FROM OPERATING ACTIVITIES</u>		
SURPLUS (DEFICIT) FROM ORDINARY ACTIVITIES	(59,537,758.29)	(7,998,680.48)
LESS -: PRIOR YEAR PROFIT ADJUSTMENT	3,144,040.62	3,251,033.39
NON-CASH MOVEMENTS		
DEPRECIATION & AMORTISATION	33,928,324.81	26,363,006.96
INCREASE IN PAYABLE		
SUNDRY CREDITORS	368,824.24	48,630.29
ACCRUED EXPENSES	(13,042,505.50)	(8,860,329.18)
EXPENCE CREDITORS	-18,837,501.50	18,015,773.12
DEPOSITS PAYABLE	420,667.74	392,111.81
INCREASE IN BORROWINGS		
INCREASE IN PROVISIONS RELATING TO EMPLOYEE COSTS	5,834,218.77	(2,937,597.89)
(GAINS)/LOSSES ON SALE OF PROPERTY, PLANT & EQUIP.	(579,134.01)	(3,922,223.72)
INCREASE IN OTHER CURRENT ASSETS		
STOCKS	8,127,355.86	(15,463,627.55)
DEBTORS LESS PROVISION	1,824,680.20	(1,345,670.44)
PURCHASE ADVANCES	(739,859.20)	(9,417,998.84)
LOANS AND ADVANCES TO EMPLOYEES	824,099.19	(1,872,176.55)
DEPOSITS RECEIVABLE	(60,000.00)	1,528,277.00
PREPAYMENTS	(92,155.77)	(14,659.28)
NET CASH FLOW FROM OPERATING ACTIVITIES	(38,416,702.84)	(2,234,131.36)
<u>CASH FLOW FROM INVESTING ACTIVITIES</u>		
PURCHASE OF PLANT & EQUIPMENT		
CONSOLIDATED FUNDS	(66,364,432.22)	(83,173,295.11)
DONOR PROJECTS	(1,320,196.74)	(1,029,674.44)
PROCEEDS FROM SALE OF PLANT & EQUIPMENT	4,084,088.34	5,082,419.35
RESEARCH & DEVELOPMENT ACTIVITIES	(17,732,930.88)	(33,436,256.03)
NET CASH FLOWS FROM INVESTING ACTIVITIES	(81,333,471.50)	(112,556,806.23)
<u>CASH FLOW FROM THE FINANCING ACTIVITIES</u>		
CAPITAL GRANT		
CAPITAL GRANT	50,700,000.00	82,695,000.00
DONOR PROJECTS	2,519,907.37	334,350.00
REVALUATION RESERVE		(20,318,656.50)
NET CASH FLOW FROM THE FINANCING ACTIVITIES	53,219,907.37	62,710,693.50
NET INCREASE / (DECREASE) IN CASH & CASH EQUIVALENTS	(66,530,266.97)	(52,080,244.09)
CASH & CASH EQUIVALENTS AT BEGINNING OF PERIOD	94,755,702.42	146,835,946.51
CASH & CASH EQUIVALENTS AT END OF PERIOD	28,225,435.45	94,755,702.42

COCONUT RESEARCH INSTITUTE -LUNUWILA
SIGNIFICANT ACCOUNTING POLICIES
YEAR ENDED 31ST DECEMBER 2012

1. GENERAL ACCOUNTING POLICIES

The Financial statements are prepared under the historical cost convention in accordance with generally accepted principles .No adjustments have been made for inflationary factors effecting the accounts. Policies are explained in the notes where appropriate.

Personnel emoluments of the permanent staff is budgeted under establishment Unit and Estate Management Division.

The expenditure in improving the young plantation in the Estates is charged to Improvements to Estates account which is amortized annually.

- 1.4 Long term projects funded by external sources are shown separately under the name of the project until the project is over.

2. TAXATION

- 2.1 The Board is not liable to Tax in the current year under the provisions of the Inland Revenue Act.

3. PROPERTY, PLANT AND EQUIPMENT

The provision for depreciation is provided for on the straight line method in order to write off such cost over their estimated useful lives as follows.

Buildings	over 25 years
Machinery & field equipment	over 10 years
Vehicles, office, workshop & other equipment	over 05 years
Furniture, fittings & Fixtures	over 20 years

No depreciation is charged on Lands and on leased lands. On the other assets full depreciation is charged in the year of disposal and no depreciation in the year of purchase.

3.1 LEASED ASSETS

Leased assets or other assets not owned by the Board are not recorded as Board's assets. Expenditure made in developing owned and leased lands is charged to Improvements to Estates account. Lands owned by the Board are shown at cost/valuation under Estate account.

Coconut Development Authority decided to allocate land known as Dunkannawa Estate which was leased to Coconut Research Institute period of thirty (30) years commencing from 1st May,2001 and ending 30th April ,2031 and annual rental of Rs.30,000 (Thirty Thousand) during the 1st year and thereafter with an annual rental increased by ten per cent (10%) per annum.

4. DISPOSALS AND TRANSFERS

- 4.1 An equivalent value to the cost/valuation of an asset is transferred to capital reserve on disposal together with the relevant adjustment in the corresponding account. Any surplus/deficit on this transaction is treated in the sundry income account.

5. TREASURY GRANT

- 5.1 The annual grant received from the Treasury is dealt in the government Grants received account.
The capital component is transferred to the respective asset accounts.

6. IMPROVEMENTS TO ESTATES

- 6.1 Expenditure in developing properties, maintaining young plantation and replanting for research purposes is charged to Improvements to Estate account which is amortized annually, @ 5%

7. CAPITAL WORK IN PROGRESS

- 7.1 An account where the expenditure on capital work is recorded. The expenditure here is on assets which are completed and ready for use, the total expenditure in this account is transferred to the appropriate asset account if not disputed. Expenses on major repairs which accrues are shown under Repair in progress account until the repair is fully completed and then transfer to the relevant account.

8. RESEARCH DEVELOPMENT COST.

- 8.1 Cost of product development, processes, production of new or substantially improved materials for research development are capitalized which are normally amortised equally during the period of five years.

Research & Development Expenditure in the previous years shown under division wise. From the year 2007 it's indicated under the following trust areas.

Crop Production
Crop Protection
Crop Improvement
Crop Processing
Technology Transfer
Socio Economic Studies in Coconut
Oil Palm Research

09. CURRENT ASSETS

9.1 Stocks

Stocks are valued at the lower of the cost/net realizable value. Net realizable value is the price at which stocks can be sold in the normal course after allowing for cost of realisation and/or cost of conversion from their existing state to saleable condition.

The cost of each category of stock is determined on the following basis.

Nuts	Net Saleable Average Price
Copra	as above
Fertilizer	First in first out
Livestock	net realizable value
Publications	First in first out
Chemical & Glassware	First in first out
Seedling Product	as above
Other stocks	as above

- 9.2 Publications which remain unsold at the end of the year are valued and shown as a current asset.

10. DEBTORS AND OTHER RECEIVABLES

- 10.1 Debtors are stated at amounts they are estimated to realise .Provision is made in the accounts for all known Bad & Doubtful debtors. Full provision has been made for irrecoverable debtors. 10% provision is on other Debtors.

11. LIABILITIES AND PROVISIONS

- 11.1 Provision for retirement benefits
The provision for gratuity payable as at 31st December 2012 is shown under accrued basis.

An employee qualifies for gratuity on completion of five years continuous service.

- 11.2 All Employees are covered by provident fund contribution.

12. CAPITAL EXPENDITURE COMMITMENT & CONTINGENT LIABILITIES.

- 12.1 Capital expenditure commitments and contingent liabilities as at 31st December 2012 are disclosed by way of notes to the accounts.

13. INCOME AND EXPENDITURE ACCOUNT

- 13.1 Income recognition
The total grant received from the Treasury for the year is recognized as income for that year.
- 13.2 Surplus/Deficit is arrived at after
1 - Charging all day to day expenses in maintaining capital assets in a state of efficiency.

2 - Providing for bad and doubtful debts, Directors fee, Auditor's fee, Depreciation of fixed assets, Amortization of Research Development cost ,Gratuity provision and for all known liabilities Depreciation is not provided for on Lands.
- 13.3 Any grant/financial assistance received for a special project is shown separately.
- 13.4 Capital component of the government grant is dealt in the appropriate asset accounts
- 13.5 Expenditure in acquiring, extending or improving an asset of a permanent nature is treated as Capital expenditure.
- 13.6 Gains/losses are dealt in appropriate accounts

13.7 Movement of reserves is shown by way of notes to the accounts.

14. BOOKS & PERIODICALS

14.1 The stocks of books & periodicals has been valued and disclosed in the accounts. The previous practice was total book & periodicals expenditure incurred on the purchase of items during the year under review had been charged against the income.

COCONUT RESEARCH INSTITUTE
NOTE 01 – PROPERTY, PLANT & EQUIPMENT

DESCRIPTION	VALUE AS AT 01.01.2012 Rs.	ADDITIONS Rs.	DISPOSALS & TRANSFERS Rs.	VALUE AS AT 31-Dec-12 Rs.	DEPRECIATION AMORTISATION				
					ON 01.01.2011 Rs.	LESS WRITT. OFF Rs.	YEAR 2012 Rs.	ACCUMULATED 31-Dec-12 Rs.	WRITTEN DOWN VALUE AS AT 31-Dec-12 Rs.
ESTATES	1,525,417,506.98			1,525,417,506.98					1,525,417,506.98
IMPROVEMENTS TO ESTATES	46,336,997.75	17,447,895.34		63,784,893.09	3,837,181.69		2,316,849.89	6,154,031.58	57,630,861.51
BUILDINGS	106,841,303.34	12,362,132.33		119,203,435.67	26,404,165.06		4,273,652.13	30,677,817.19	88,525,618.48
ENGINEERING TOLLS & ELC.EQU.	2,941,977.10		601,990.00	2,339,987.10	2,755,622.37	601990.00	164,541.08	2,318,173.45	21,813.65
VEHICLES	57,319,063.34	8,735,280.00	2,058,750.00	63,995,593.34	32,275,033.10	2058750.00	5,669,012.67	35,885,295.77	28,110,297.57
OFFICE FURNITURE	12,836,838.92	218,761.60	108,856.00	12,946,744.52	4,266,540.81	43542.4	641,841.95	4,864,840.36	8,081,904.16
BUNGLALOW FURNITURE	9,057,103.57	291,265.25	74,665.00	9,273,703.82	3,069,062.20	29866.00	452,855.18	3,492,051.38	5,781,652.44
OFFICE EQUIPMENT	19,970,197.49	2,615,426.20	975,558.75	21,610,064.94	16,203,025.05	975558.75	654,916.30	15,882,382.60	5,727,682.34
LAB EQUIPMENT	94,733,742.79	13,860,932.93	4,668,287.10	103,926,388.62	44,458,286.98	1004747.20	9,473,374.28	52,926,914.06	50,999,474.56
FIELD EQUIPMENT	7,950,228.96	2,050,092.36	11,250.00	9,989,071.32	3,079,018.45	9000.00	795,022.90	3,865,041.35	6,124,029.97
AUDIO VISUAL & PRINTING EQU.	2,868,344.00	2,923,938.24		5,792,282.24	1,550,973.60		286,834.40	1,837,808.00	3,954,474.24
WATER SUPPLY & IRRIGATION EQUIPMENT	13,105,335.23	471,525.42		13,576,860.65	1,308,402.23		1,310,533.52	2,618,935.75	10,957,924.90
COMPUTER EQUIPMENT	15,811,274.60	4,714,712.55	1,500,169.75	19,025,817.40	10,169,731.62	1500169.75	1,197,404.22	9,866,966.09	9,158,851.31
NET WORK & TELECOMM.SYSTEM	827,876.16	51,436.00	327,661.00	551,651.16	791,805.59	327661.00	70,488.71	534,633.30	17,017.86
	1,916,017,790.23	65,743,398.22	10,327,187.60	1,971,434,000.85	150,168,848.75	6,551,285.10	27,307,327.23	170,924,890.88	1,800,509,109.97
WORK-IN-PROGRESS		621034.00	0.00	621,034.00					621,034.00
	1,916,017,790.23	66,364,432.22	10,327,187.60	1,972,055,034.85	150,168,848.75	6,551,285.10	27,307,327.23	170,924,890.88	1,801,130,143.97

ADDITIONS DURING THE YEAR **66,364,432.22**

COCONUT RESEARCH INSTITUTE
NOTE 01 – PROPERTY, PLANT & EQUIPMENT - PROJECTS

DESCRIPTION	VALUE AS AT 01.01.2012	ADDITIONS	DISPOSALS & TRANSFERS	VALUE AS AT 31-Dec-12	DEPRECIATION				
					AMORTISAETION				
					ON 01.01.2012	LESS WRITT. OFF	YEAR 2012	ACCUMULATED 31-Dec-12	WRITTEN DOWN VALUE AS AT 31-Dec-12
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
OFFICE FURNITURE	162,961.49	8,146.25		171,107.74	26,488.56		7,685.57	34,174.13	136,933.61
OFFICE EQUIPMENT	644,990.65	148,428.00	4000	789,418.65	310,250.60	4000	73,578.13	379,828.73	409,589.92
LAB EQUIPMENT	6,154,553.88	352,340.00	20000	6,486,893.88	3,612,581.66	16000	616,380.39	4,212,962.05	2,273,931.83
FIELD EQUIPMENT	969,503.99	342,472.09		1,311,976.08	397,101.60		96,950.40	494,052.00	817,924.08
AUDIO VISUAL & PRINTING EQU	87,200.00			87,200.00	51,000.00		8,720.00	59,720.00	27,480.00
WATER SUPPLY & IRRI. EQU	15,000.00			15,000.00	15,543.07	543.07		15,000.00	0.00
COMPUTER EQUIPMENT	1,864,470.00	468,810.40	73725	2,259,555.40	1,639,750.00	73725	20,142.00	1,586,167.00	673,388.40
WORK-IN-PROGRESS	9,898,680.01	1,320,196.74	97,725.00	11,121,151.75	6,052,715.49	94,268.07	823,456.49	6,781,903.91	4,339,247.84
	9,898,680.01	1,320,196.74	97725	11,121,151.75	6,052,715.49		823,456.49	6,781,903.91	4,339,247.84

COCONUT RESEARCH INSTITUTE - NOTE 1.1 – RESEARCH AND DEVELOPMENT

Description (Thrust Area)	CODE	VALU AS AT 01.01.2012 (Rs.)	ADDITION YEAR 2012 (Rs.)	AMORTIZATION YEAR 2012	Balance as at 31st December 2012
(1) Crop Protection					
1.1Crop Protection Division					
Major Pests	257	411,877.06	-	39,679.52	372,197.54
Minor Pests	258	203,830.10	-	17,422.90	186,407.20
Diseases	259	725,598.38	18,427.00	85,442.39	658,582.99
Protection services	260	1,731,770.77	3,722,732.15	282,757.35	5,171,745.57
Weligama Leaf Wilt Disease	287	25,232,703.35	9,981,395.33	5,274,634.79	29,939,463.89
Maintenance of Predator Lab	289		1,096,795.75		1,096,795.75
Plesispa Beetle	290	99,196.61	171,043.53	20,261.09	249,979.05
		28,404,976.27	14,990,393.76	5,720,198.05	37,675,171.98
(2) Crop Production					
2.1 Agronomy Division					
Soil Moisture Conservation	261	832,536.80	163,701.95	150,031.23	846,207.52
Low Yielding Palms	262	2,015,014.90	1,151,708.83	378,786.13	2,787,937.60
Farming System	263	1,078,644.72	419,853.24	195,961.43	1,302,536.53
Bio-energy Production	264	1,834,414.63	890,742.08	344,441.94	2,380,714.77
Inter Cropping	265	1,318,375.04	345,704.32	248,252.70	1,415,826.66
Weed Management	266	944,426.61	304,976.13	155,095.34	1,094,307.40
Poverty Alleviation Studies	267	122,134.01	900.00	12,105.48	110,928.53
Animal Husbandry	268	2,197,762.57	540,773.29	423,893.23	2,314,642.63
Vermi Culture	269	879,366.01	145,815.35	150,512.58	874,668.78
Coconut Planting Systems	270	753,333.94	459,108.56	123,817.57	1,088,624.93
Organic Farming	271	1,275,539.46	203,093.39	246,157.81	1,232,475.04
		13,251,548.69	4,626,377.14	2,429,055.42	15,448,870.41
2.2 Oil Farm					
Oil farm research	291	74,531.20	85,225.55	14,906.24	144,850.51
Land Suitability Assessment	292		3,110.00		3,110.00
Genetic Improvement	294	1,125.00	52,500.00	225.00	53,400.00
Clonal Studies	295	55,670.00	16,500.00	11,134.00	61,036.00
Soil & Fertilizer Studies	296	78,803.91	242,300.34	15,760.78	305,343.47
Environment Physiology Studies	297	1,091.25	3,400.00	218.25	4,273.00
Pest & Diseases Management	298	13,566.00	1,239.93	2,713.20	12,092.73
		224,787.36	404,275.82	44,957.47	584,105.71

COCONUT RESEARCH INSTITUTE - NOTE 1.1 – RESEARCH AND DEVELOPMENT

Description (Thrust Area)	CODE	VALU AS AT 01.01.2012 (Rs.)	ADDITION YEAR 2012 (Rs.)	AMORTIZATION YEAR 2012	Balance as at 31st December 2012
2.2 Soil & Plant Nutrition Div.					
Low cost Material	272	2,663,013.76	669,455.57	502,130.30	2,830,339.03
Fertilizer Mixture	273	4,451,430.45	508,442.50	887,883.56	4,071,989.39
D.F.R.	274	2,072,720.31	529,183.69	391,237.60	2,210,666.40
Micronutrients	275	3,937,369.85	898,347.98	788,216.93	4,047,500.90
Fertilizer Application	276	60,641.31	-	5,127.26	55,514.05
Irrigation	277	2,367,546.33	213,471.00	514,081.49	2,066,935.84
Nutrient Mapping	278	2,482,732.58	457,608.64	523,356.44	2,416,984.78
Organic Manure	279	1,819,231.05	164,043.50	331,650.37	1,651,624.18
Land suitability assessment	288	1,878,102.63	2,066,961.82	375,620.68	3,569,443.77
		21,732,788.27	5,507,514.70	4,319,304.62	22,920,998.35
(3) Crop Improvement-GPBD					
Eval. Exis. Co. Cultivars	280	4,800,566.87	1,319,485.02	809,725.13	5,310,326.76
Dev. New co. Cultivars	281	10,271,462.63	2,595,948.14	2,023,270.84	10,844,139.93
Conse. Eva. Co. Germplasm	282	2,784,090.92	979,357.51	522,767.89	3,240,680.54
Tolerance to Aceria mite	283	145,995.02	128,599.00	21,185.91	253,408.11
Research Nursery	284	380,729.90	-	36,278.82	344,451.08
Miscellaneous Research	285	83,535.91	-	7,701.89	75,834.02
		18,466,381.25	5,023,389.67	3,420,930.47	20,068,840.45
(4) Coconut Processing-CPRD					
Project on Coconut Oil	255	2,803,235.11	3,038,813.10	638,818.76	5,203,229.45
Project on Product Develop.	256	2,330,178.97	379,690.69	363,024.27	2,346,845.39
		5,133,414.08	3,418,503.79	1,001,843.03	7,550,074.84
(5) Agriculture Economics					
Socio Economy Studies	286	1,854,920.36	765,980.68	314,280.16	2,306,620.88
		1,854,920.36	765,980.68	314,280.16	2,306,620.88
Total		89,068,816.28	34,736,435.56	17,250,569.23	106,554,682.61

COCONUT RESEARCH INSTITUTE
NOTE 1.1 – RESEARCH AND DEVELOPMENT

Code	Description (Thrust Area)	Value As At 01.01.2012 Rs.	ADDITION YEAR 2012 Rs.	AMORTIZATION YEAR 2012 Rs.	VALUE AS AT 31.12.2012 Rs.
	Development & Services Related to Crop Production				
400	Drought Study - Middeniya (ppd)	1,718,581.30	647,725.10	483,314.78	1,882,991.62
401	Phosphate Sources - Middeniya (ppd)	55,233.60	-	30,569.89	24,663.71
402	Monthly Harvesting Impact(ppd)	125,446.95	-	53,478.02	71,968.93
403	Development & Maintenance of Middeniya R.C.(ME)	1,149,882.66	-	611,057.73	538,824.93
404	Assessment & Improv. Of soil Quality Dep.Co.Land	332,830.43	-	173,152.08	159,678.35
406	Asses. Potential Subsurface Irr. Fertigation of Coco.	26,474.31	-	14,180.99	12,293.32
407	Yield Improv.Co. Land by Rain Water Harve. Tech.	172,045.46	-	59,620.72	112,424.74
408	Consumer survey Nut Consumption & coco. Oil	409,794.14	-	185,168.42	224,625.72
427	Predication of husk weight / copra weight (Bio)	262,890.07	-	78,696.76	184,193.31
428	Biofertilizer for co.Indigenouse arbuscular mycorrhiza	1,043.00	-	1,043.00	-
429	Appling Zn & Cu sources for coconut palm	6,483.80	-	3,814.00	2,669.80
430	Formulation of an Effective Fertilizer Mix.Young Coco.	118,796.97	-	46,541.10	72,255.87
431	Use of locally K sources as Fertilizer for coconut(Bio)	2,298,892.67	571,120.24	554,613.79	2,315,399.12
446	Improv. of soil Ferti.coco. Land Through Vermiculture	291,769.53	-	132,270.12	159,499.41
		6,970,164.89	1,218,845.34	2,427,521.40	5,761,488.83
	Development & Services Activities Related to Genetical Improvement of Coconut (GPB)				
410	Assessment of Biodiversity in Unawatuna (ppd)	13,641.60	-	13,641.60	-
411	Construction of a Coconut Genome map	2,018,445.60	820,333.83	552,305.45	2,286,473.98
412	Constr. Of a Population for Mpping QTL Acaria Mite	233,108.87	29,545.85	63,419.93	199,234.79
413	Molecular Diagnosis of coco. Disorders	153,064.06	126,263.60	37,491.55	241,836.11
414	Estab. P.S.G. for mass Production of CRISL98	1,588,256.73	676,006.18	564,188.86	1,700,074.05
415	Upgrading ISG to Increase the Produ. Of CRIC 65	1,590,154.17	657,160.64	483,105.91	1,764,208.90
416	Germplasm Importation	197,223.30	16,160.50	68,237.90	145,145.90
417	Function of the Seed Production Unit	6,713,516.39	2,427,538.95	2,041,442.47	7,099,612.87
432	Estab. Seed Garden for mass Produ. Of Kapruwana	58,076.00	-	22,872.40	35,203.60
		12,565,486.72	4,753,009.55	3,846,706.07	13,471,790.20

COCONUT RESEARCH INSTITUTE
NOTE 1.1 – RESEARCH AND DEVELOPMENT

	<u>Development & Services Related to Crop Protection</u>				
418	Coconut Mite Research & Development (CPD)	4,324,145.77	1,266,665.55	1,133,055.88	4,457,755.44
419	Extension Programs for Mite Management	109,348.51	-	61,540.18	47,808.33
420	Impact of mite damage on yeild at spatial & temp.scale	117,994.52	-	58,591.03	59,403.49
421	Determi. Proba. Casues of palm decline multidis. Project	1,647,716.43	7,000.00	479,062.64	1,175,653.79
433	Manag. Of black beetal using pherom. & Oryctes(CPD)	1,377,380.98	280,925.02	445,934.71	1,212,371.29
434	Power driven sprayer to tall coconut palms	-	209,346.05		209,346.05
		7,576,586.21	1,763,936.62	2,178,184.44	7,162,338.39
	<u>Development & Services Related to Coconut Processing & Value Addition (CPRD)</u>				
405	Dev. & Popula.organic Pro. & Processing Of Coconut	370,512.07	-	170,355.90	200,156.17
422	Vergine oil - value addition	130,999.22	-	61,608.15	69,391.07
423	Dev.& Impro. Co. coir retting thro. Intrudu.Cons. Micro	1,183,975.24	302,607.06	337,500.17	1,149,082.13
424	Dev.& Impro. Coconut fibre based Products	508,821.72	21,860.74	167,519.19	363,163.27
425	Dev. Prod. Of high qua. Charcoal & Copra	459,272.48	92,656.22	157,878.45	394,050.25
		2,653,580.73	417,124.02	894,861.86	2,175,842.89
	<u>Development & Services Related to Coconut Processing & Value Addition</u>				
435	Develop. Farm machinery for coconut sector (CPRD)	337,897.44	13,859.00	84,521.37	267,235.07
436	Coconut milk pouch for household use(CPRD)	8,268.70	-	3,600.00	4,668.70
437	Coconut water vinegar manufacturing method(CPRD)	276,700.30	124,200.00	92,776.31	308,123.99
		622,866.44	138,059.00	180,897.68	580,027.76
	<u>Agricultural Economics</u>				
438	Mechanization & the demand of machinery co. Indus.	759,183.36	32,832.60	198,993.30	593,022.66
439	Increasing farmers through toddy tapping	26,479.08	-	10,220.40	16,258.68
440	Fertilizer use in incre. Productivity & Profitability C. P.	12,293.82	-	8,338.60	3,955.22
		797,956.26	32,832.60	217,552.30	613,236.56
	<u>Transfer of Technology</u>				
426	Coconut Technology Village	3,291,852.19	1,077,627.52	769,459.33	3,600,020.38
441	Electronic print media & Techn. transfer Prog (Ext)	1,984,973.34	1,242,464.51	580,513.01	2,646,924.84
442	Development of field models & exhibits (Ext)	3,235,719.23	1,408,834.13	709,598.40	3,934,954.96
443	Farmer field school Expansion (Ext)	69,434.40	32,488.41	25,342.85	76,579.96
444	Impro. farm practices in mini coco. Triangle Hambantota (Ext)	18,244.82	-	7,519.80	10,725.02
		8,600,223.98	3,761,414.57	2,092,433.39	10,269,205.16
	Grand Total	39,786,865.23	12,085,221.70	11,838,157.14	40,033,929.79
	RESEARCH & DEVELOPMENT GRAND TOTAL	128,855,681.51	46,821,657.26	29,088,726.37	146,588,612.40

COCONUT RESEARCH INSTITUTE
NOTES TO THE BALANCE SHEET

NOTE - 02

STOCKS

	COCONUT	PRODUCE COPRA	TOTAL
	Rs.	Rs.	Rs.
BANDIRIPPUWA ESTATE	2,546,865.66	174,775.00	2,721,640.66
RATHMALAGARA ESTATE	3,944,189.95	67,895.00	4,012,084.95
AMBAKELLE SEED GARDEN	2,125,861.92	6,950.00	2,132,811.92
POTHTHUKULAMA ESTATE	3,773,927.66		3,773,927.66
WALPITA ESTATE	319,552.89	26,750.00	346,302.89
DUNKANNAWA ESTATE	334,953.13		334,953.13
MADURUOYA SEED GARDEN	2,383,100.34	5,895.00	2,388,995.34
PALLAMA SEED GARDEN	1,689,900.90	238,575.00	1,928,475.90
MIDDENIYA RESEARCH CENTRE	87,677.33		87,677.33
MAKANDURA SEED GARDEN	2,629,269.49		2,629,269.49
	19,835,299.27	520,840.00	20,356,139.27

GENERAL STORES/ESTATE	5,377,681.81
FERTILIZER	5,543,158.77
CHEMICALS & GLASSWARE	14,892,764.61
LIVE STOCKS	9,714,405.00
SEEDLING STOCKS	6,281,783.03
STOCK OF PUBLICATIONS	2,989,005.00
	65,154,937.49

NOTE - 03

DEBTORS

SALES LEDGER CONTROL ACCOUNT	1,080,152.09
<u>LESS - BAD & DOUBTFUL DEBTS</u>	
PROVISION FOR THE YEAR	-108,015.21
	972,136.88
POST MASTER GENERAL	31,620.00
	1,003,756.88

NOTE - 04

PURCHASE ADVANCES

ADVANCE TO LOCAL SUPPLIERS	26,645,055.98
ADVANCE TO STAFF	35,000.00
MOBILIZATION ADVANCE & ADVANCE TO FOREIGN SUPPLIERS	2,824,793.00
	29,504,848.98

COCONUT RESEARCH INSTITUTE
NOTES TO THE BALANCE SHEET

NOTE - 05

LOAN AND OTHER ADVANCES

DISTRESS LOANS	18,114,811.38
TRANSPORT LOAN	1,636,728.13
WAGES ADVANCE	150,134.19
FESTIVAL ADVANCE	477,450.00
SPECIAL ADVANCES	1,700.00
SPECIAL SALARY ADVANCES	281,368.00
FESTIVAL ADVANCES TO LABOURERS	519,872.66
SPECIAL SALARY ADVANCES TO LABOURERS	184,657.28
	21,366,721.64

SAVINGS DIPOSITS

TREASURY BILLS -BOC	13,250,880.00
NSB - NEGOMBO	1,000.00
	13,251,880.00

NOTE - 07

CASH & BANK BALANCES

BANK OF CEYLON - DANKOTUWA-AC/NO 3002507	72,703.92
BANK OF CEYLON - DANKOTUWA-AC/NO 3002942	11,954,086.77
BANK OF CEYLON - DANKOTUWA-AC/NO 3002556	37,488.56
BANK OF CEYLON - DANKOTUWA-AC/NO 3003088	1,610,301.70
BANK OF CEYLON - DANKOTUWA-AC/NO 3002557	86,035.48
BANK OF CEYLON - CORP. BRANCH-AC/NO. 1528	1,166,871.02
	14,927,487.45

COCONUT RESEARCH INSTITUTE
NOTES TO THE BALANCE SHEET

NOTE 8

SUNDRY CREDITORS

UNCLAIMED WAGES	12,005.35
UNPAID SALARIES	28,850.00
PROVISION FOR AUDIT FEES	1,200,000.00
PROVIDENT FUND (LABOURER)	9,098.99
	1,249,954.34

NOTE - 09

DIPOSITS PAYABLES

SECURITY DEPOSITS	139,424.35
RETENTION	1,352,690.80
SECURITY DEPOSIT STAFF	45,000.00
TENDER DIPOSITS PAYABLE	277,600.00
	1,814,715.15

NOTE - 10

ON GOING PROJECTS

AID FROM CESS FUND FOR SPECIAL PRO.	519,989.28
LAND SUITABILITY MAPS	
	519,989.28

NOTE - 11

PROVISION FOR GRATIVITY

Description	Balance as at 01/01/12	Payment During the Year	Provision for the Year	Balance as at 31/12/2012
Head Office	71,732,990.08	9,835,743.67	13,456,056.48	75,353,302.89
Bandirippuwa R.S.	4,769,739.80	632006.56	1263807.66	5,401,540.90
Ratmalagara R.C.	3,574,057.62	566166.39	771333.59	3,779,224.82
Ambakele G.R.C.	4970414.4	116996.04	1039643.64	5,893,062.00
Pottukulama R.C.	1,712,497.50	185893.4	272230.28	1,798,834.38
Walpita R.C.	473,818.52		66449.88	540,268.40
Dunkannawa R.C.	164353.84	45498.46	37139.34	155,994.72
Makandura R.C.	751855.72	270560.22	100485.14	581,780.64
Maduruoya G.R.C.	2832259.08	396486.58	507047.8	2,942,820.30
Pallama G.R.C.	2537875.2	275712.78	484076.04	2,746,238.46
Middeniya R. C.	300264.02		161013.02	461,277.04
TOTAL	93,820,125.78	12,325,064.10	18,159,282.87	99,654,344.55

**COCONUT RESEARCH INSTITUTE
NOTES TO THE BALANCE SHEET**

NOTE - 12

SURPLUS OF THE GRANT AFTER RECURRENT EXPENDITURE - CF

BALANCE AS AT 01.01.2012	707,465,966.77
ADD - CAPITAL CONTRIBUTIONS DURING THE YEAR	50,700,000.00
	758,165,966.77
BALANCE AS AT 31.12.2012	758,165,966.77

NOTE 13

REVENUE RESERVE ACCOUNT

BALANCE AS AT 01.01.2012	- 335,085,523.71
ADJUSTMENTS RELATED TO PRIOR YEAR	3,144,040.62
	- 331,941,483.09
SURPLUS OF EXPENDITURE OVER INCOME	- 59,537,758.29
BALANCE AS AT 31.12.2012	- 391,479,241.38
	-391,479,241.38

COCONUT RESEARCH INSTITUTE - LUNUWILA
NOTES TO THE BALANCE SHEET

➤ **CAPITAL EXPENDITURE COMMITMENTS**

The appropriate amount of capital expenditure approved by the board as at the balance sheet date is as follows.

1. Capital expenditure approved by the board for construction is.

TREASURY FUNDS

2. Capital expenditure approved by the board for equipments are

TREASURY FUNDS

Lab Equipment
Field Equipment
Office Equ. & Furniture
Research & Development Expenditure

3. SELF FINANCING UNITS –

Estates Improvement

➤ **GRATUITY PAYMENTS**

Gratuity payments as at 31st December 2012 are Rs. 12,325,064.10 and Provision for the current year in made Rs. 18,159,282.87

➤ **CHEMICAL & GLASSWARE**

The stock of chemicals & glassware as at the end of the year at research laboratories has been valued and disclosed in the accounts.

Chemical and Glassware Stock of Cess funded Projects and Donor Funded Projects have been incorporated with Board Account.

➤ **CONTINGENT LIABILITIES**

The following liabilities are likely to exist respect of the pending cases.

<u>CASE</u>	<u>PLANTIFF/APPLICANT RESPONDENT</u>	<u>ESTIMATED EXTENT OF LOSS/GAIN</u>
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Not Available

➤ **VERIFICATION OF ASSETS:**

A survey was done to verify the assets owned by the board.

➤ **MEMBERS' FEES:**

Members of the board and members of sub committees have received fees in the year under review.

➤ **MEMBERS INTEREST IN CONTRACTS:**

No members of the board either directly or indirectly had any interest in any contract with the board in the year under review.



Whole Assets, Liabilities, Income and expenditure of Cess funded project have been incorporated with the Board financial Statement.



An extent of 75 acres from Middeniya Farm has been temporary released for 30 years by the Assistant Divisional Secretary of Katuwana to the Ministry of Plantation Industries on October 7, 2004 and it was Vested to Coconut Research Institute on October 11, 2004 by the Ministry of Plantation Industries for stabilizing of Sub Coconut Research Centre in Southern Province.

COCONUT RESEARCH INSTITUTE
PROGRAMME – 01 – ADMINISTRATION DIVISION

ITEM	UNIT - 1 FINANCE	UNIT - 2 ESTABLISHMENT	UNIT - 3 ENGINEERING	TOTAL 2012	TOTAL 2011
SALARIES ALLOWANCES & OVER TIME		93,721,356.73		93,721,356.73	79,437,107.50
BOARD'S CONTRIBUTION TO P.F & E.T.F.		15,306,676.55		15,306,676.55	14,326,358.43
COCONUT ALLOWANCES		221,518.14		221,518.14	672,571.09
TRAVELLING & FEES TO BOARD MEMBERS		316,985.00		316,985.00	249,437.77
STAFF TRAVELLING	39,447.87	705,552.05	78,369.94	823,369.86	931,851.96
STATIONARY	102,084.63	660,018.92	16,125.14	778,228.69	985,527.32
TELEPHON & INTERNET		137,463.22	2,252,000.11	2,389,463.33	1,998,146.87
POSTAGE		377,817.87	19,500.00	397,317.87	485,193.80
CONSULTANCY & LEGAL FEES		509,384.50		509,384.50	826,966.95
COST OF AUDIT		400,000.00		400,000.00	400,000.00
ENTERTAINMENT		1,531,330.46		1,531,330.46	2,072,620.64
OFFICE UPKEEP	80,533.63	312,188.76	28,162.00	420,884.39	971,456.86
UPKEEP OF BUILDING & ROADWAYS		3,198,866.83	2,521,872.42	5,720,739.25	5,934,886.49
UPKEEP OF ELECTRICITY & WATER SUPPLY			7,160,619.45	7,160,619.45	8,930,895.07
UPKEEP OF MACHINERY			76,687.92	76,687.92	548,769.43
INSURANCE REGISTRATION OF VEHICLES		1,535,852.95		1,535,852.95	2,806,440.86
RECREATION & WELFARE	70,358.10	364,501.67		434,859.77	312,328.76
DEPRECIATION	22,172,263.65			22,172,263.65	15,181,601.66
GRATUITY		18,159,282.87		18,159,282.87	9,608,008.17
UPKEEP OF COMPUTERS	36,367.20	72,089.98	20,614.00	129,071.18	520,569.63
SECURITY SERVICES		2,385,477.46		2,385,477.46	2,308,453.65
FUEL & LUBRICANTS		7,719,469.07		7,719,469.07	5,541,114.60
REPAIRS TO VEHICLES			2,870,700.93	2,870,700.93	3,533,791.38
Losses Accounts			47,885.07	47,885.07	30,827.33
MEDICAL AID		4,892,888.99		4,892,888.99	4,459,655.51
PRINTING & ADVERTISING		1,144,140.40		1,144,140.40	1,927,981.56
DEVELOPMENT & TRAINING OF STAFF		1,354,178.36		1,354,178.36	1,488,163.16
BANK CHARGES	62,290.00			62,290.00	53,231.73
SEMINARS & WORK WORKSHOPS		865,458.00		865,458.00	54,575.00
COMPENSATION & REVALUATION LOSSES				0.00	
BAD DEBTS & BAD DEBTS PROVISION				0.00	141,517.94
TOTAL EXPENDITURE	22,563,345.08	155,892,498.78	15,092,536.98	193,548,380.84	166,740,051.12
LESS: INCOME					
INTEREST ON LOANS	847,605.47			847,605.47	849,674.71
GOVERNMENT GRANT	151,830,000.00			151,830,000.00	137,250,000.00
INTEREST ON INVESTMENT				0.00	
SUNDRY RECEIPTS	5,740,587.79	100.00		5,740,687.79	7,029,563.40
CHARGES TO STAFF FOR ELECTRICITY & RENT			354,123.43	354,123.43	336,901.00
INCOME FROM MOTER VEHICLES		643,922.05		643,922.05	612,815.95
TOTAL INCOME	158,418,193.26	644,022.05	354,123.43	159,416,338.74	146,078,955.06
SURPLUS/(DEFICIT)	135,854,848.18	-155,248,476.73	-14,738,413.55	-34,132,042.10	-20,661,096.06

COCONUT RESEARCH INSTITUTE
PROGRAMME – 02 – TISSUE CULTURE DIVISION

ITEM	THE MONTH Rs.	CUMULATIVE 2012 Rs.	CUMULATIVE 2011 Rs.
GENERAL ADMINISTRATION			
STAFF TRAVELLING	0.00	12,547.50	25,282.50
STATIONERY	4,969.84	18,015.17	17,814.39
TELEPHONE & INTERNET	0.00	0.00	0.00
COMPUTER UPKEEP	0.00	0.00	0.00
	0.00	0.00	45.00
UPKEEP OF MACHINERY	0.00	12,849.00	27,510.00
OFFICE UPKEEP	0.00	0.00	0.00
CHEMICALS & GLASSWARE	60,079.49	219,075.87	515,340.91
AMORTISATION	0.00	0.00	0.00
UPKEEP OF COMPUTERS	1,600.00	13,190.00	32,700.00
RESEARCH PROJECTS			
CLONAL PROPAGATION	14,468.00	162,172.97	246,396.89
EMBRYO CULTURE	2,960.41	21,604.61	159,305.97
TOTAL EXPENDITURE	84,077.74	459,455.12	1,024,395.66
LESS: INCOME	250.00	250.00	2,600.00
TOTAL INCOME	250.00	250.00	2,600.00
	-83,827.74	-459,205.12	-1,021,795.66

COCONUT RESEARCH INSTITUTE
PROGRAMME – 03 – GENETICS AND PLANT BREEDING DIVISION

ITEM	THE MONTH Rs.	CUMULATIVE 2012 Rs.	CUMULATIVE 2011 Rs.
GENERAL ADMINISTRATION			
STAFF TRAVELLING	0.00	0.00	0.00
STATIONERY	0.00	0.00	0.00
TELEPHONE & INTERNET	0.00	0.00	0.00
POSTAGE	0.00	0.00	0.00
SEEDLINGS	0.00	0.00	441,000.00
LAB & OFFICE UPKEEP	0.00	0.00	0.00
AMORTISATION	7,262,548.43	7,262,333.54	1,427,950.49
UPKEEP OF COMPUTERS	0.00	0.00	0.00
RESEARCH PROJECTS			
LABOUR PROJECT 05	0.00	0.00	0.00
LABOUR PROJECT 06	0.00	0.00	0.00
TOTAL EXPENDITURE	7,262,548.43	7,262,333.54	1,868,950.49
LESS: INCOME			
SALE OF SEEDLINGS & SUNDRY	7,300.00	37,250.00	29,400.00
TOTAL INCOME	7,300.00	37,250.00	29,400.00
SURPLUS/(DEFICIT)	-7,255,248.43	-7,225,083.54	-1,839,550.49

COCONUT RESEARCH INSTITUTE
PROGRAMME – 04 – SOILS AND PLANT NUTRITION DIVISION

ITEM	THE MONTH 2012 Rs.	CUMULATIVE 2012 Rs.	CUMULATIVE 2011 Rs.
GENERAL ADMINISTRATION			
STAFF TRAVELLING	0.00	0.00	0.00
STATIONERY	0.00	0.00	0.00
TELEPHONE & INTERNET	0.00	0.00	0.00
POSTAGE	0.00	0.00	0.00
OFFICE UPKEEP	0.00	0.00	0.00
LAB UPKEEP	0.00	0.00	0.00
UPKEEP OF COMPUTER	0.00	0.00	0.00
AMORTISATION	5,193,214.04	5,193,214.04	789,275.73
RESEARCH PROJECTS			
ANALYTICAL SERVICES	0.00	0.00	0.00
STUDIES ON IMPROVEMENT PHY. COND.	0.00	0.00	0.00
STUDIES ON FIELD MANAGEMENT	0.00	0.00	0.00
STUDIES ON NUTRIENT REQUIREMENT	0.00	0.00	0.00
STUDIES ON IRRIGATION OF COCONUT	0.00	0.00	0.00
STUDIES ON WATER RELATION OF	0.00	0.00	0.00
COCONUT AND INTERCROPS	0.00	0.00	
FERTILIZER USE	0.00	0.00	0.00
SOIL MICRO BIOLOGY			0.00
TOTAL EXPENDITURE	5,193,214.04	5,193,214.04	789,275.73
LESS: INCOME			
ANALYTICAL SERVICES & SUNDRY	120,200.00	2,017,500.00	1,456,855.00
TOTAL INCOME	120,200.00	2,017,500.00	1,456,855.00
SURPLUS/(DEFICIT)	-5,073,014.04	-3,175,714.04	667,579.27

COCONUT RESEARCH INSTITUTE
PROGRAMME – 05 – AGRONOMY DIVISION

ITEM	THE MONTH Rs.	CUMULATIVE 2012 Rs.	CUMULATIVE 2011 Rs.
GENERAL ADMINISTRATION			
AMORTISATION	2,561,325.54	2,561,325.54	
I.R.D. PROJECT	139,266.90	1,037,683.91	
TOTAL EXPENDITURE	2,700,592.44	3,599,009.45	
LESS: INCOME			
I.R.D. PROJECT & SUNDRY	332,598.85	2,186,964.27	
TOTAL INCOME	332,598.85	2,186,964.27	
SURPLUS/(DEFICIT)	2,367,993.59	1,412,045.18	

COCONUT RESEARCH INSTITUTE
PROGRAMME – 06 – CROP PROTECTION DIVISION

ITEM	THE MONTH Rs.	CUMULATIVE 2012 Rs.	CUMULATIVE 2011 Rs.
GENERAL ADMINISTRATION			
STAFF TRAVELLING			
STATIONERY			
TELEPHONE & INTERNET			
COMPUTER UPKEEP			
POSTAGE			
OFFICE UPKEEP			
AMORTISATION	7,374,556.58	7,374,556.58	1,318,700.57
LAB UPKEEP			
RESEARCH SERVICES			
MAJOR PESTS			
MINOR PESTS			
CROP PROTECTION SERVICE			
DISEASE			
PEST CONTROL			
TOTAL EXPENDITURE	7,374,556.58	7,374,556.58	1,318,700.57
LESS: INCOME			
SALE OF THE PHEROMONE	14,900.00	198,350.00	189,800.00
SALE OF MONOCROTOPHOSE & SUNDRY	5,575.00	29,250.00	51,029.48
	20,475.00	227,600.00	240,829.48
	-7,354,081.58	-7,146,956.58	-1,077,871.09

COCONUT RESEARCH INSTITUTE
PROGRAMME – 07 – BIOMETRY DIVISION

ITEM	THE MONTH Rs.	CUMULATIVE 2012 Rs.	CUMULATIVE 2011 Rs.
GENERAL ADMINISTRATION			
STAFF TRAVELLING	4,334.50	35,470.50	100,989.50
STATIONERY	10,002.72	20,830.03	65,327.59
TELEPHONE & INTERNET	74,352.87	1,195,746.58	1,397,238.42
POSTAGE	0.00	0.00	1,075.00
OFFICE UPKEEP	0.00	0.00	0.00
CHEMICALS & GLASSWARE	0.00	0.00	0.00
AGRI-METEOROLOGICAL STUDIES	0.00	0.00	0.00
DATA RECORDING	0.00	0.00	0.00
UPKEEP OF COMPUTERS	238,646.44	238,646.44	146,308.82
AMORTISATION	0.00	3,872.00	14,784.00
Biometrical Consultancy	0.00	23,761.67	85,621.85
Agro Chemical Services	0.00	0.00	27,258.00
Statistical Studies on Field Exp.	10,510.00	167,893.92	227,652.97
Internet/Website	0.00	0.00	0.00
Survey of National Yield			
TOTAL EXPENDITURE	337,846.53	1,686,221.14	2,066,256.15
LESS: INCOME			
SALE OF SEEDLINGS & SUNDRY	0.00	0.00	0.00
TOTAL INCOME	0.00	0.00	0.00
	-337,846.53	-1,686,221.14	-2,066,256.15

COCONUT RESEARCH INSTITUTE
PROGRAMME – 08 – PLANT PHYSIOLOGY DIVISION

ITEM	THE MONTH Rs.	CUMULATIVE 2012 Rs.	CUMULATIVE 2011 Rs.
GENERAL ADMINISTRATION			
STAFF TRAVELLING	31,926.30	262,219.80	85,985.00
STATIONERY	774.00	22,626.14	12,213.11
TELEPHONE & INTERNET			5.00
POSTAGE			
COMPUTER UPKEEP	800.00	68,116.88	76,499.40
AMORTISATION	1,062,227.38	1,671,098.87	220,548.65
MACHINERY/LAB UPKEEP	149,051.00	670,828.73	1,069,899.71
RESEARCH PROJECTS			
DRY MATTER PRODUCTION	4,640.62	141,970.38	150,085.85
WATER STRESS		145,771.50	224,138.07
ROOT PHYSIOLOGY	7,211.70	99,362.18	248,846.69
DISORDERS			
ROOT STUDIES			
BIOCHEMISTRY OF COCONUT PALM			
TOTAL EXPENDITURE	1,256,631.00	3,081,994.48	2,088,221.48
LESS: INCOME			
SUNDRY INCOME			
TOTAL INCOME			
	-1,256,631.00	-3,081,994.48	-2,088,221.48

COCONUT RESEARCH INSTITUTE
PROGRAMME – 09 – COCONUT PROCESSING RESEARCH DIVISION

ITEM	THE MONTH Rs.	CUMULATIVE 2012 Rs.	CUMULATIVE 2011 Rs.
GENERAL ADMINISTRATION			
STAFF TRAVELLING			
STATIONERY			
TELEPHONE & INTERNET			
COMPUTER UPKEEP			
POSTAGE & TELEPHONE			
OFFICE UPKEEP			
MACHINERY UPKEEP			
AMORTISETION	2,356,335.63	2,356,335.63	444,409.20
CHEMICALS & GLASSWARE			
RESERCH PROJECTS			
COCONUT OIL			
PRODUCT DEVELOPMENT			
TOTAL EXPENDITURE	2,356,335.63	2,356,335.63	444,409.20
LESS: INCOME			
SUNDRY INCOME	28,740.00	319,090.00	236,525.00
TOTAL INCOME	28,740.00	319,090.00	236,525.00
	-2,327,595.63	-2,037,245.63	-207,884.20

COCONUT RESEARCH INSTITUTE
PROGRAMME – 10 – EXTENSION SERVICES DIVISION

ITEM	THE MONTH Rs.	CUMULATIVE 2012 Rs.	CUMULATIVE 2011 Rs.
GENERAL ADMINISTRATION			
STAFF TRAVELLING	9,185.00	275,952.35	289,941.55
STATIONERY	14,344.44	45,271.34	35,216.66
TELEPHONE & INTERNET	0.00	0.00	0.00
POSTAGE	0.00	0.00	475.00
OFFICE UPKEEP	0.00	40,083.00	79,750.50
PRINTING & PUBLICITY	3,234.88	191,682.75	1,012,724.00
PRINTING OF COCOS, COCONUT BULLETIN, POLPAWATH	3,000.00	1,061,974.82	3,189,215.76
UPKEEP OF PHTOGRAPHIC & OTHER EQUIPMENT	0.00	0.00	2,834.00
INCIDENTAL EXPENSES	5,345.00	167,205.23	70,974.33
ONE DAY TRANNING	29,545.40	399,955.71	460,829.86
UPKEEP OF AUDITORIUM	0.00	47,196.00	127,061.00
UPKEEP OF COMPUTERS	0.00	275,448.70	108,599.60
TOTAL EXPENDITURE	64,654.72	2,504,769.90	5,377,622.26
LESS: INCOME			
SALES OF PUBLICATION & SALES CENTER INCOME	156,084.80	1,778,249.51	2,127,049.64
TOTAL INCOME	156,084.80	1,778,249.51	2,127,049.64
SURPLUS/(DEFICIT)	91,430.08	-726,520.39	-
			3,250,572.62
LESS - STOCK OF PUBLICATION	2,989,005.00	521,075.00	70,765.00
NET SURPLUS/(DEFICIT)	3,080,435.1	-205,445.4	-3,179,807.6

COCONUT RESEARCH INSTITUTE
PROGRAMME – 11 – LIBRARY SERVICES DIVISION

ITEM	THE MONTH Rs.	CUMULATIVE 2012 Rs.	CUMULATIVE 2011 Rs.
<u>GENERAL ADMINISTRATION</u>			
STAFF TRAVELLING	1,000.00	3,385.00	716.00
STATIONERY	5,100.00	57,575.77	196,528.44
TELEPHONE & INTERNET			
POSTAGE			5.00
OFFICE UPKEEP	932.10	11,652.88	
BOOKS & PERIODICALS	15,602.00	56,162.00	55,866.00
BINDING OF BOOKS			
UPKEEP OF COMPUTERS			
MICROFICHING DOCUMENTS			
PRINTING & PUBLICITY/PHOTOCOPY SERVICE		476.00	
COMMUNICATION SYSTEM-INTERNET			
TOTAL EXPENDITURE	22,634.10	129,251.65	253,115.44
LESS: INCOME			
SUNDRY RECEIPTS	17,514.00	61,829.00	98,486.00
TOTAL INCOME	17,514.00	61,829.00	98,486.00
SURPLUS/(DEFICIT)	-5,120.10	-67,422.65	-154,629.44

COCONUT RESEARCH INSTITUTE
PROGRAMME – 12 – AGRICULTURE ECONOMICS DIVISION

ITEM	THE MONTH Rs.	CUMULATIVE 2012 Rs.	CUMULATIVE 2011 Rs.
<u>GENERAL ADMINISTRATION</u>			
STAFF TRAVELLING	0.00	0.00	0.00
STATIONERY	0.00	0.00	0.00
TELEPHONE & INTERNET	0.00	0.00	0.00
POSTAGE	0.00	0.00	0.00
AMOTIZATION	314,280.16	314,280.16	119,166.04
UPKEEP OF COMPUTERS	0.00	0.00	0.00
TOTAL EXPENDITURE	314,280.16	314,280.16	119,166.04
SURPLUS/(DEFICIT)	-314,280.16	-314,280.16	-119,166.04

COCONUT RESEARCH INSTITUTE
PROGRAMME – 13 – WORKING ACCOUNT ESTATE

Item	BE Rs.	RE Rs.	GRC ISG Rs.	Pottukulama RC Rs.	Walpita RC Rs.	MGRC Rs.	Moya GRC Rs.	PSG Rs.	DRC Rs.	EMD Rs.	TOTAL 2012 Rs.	CUMULATIVE 2011 Rs.
GENERAL CHARGES	3,015,701.66	3,773,587.53	6,476,181.87	3,377,093.45	983,441.89	3,115,861.37	3,435,152.75	3,751,352.95	728,174.65	14,242,637.73	42,899,185.85	35,603,992.88
SUPERINTENDENT & STAFF	3,937,058.67	2,803,630.09	4,359,137.53	1,770,606.86	349,487.57	1,329,784.80	1,282,151.53	3,050,588.13	352,618.25	1,846,180.70	21,081,244.13	22,037,128.33
UPKEEP	1,550,717.77	1,267,817.54	7,085,825.63	1,156,646.67	466,476.60	1,429,012.79	1,465,101.18	3,567,824.31	1,615,600.24		19,605,022.73	19,223,258.38
CUTIVATION	1,642,647.53	1,593,702.17	3,120,277.67	1,223,606.05	220,082.49	812,602.42	675,002.37	368,433.08	133,162.10		9,789,515.88	15,510,544.37
HARVESTING	2,148,728.86	964,956.16	1,885,566.10	1,163,919.75	315,470.69	460,208.55	952,767.59	1,043,007.93	79,172.62		9,013,798.25	7,673,857.94
TOTAL COST OF PRODUCT.	12,294,854.49	10,403,693.49	22,926,988.80	8,691,872.78	2,334,959.24	7,147,469.93	7,810,175.42	11,781,206.40	2,908,727.86	16,088,818.43	102,388,766.84	100,048,781.90
CURING INTO COPRA/DISPOSE	380,850.98	174,720.17	174,445.96	308,222.97	19,676.12	121,280.91	47,377.53	229,689.20	16,515.20		1,472,779.04	981,923.45
ANIMAL HUSBANDRY	1,355,668.22	629,802.82	615,880.63	490,958.25		534,233.24	338,129.34	612,457.88	157,575.15		4,734,705.53	4,340,537.30
TOTAL EXPENDITURE	14,031,373.69	11,208,216.48	23,717,315.39	9,491,054.00	2,354,635.36	7,802,984.08	8,195,682.29	12,623,353.48	3,082,818.21	16,088,818.43	108,596,251.41	105,371,242.65
SALES OF COPRA	796,346.35	254,349.10	96,526.50	340,676.65	16,763.30	38,299.40	56,030.00	556,796.94		304,443.05	2,460,231.29	1,074,702.80
SALES OF COCONUT	13,823,376.30	10,647,937.08	29,819,287.89	17,254,248.01	3,062,232.83	8,731,460.90	16,734,230.19	12,333,973.35	1,009,732.03		113,416,478.58	100,662,384.34
SALES OF SEEDLING	81,000.00	303,276.50	1,274,750.00		498,375.00	456,425.00	89,900.00	1,289,375.00	1,518,850.00	677,000.00	6,188,951.50	5,491,455.00
SALES OF SUNDRIES	1,711,439.49	520,214.15	296,129.24	246,011.58	215,526.32	349,951.47	11,134.70	477,111.97	14,325.34	1,558,799.94	5,400,644.20	7,450,923.19
SALE OF ANIMALS PRODUCE & ANIMALS	1,915,847.15	337,818.89	614,541.25	882,539.00		1,091,784.60	217,511.00	640,336.00	67,977.00		5,768,354.89	4,594,905.40
	18,328,009.29	12,063,595.72	32,101,234.88	18,723,475.24	3,792,897.45	10,667,921.37	17,108,805.89	15,297,593.26	2,610,884.37	2,540,242.99	133,234,660.46	119,274,370.73
STOCK VARIANCES	-274,350.34	887,507.35	-3,757,931.06	-5,284,608.34	-146,706.11	1,378,248.49	870,266.34	-735,195.09	732,514.53	-573,697.67	-6,903,951.90	19,771,697.20
ADJUSTED INCOME												
	18,053,658.95	12,951,103.07	28,343,303.82	13,438,866.90	3,646,191.34	12,046,169.86	17,979,072.23	14,562,398.17	3,343,398.90	1,966,545.32	126,330,708.56	139,046,067.93
SURPLUS/(DEFICIT)	4,022,285.26	1,742,886.59	4,625,988.43	3,947,812.90	1,291,555.98	4,243,185.78	9,783,389.94	1,939,044.69	260,580.69	-14,122,273.11	17,734,457.15	33,674,825.28
LESS - AMORTIZATION & DEPRICIATION	-665,109.24	-359,422.96	-741,026.65	-334,266.81	-99,928.33	-208,699.62	-248,482.90	-1,150,032.69	-208,746.49	-1,119,347.89	-5,135,063.58	4,178,823.73
NET SURPLUS/(DEFICIT)	3,357,176.02	1,383,463.63	3,884,961.78	3,613,546.09	1,191,627.65	4,034,486.16	9,534,907.04	789,012.00	51,834.20	-15,241,621.00	12,599,393.57	37,853,649.01

**COCONUT RESEARCH INSTITUTE
PROGRAMME – 14 – PROJECTS**

ITEM	ARGO. Rs.	CPD Rs.	TCD Rs.	EST Rs.	TOTAL 2012 Rs.	CUMULATIVE 2011 Rs.
PERSONAL EMOLUMENTS	243,357.00	90,520.00	52,310.91		386,187.91	351,598.35
TRAVELLING	2,660.00				2,660.00	
SUPPLIERS & CONSUMABLES	17,352.50				17,352.50	8,897.00
MAINTAINANCE	165,870.00	27,590.00	39,986.65		233,446.65	752,210.77
CONTRACTUAL SERVICES					0.00	
DEPRECIATION				823,456.49	823,456.49	685,654.28
STOCK VARIANCE				930,510.00	930,510.00	-231,810.00
OTHERS	159,280.00	1,173,107.35	109,764.00		1,442,151.35	141,265.42
TOTAL EXPENDITURE						
	588,519.50	1,291,217.35	202,061.56	1,753,966.49	3,835,764.90	1,707,815.82
INCOME	162,448.00	678,225.00			840,673.00	1,959,969.08
	-426,071.50	-612,992.35	-202,061.56	-1,753,966.49	-2,995,091.90	252,153.26

COCONUT RESEARCH INSTITUTE
PROGRAMME – 15 – CESS

ITEM	ARGO.	EST/EMD/ENG	TOTAL	CUMULATIVE
	Rs.	Rs.	2012	2011
			Rs.	Rs.
PERSONAL EMOLUMENTS				
TRAVELLING				
SUPPLIERS & CONSUMABLES				
MAINTAINANCE				
DEPRECIATION		5,797,541.10	5,797,541.10	6,316,927.29
STOCK VERIANCE				
OTHERS				
TOTAL EXPENDITURE		5,797,541.10	5,797,541.10	6,316,927.29
INCOME				410159.4
		-5,797,541.10	-5,797,541.10	-5,906,767.89



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கணக்காய்வாளர் தலைமை அபிபதி திணைக்களம்
AUDITOR GENERAL'S DEPARTMENT



මගේ අංකය }
My Number
எனது இல }

පයිපස්/එල්/සීආර්බී/ එල්ටී/2012

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පොල් පර්යේෂණ මණ්ඩලය.

පොල් පර්යේෂණ මණ්ඩලයේ 2012 දෙසැම්බර් 31 දිනෙන් අවසන් වර්ෂය සඳහා වූ මූල්‍ය ප්‍රකාශන පිළිබඳව 1971 අංක 38 දරන මුදල් පනතේ 14(2)(සී) වගන්තිය ප්‍රකාර විගණකාධිපති වාර්තාව

සමාංක හා 2013 ඔක්තෝබර් 31 දිනැති මාගේ ලිපියට යොමුවේ.

02. ඉහත සඳහන් ලිපිය සමඟ එවන ලද මාගේ වාර්තාවේ ඉංග්‍රීසි අනුවාදය මේ සමඟ එවා ඇත.


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විගණකාධිපති .

- පිටපත් :-
1. ලේකම් - පොල් සංවර්ධන හා ජනතා වතු සංවර්ධන අමාත්‍යාංශය
 2. ලේකම් - මුදල් හා ක්‍රම සම්පාදන අමාත්‍යාංශය.



විගණකාධිපති දෙපාර්තමේන්තුව
கணக்காய்வாளர் தலைமை அறிபதி திணைக்களம்
AUDITOR GENERAL'S DEPARTMENT



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 My Number } YS/F/CRB/FA/2012
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 உமது இல }
 Your No. }

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 திகதி } 31 October 2013
 Date }

The Chairman
 Coconut Research Board

Report of the Auditor General on the Financial Statements of the Coconut Research Board for the year ended 31 December 2012 in terms of Section 14(2)(c) of the Finance Act. No. 38 of 1971.

The audit of financial statements of the Coconut Research Board for the year ended 31 December 2012 comprising the balance sheet as at 31 December 2012 and the statement of financial performance and cash flow statement for the year then ended and a summary of significant accounting policies and other explanatory information was carried out under my direction in pursuance of provisions in Article 154(1) of the Constitution of the Democratic Socialist Republic of Sri Lanka read in conjunction with Section 13(1) of the Finance Act, No. 38 of 1971 and Section 43 of the Coconut Development Act, No. 46 of 1971. My comments and observations which I consider should be published with the Annual Report of the Board in terms of Section 14(2)(c) of the Finance Act appear in this report. A detailed Report in terms of Section 13(7)(a) of the Finance Act was furnished to the Chairman of the Board on 29 May 2013.

1:2 Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Generally Accepted Accounting Principles and for such internal control as the management determines is necessary to enable the preparation of financial statements that are free from material misstatements whether due to fraud or error.

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சுதந்திர சதுக்கம்,

INDEPENDENCE SQUARE,

දුරකථනය }
 தொலைபேசி } 2691151
 Telephone. }

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 பக்ஸ் இல } 2697451
 Fax No. }

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 #- மெயில் } oaggov@sltnet.lk
 E-mail. }

1:3 Auditor's Responsibility

My responsibility is to express an opinion on these financial statements based on my audit. I conducted my audit in accordance with Sri Lanka Auditing Standards. Those Standards require that I comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatements.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgements, including the assessment of the risks of material misstatements of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Board's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Board's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of financial statements. Sub-sections (3) and (4) of Section 13 of the Finance Act, No. 38 of 1971 give discretionary power to the Auditor General to determine the scope and the extent of the audit.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

2. Financial Statements

2:1 Opinion

In my opinion, the financial statements give a true and fair view of the financial position of the Coconut Research Board as at 31 December 2012 and its financial performance and cash flows for the year then ended in accordance with Generally Accepted Accounting Principles.

2:2 Comments on Financial Statements

2:2:1 Accounts Receivable

Out of the debtors balances as at 31 December 2012 totalling Rs.558,631, balances totalling Rs.164,960 existed over a period of 04 years while debtors balances totalling Rs.389,777 existed over periods from 04 to 05 years. Nevertheless the Board had failed to recover those balances even by the end of the year under review.

3. Financial Review

3:1 Financial Results

According to the financial statements presented, the working of the Board for the year under review had resulted in a deficit of Rs.59,537,758 after taking into account the Treasury grant of Rs.151,830,000 received for the year, as compared with the corresponding deficit of Rs.7,998,680 for the preceding year after taking into account the Treasury grant of Rs.137,250,000 received for that year, thus indicating a deterioration of Rs.51,539,078 in the financial results. The deterioration of the financial results had been mainly due to the increase of depreciation by Rs.30,707,567 resulting from the rectification of computation of depreciation in the year under review as compared with the year 2011 and the increase of employees; gratuity and the salaries and allowances of employees amounting to Rs.8,551,274 and Rs.14,284,249 respectively.

3:2 Analytical Financial Review

The following observations are made.

- (a) The income earned from the operating activities had covered 39 per cent of the overall expenditure of the Board.
- (b) The overall income of the Board comprised income from operating activities representing 47 per cent and Government grants representing 53 per cent.

- (c) The expenditure on gratuity included in the operating expenses, indicated an increase of 93 per cent as compared with the preceding year.

4. Operating Review

4:1 Performance

(a) Performance of the Crop Protection Division

According to the Coconut Development Act, No. 46 of 1971, a Crop Protection Division had been established with objectives of improvement of the technology for the protection of coconut cultivation from pests for the minimization of damage to the crop. The following observations are made in this connection.

(i) Control of Coconut Maita

Even though breeding of a predator maita in the laboratories and release for the control of the coconut maita causing damage to the coconut cultivation thus damaging the coconut crop, out of the 75,557 maita produced by 11 laboratories in the year under review 54,744 packets only had been released during the year.

(ii) Suppression of Red Beetle

The method recommended for the suppression of the red beetle covering deadly damage to the coconut cultivation is the use of pheromone traps. The success of this method depends on the setting up of traps in a very large area. This method could not be used for the prevention of the red beetle pest in the coconut cultivation of the smallholders due to practical difficulties.

(b) Estates Management

The Board had managed 04 Genetic Resources Centres and 06 Research Centres during the year 2012. The following matters were observed at the analytical review of the crop of those estates.

Genetic Resources Research Centre	Estimated Crop Nuts		Actual Crop Nuts		Variance between the Estimated Crop for 2012 and actual Crop		Variance of the Actual Crop as compared with the preceding year	
	2012	2011	2012	2011	Nuts	Percentage	Nuts	Percentage
Bandirippuwa	700,000	700,000	745,665	573,307	45,665	6	172,358	30
Pallama	550,000	518,000	382,095	436,483	(167,905)	(30)	(54,388)	(12)
Pottukulama	725,000	700,000	617,261	762,978	(107,739)	(15)	(145,717)	(19)
Ambakele	1,400,000	1,360,000	1,180,544	1,091,335	(219,456)	(16)	89,209	8
Rathmalagara	650,000	650,000	648,327	612,563	(1,673)	(0.25)	35,764	6
Walpita	80,000	80,000	127,245	76,209	47,245	60	51,036	67
Makandura	425,000	400,000	511,306	415,915	86,306	20	95,391	23
Maduruoya	555,000	572,664	697,827	592,034	142,827	26	105,793	18
Dunkannawa	40,000	--	53,983	45,591	13,983	35	8,392	18
Middeniya	--	--	23,691	7,800	23,691	100	15,891	203
Total	5,120,000	4,980,664	4,987,944	4,614,215	(137,056)		373,729	

The crop of the Pottukulama and Pallama Estates, as compared with the preceding year had decreased by 12 per cent and 19 per cent respectively. The Chairman had stated that the decrease of the crop was due to the drought that prevailed over long period of 15 months.

(c) Crop Per Acre and Average Annual Crop Per Palm

The information on the coconut crop per acre of 04 Genetic Centres and 06 Research Centres in the year under review is given below.

Genetic Resources Research Centre	Extent of Lands with bearing Palms	Number of bearing Palms	Fallen coconuts (Nuts)	Total Annual Crop (Nuts)	Annual Average Crop per Palm (Nuts)	Crop per Acre (Nuts)	Nuts per Bunch (Average Annual Crop per Palm) per Month 12	Percen- tage of Fallen Coconuts
Bandirippuwa	286	10,859	66,646	745,665	68	2,607	6	9
Pallama	481	8,494	62,228	382,095	45	794	4	16
Pottukulama	194	9,477	121,614	617,261	65	3,182	5	20
Ambakele	318	17,668	260,534	1,180,544	67	3,712	6	22
Rathmalagara	240	12,526	141,447	648,327	52	2,701	4	22
Walpita	32	1,737	40,064	127,245	73	3,976	6	31
Makandura	144	4,700	68,310	511,306	108	3,550	9	13
Maduruoya	195	7,556	209,587	697,827	92	3,579	8	30
Dunkannawa	21	943	8,213	53,983	57	2,570	5	15
Middeniya	47	1,200	515	23,691	19	504	2	2
Total	1,958	75,160	979,158	4,987,944				

- (i) The average annual crop per palm of the Pallama, Rahtmalagara, Dunkannawa and Middeniya Estates had been less than 60 nuts.
- (ii) Even though the average coconut crop per acre should be between 4,500 to 5,000 nuts, the coconut crop of all the estates of the Research Board had been below 4,000 nuts. The Chairman stated that it was due to the differences in the suitability of soil of each estate.

- (iii) Out of the crop of coconut estates of 05 Research Centres the percentage of fallen coconuts ranged between 20 per cent and 31 per cent. Thus it was observed that the crop had not been plucked on time.

The Chairman stated that the plucking of coconuts of Coconut Seedling Gardens at Maduruoya and Ambakele is done every two month and in view of the very tall palms in the other estates plucking coconuts with the picker is difficult and as such the percentage of fallen coconuts is very high.

5. Accountability and Good Governance

5:1 Presentation of Financial Statements

The accounting deficiencies amounting to Rs.6,910,013 revealed at the examination of the financial statements presented on 01 March 2013 were brought to the notice of the Chairman of the Board. The financial statements amended by rectification of those deficiencies were presented again on 28 March 2013.

6. Systems and Controls

Deficiencies in systems and controls observed during the course of audit were brought to the notice of the Chairman of the Board from time to time. Special attention is needed in respect of the following areas of control.

- (a) Accounting
- (b) Human Resources Management
- (c) Estates Management

W.P.C. Wickramaratne
Acting Auditor General

-/dk.