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## Our Vision

*To be the centre of excellence in coconut research, technology development and technology transfer in the region.*

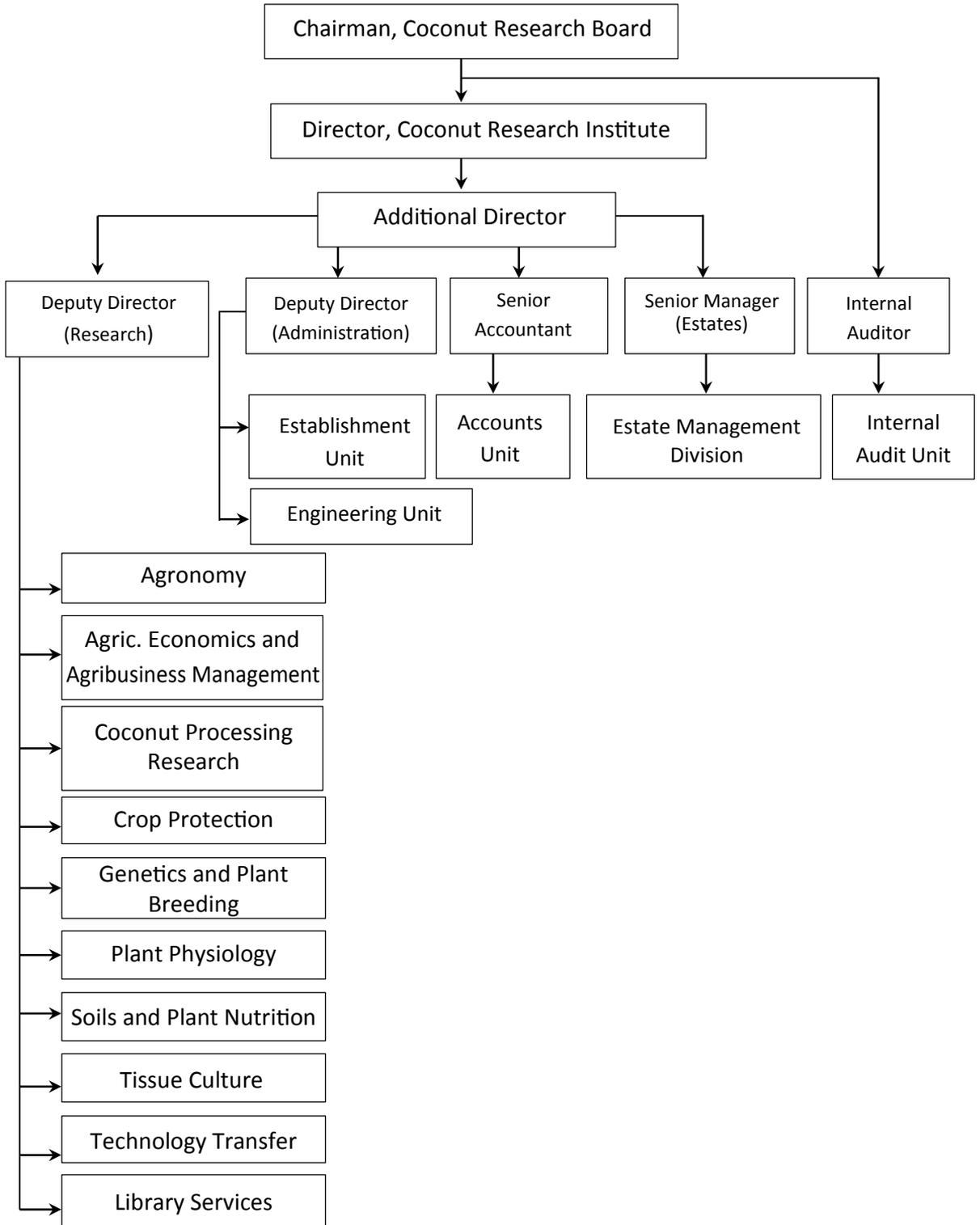
## Our Mission

*Generate knowledge and technology through excellence in research towards increasing productivity and profitability of coconut.*

## Our 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 institute's seed gardens and experimental stations.
4. Train advisory and extension workers to assist the coconut industry.
5. Guide and advise coconut industry on all matters of technical nature.
6. Conduct R & D activities for development of the oil palm industry.

### ORGANOGRAMME OF THE INSTITUTE



# MINISTRY OF PLANTATION INDUSTRIES

## THE COCONUT RESEARCH INSTITUTE

### SHORT ANNUAL REPORT – 2016

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	Mr. Jayantha Jayewardene,
Members	Mr. D. M. L. Bandaranayake, Additional Secretary (Development III), Ministry of Plantation Industries (up to February)
	Mr. B. L. A. J. Dharmakeerthi, Additional Secretary, Ministry of Plantation Industries (from June)
	Mr. H. K. U. K. Rupasinghe, Chairman, Coconut Development Authority
	Mr. Y. L. K. Yakandawala, Chairman, Coconut Cultivation Board
	Dr. Rohan Wijekoon, Director General, Department of Agriculture
	Dr. S. F. N. Silva, Past President, Coconut Growers Association
	Prof. A. R. Ariyaratne, Director/Secretary, CARP (up to April)
	Dr. J. D. H. Wijewardena, Director/Secretary, CARP (from June)
	Mr. J. T. E. Perera
	Ms. L. A. G. N. Liyanaarachchi, Treasury Representative (up to January)
	Mr. C. H. S. Dangalle, Assistant Director, Treasury Representative (from February)
	Dr. K. P. Premaratne
	Dr. H. A. J. Gunathilaka, Director, CRI (up to April)
	Dr. L. C. P. Fernando, Director, CRI (from July)

Secretary-to-the-Board	Dr. L. C. P. Fernando, Director (up to July)
Secretary-to-the-Board	Dr. Sanathanie Ranasinghe, Head - Plant Physiology Division, (from August)

### **The Audit and Management Committee**

In order to discuss the audit and management plan four meetings were held during the year.

The members of the audit committee are;

	<b>Name</b>	<b>Record of attendance</b>
Chairperson	Mrs. L. A. G. N. Liyanarachchi (January)	1/1
Chairman	Mr. C. H. S. Dangalle (June, Sept, Dec)	2/3
Board member	Dr. K. P. Premarathne(June, Sept, Dec.)	3/3
Observer	Mr. L. P. Jayantha Pushpakumara	4/4
Ministry Rep.	Mr. D. M. L. Bandaranayake (January)	1/1
Ministry Rep.	Mr. B. L. A. J. Dharmakeerthi(September)	1/1
Director	Dr. Jayantha Gunathilake (January)	1/1
Director	Dr. L. C. P. Fernando	4/4
Convener, Addl. Director	Dr. (Mrs.) Sanathanie Ranasinghe(Sep, Dec)	2/2
Internal Auditor	Mr. P. W. A. Fernando	4/4

# Chairman's Message



The Coconut Research Institute enjoyed a relatively successful year in 2016 compared to the previous year. However, the CRI has potential to reach higher levels.

Success cannot be achieved by only working towards achieving targets and objectives. Success in the context of the CRI should not be measured only by the successful completion of its research activities. Success should be measured mainly by the level of adoption of the CRI recommendations by the coconut growers. It seems that this has not happened to the extent it should have as expected by the CRI.

The coconut yields have decreased in the recent past. The low coconut yields recorded seem to confirm that the CRI recommendations are not going, to a certain extent, to the coconut growers. However, the prolonged drought has also played a part in depressing yields.

Research at the CRI saw two of our senior researchers taking control of all aspects of research at the CRI. This was a good thing. They have now forged ahead with various innovative programs.

Now all research programs, in addition to the internal reviews carried out by the CRI researchers, are reviewed by qualified and experienced external professionals, who guide our researchers so that their work achieves the best possible results. Regular meetings are held with the research staff.

Another aspect, taken over by these two senior researchers, is the training of the second tier of the CRI research staff and to make them competent to take over responsibilities at the highest CRI level in the future.

The management of the CRI estates, which is the economic mainstay of the CRI, saw new management techniques being employed and professionalism brought to the estate staff through training and other motivational strategies. The estates are visited regularly by CRI teams to help improve the management of the estates and their profitability. Monthly review meetings are held with the superintendents of the CRI estates.

The CRI has developed, along with the Asia Pacific Coconut Community, three international training programs utilizing only CRI research staff. There is already much interest shown by many countries to participate in these training programs.

Now with proper research and management strategies in place there is the ability of the CRI to play a very useful and important role in Sri Lanka's coconut industry.

A handwritten signature in black ink, appearing to read 'Jayantha Jayewardene', with a long horizontal line underneath it.

**Jayantha Jayewardene**

Chairman

Coconut Research Board

# Director's Report



In 2016, the country produced 2845 Mn nuts which is a 6% reduction in yield compared to that of 2015. Severe drought and heat stress prevailed from January to April and June to October periods reduced the fruit set of palms in 2016, forecasting a significant yield reduction for 2017. However, the coconut industry grew with a steady increase in the volume of exported products by utilizing nearly 1492 mln nuts. Kernel products constituted the major portion of the exports (55%).

The Coconut Research Institute continued to serve the coconut industry in numerous ways in the year 2016 with its' many contributions. Many achievements in research and development were recorded. Two recommendations were made during the year. A novel collection method of coconut sap was developed to collect high quality unfermented sap for jaggery, beverage and sugar production. A pollination strategy to increase the fruit setting of dwarf x tall hybrid seed coconut during stress periods was identified. The institute proposed two policies; to revise the special commodity tax of crude palm oil to Rs. 130.00 per kg and palm kernel and refined palm oil to Rs. 150.00 and, to reduce the registration fee for small scale fresh nut exporters to Rs. 50,000.00 and remove the handling fee of Rs. 5.00 to be paid by all exporters. Various research projects marked high achievements and focus was more towards researching for nano fertilizers, biochar for moisture conservation and microbes for improving soil fertility. Three collaborative projects with universities to study the health benefits of coconut were continued. The international collaboration to develop a coconut water beverage with Global Health Coconut Product Limited, Hong Kong completed.

In addition to various research outputs the CRI scientists actively contributed to fostering science. Ten scientists received awards of excellence in various fora and seven scientists secured research grants during the year. They published 08 research papers in Science Citation Indexed Journals, 06 research papers in international journals, 07 research papers in local journals and published 04 book chapters.

CRI jointly with the Coconut Cultivation Board continued to manage the Weligama Coconut Leaf Wilt Disease (WCLWD) successfully. As a long term solution, production of the hybrid coconut cultivar identified as tolerant to WCLWD was scaled up. An MOU was signed between the Coconut Research Institute and the Coconut Cultivation Board to take over the Weligama CCB coconut nursery premises for the establishment of a mini coconut seed garden for the mass production of hybrid coconut seed nuts which are expected to be

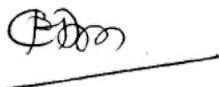
tolerant to Weligama Coconut Leaf wilt Disease.

Soil and land suitability maps for Polonnaruwa district were completed. Bi-monthly yield predictions of 08 months in advance, analysis/test reports of various substrates and products and supply of bio control agents were in high demand. Several programs for transferring the technologies to various stakeholder and 'Kapruka' SMS Service to alert the coconut growers on various coconut related information were continued.

The 3 Genetic Resource Centres and 8 Research Centers of the institute continued to produce hybrid seed nuts for the national requirement, supported various research trials and maintained demonstrations for the use of coconut growers and the public. A large scale hand (artificial) pollination programme was initiated at the Pallama Seed Garden aiming at producing minimum of 100,000 hybrid seeds for the home gardens of Northern Province in the next three years.

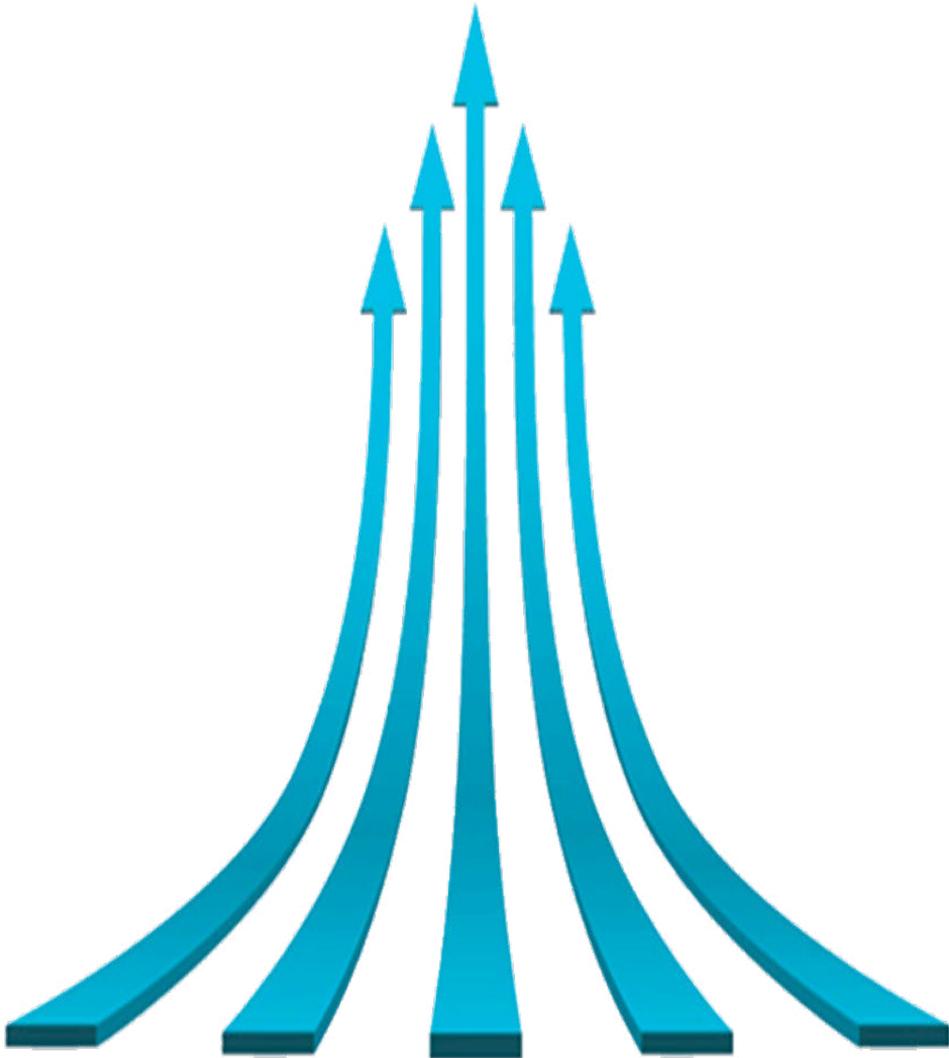
The staff attended various training programmes in capacity and human resource development.

I wish to thank all staff of the institute and the estates for their untiring efforts to achieve the goals of the institute. I am grateful to the Hon. Minister of Plantation Industries, Secretary and the officials of the Ministry of Plantation Industries for their guidance and support extended to us during the year. I appreciate the Coconut Cultivation Board, Coconut Development Authority, Universities, government departments, institutes, coconut growers and industrialists collaborated with us to achieve the targets of 2016.



**Dr. (Mrs) L. C. P. Fernando**  
Director  
Coconut Research Institute

# Research Recommendations

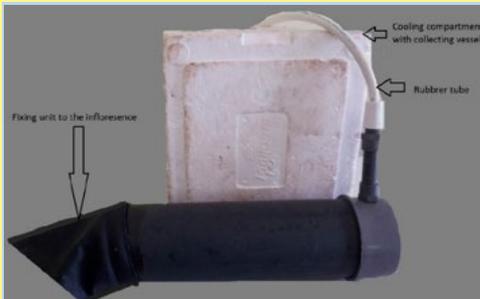




## Quality improvement of coconut sap by a novel collection method

Traditional anti fermenting agents such as hal bark and lime are not sufficient to keep coconut sap in unfermented stage for jaggery and sugar production. Therefore, a collection device was developed by the Coconut Processing Research Division of CRI to collect fresh sap in unfermented condition.

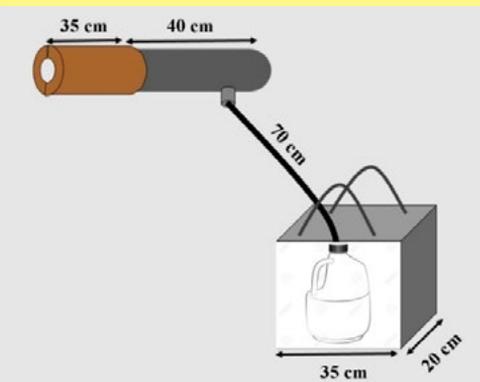
The device is comprised of a cooling compartment, collecting vessels, fixing unit to the inflorescence and an outer cover. Cooling material (ice crystals in a sealed polythene bag) is placed in the cooling compartment and it controls the inner temperature of collecting vessel and prevents the growth of microbes and fermentation. The 'fixing unit' which fix the device to the tapping inflorescence creates a tightly sealed condition preventing from entering air and other contaminants to the inflorescence. The device is sealed with an outer cover.



The sap collection device



Field application of the sap collection device



Sketch of the device



Sweet toddy based products

Using this device, the unfermented sap can be collected at two intervals, 6hrs or 12hrs. The quality of sap collected 6 hrs (17°bx) interval is greater than that of 12 hrs collection (15°bx). The collected sap can be used to produce good quality beverage, sugar and jaggary.

*Coconut Processing Research Division*

## **A pollination strategy to increase the fruit setting of dwarf x tall hybrid seed coconut during stress periods**

Failures in Dwarf x Tall hybrid fruit set under heat and drought stress are already witnessed in the coconut seed gardens, especially in flowers opened during February-April and August-October and this has significantly affected the supply of hybrid seed nuts to the national replanting programme. Therefore, identifying strategies to minimize the failures in Dwarf x Tall hybrid fruit set during stress periods is of utmost importance to increase the production of hybrid seed nuts.

The reduction in hybrid fruit set under stress is mainly due to reduced quality of pollen and female flowers and impaired pollination process. According to the existing practice of hybrid seed nut production, both male and female reproductive structures are simultaneously subject to stress during stressed months. Therefore, consequent reductions in fruit set due to crossing between stressed parents cannot be avoided. This can be minimized by using unstressed pollen (produced under favourable conditions during three months prior to flower opening), to pollinate the female flowers produced under stress conditions, in controlled hand pollination (The processed pollen can be stored for about 12 months under frozen conditions).



Successfully set nuts and aborted female flowers

*Plant Physiology Division & Genetics and Plant Breeding Division*

# Policy Proposals





## Import tariff on substitute edible oils

CRI observed a declining trend of farm gate nut prices in the country during the first half of 2016. This was mainly due to increase of nut production, less utilization of nuts for coconut oil production and restriction of fresh nut exports. Coconut oil production was reduced as coconut oil producers were not able to compete with low quality imported edible oils of low price. This situation affected seriously on the coconut growers as well as coconut oil producers. By considering above situation and exploring field situation CRI proposed the following recommendations.

### **Recommendation 1**

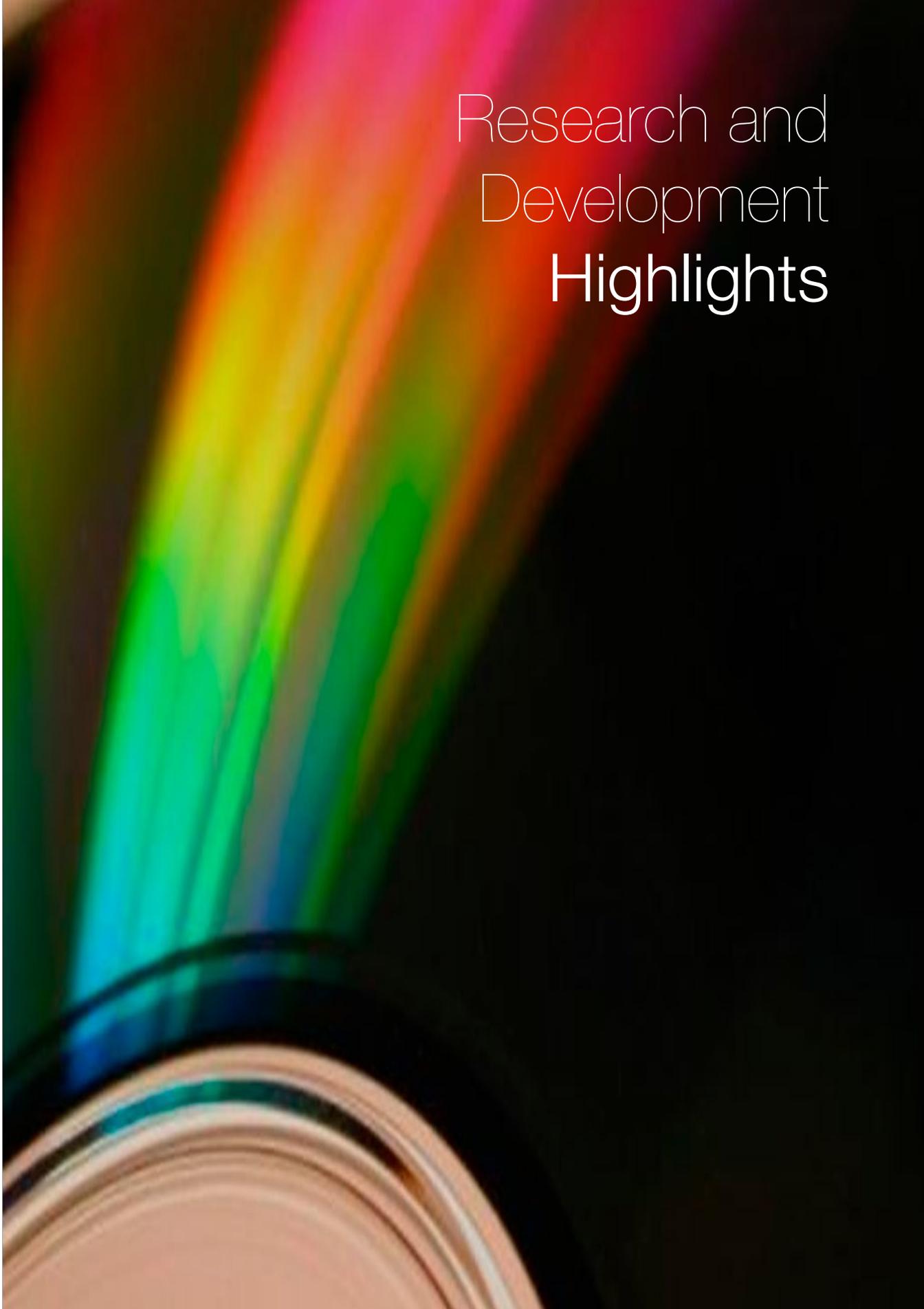
The tariff levels on importation of edible oils were adjusted to balance all industries. Therefore, CRI recommended to revise the special commodity tax of crude palm oil from Rs. 110.00 per kg to the level of Rs. 130.00 per kg and special commodity tax of palm kernel and refined palm oil from Rs. 130.00 to the level of Rs. 150.00.

### **Recommendation 2**

To promote fresh nut exports, CRI recommended the CDA to reduce the registration fee for small scale fresh nut exporters (export less than 30,000 nuts per month) to Rs. 50,000.00 and remove the handling fee of Rs. 5.00 paid to CDA by all exporters.

*Agricultural Economics & Agribusiness Management Division*





Research and  
Development  
**Highlights**





# COCONUT VARIETAL IMPROVEMENT

**Ambakelle Special exhibited superiority over other tall coconut cultivars in water limited environments at the seedling stage.**

## *Genetics & Plant Breeding Division*

As a preliminary investigation, different coconut cultivars at their seedling stage were evaluated under different moisture regimes in a glass house at the Coconut Research Institute, Lunuwila. Ambakelle Special is a selection for drought tolerance from Ambakelle tall at the Isolated Seed Garden, Ambakelle. The third generation Ambakelle Special was used for this experiment. Ambakelle Special showed promising drought tolerance ability presenting low rate of leaf drying than other two tall cultivars used in the experiment (CRIC60 and CRISL98). The physiological and the biochemical parameters related drought tolerance of the samples collected from the same experiment are being analyzed. Furthermore, for further investigation, three field experiments were established in different areas covering the dry zone of Sri Lanka. These field experiments include Ambakelle Special and two other tall cultivars used in the glass house experiment.



Glasshouse experiment for evaluation of coconut cultivars for moisture stress

## **Preliminary results recognize a potential new Coconut Hybrid; Yellow Dwarf x San Ramon.**

### *Genetics & Plant Breeding Division*

Long term progeny evaluation trials which involved the exotic coconut variety San Ramon for the first time in the national coconut breeding programme already resulted in the recommendation of two hybrids CRSL98 and Kapruwana. Yellow Dwarf x San Ramon has been evaluated at an observational trial established at the same time at Rathmalagara estate of CRI. Data from this trial complemented with the initial growth data of the *Aceria* mite evaluation trials recently established to disclose the high potential of the coconut hybrid, Sri Lanka Yellow Dwarf x San Ramon.

This early growth parameters and the nut yield of this hybrid is comparable to those of CRIC65 (DG x T) and Kapruwana (DG x SR), while it performs comparable to DGxSR with respect to components of the fruit recording an average kernel weight of 270 grams per nut.

### **Cloning coconut.**

#### *Tissue Culture Division*

More than 400 new shoots regenerated from 3 mother palms (CRIC65 – 1, CRISL98 – 2) were maintained. About 200 clonal plants raised in previous year were transferred to acclimatization. Eighty acclimatized plants from two improved varieties of coconut, namely CRIC65 and CRISL98 are ready for field planting.



Acclimatized clonal plants

It is important to assess the genetic stability and constitution stability of micropropagated plants before implementing strategies for further propagation. A study proved that individuals are genetically identical to each other within the clone when derived through micropropagation. Proximate analysis showed no significant difference between coconut from micropropagated plants and seed derived plants. Chemical composition of both kernel and coconut water of the coconuts derived through micropropagation was similar to that of the seed derived coconuts of the same variety.

### **Production of homozygote (pure lines) coconut.**

#### *Tissue Culture Division*

Studies on androgenesis were focused on reducing the shoot tip burning and necrosis of haploid plants *in vitro*. Application of double strength  $\text{CaCl}_2$  in Eeuwens  $Y_3$  medium reduced the occurrence of necrosis. About ten plantlets derived through androgenesis were transferred for acclimatization.



Acclimatized homozygote plants

with 0.75 M sucrose for three days and dehydrated in silica gel for 20 h. For successful cryopreservation, it is important that cultures retain genetic stability after storing them in liquid nitrogen. For this reason genetic fidelity of cryopreserved tissues was also evaluated. Eleven Simple Sequence Repeat (SSR) primer pairs were selected for the amplification of genomic DNA through polymerase chain reaction (PCR) for the detection of genetic fidelity. The genetic stability of the somatic embryos recovered from the cryopreserved EC of coconut evaluated using SSR primers showed no significant variations in the banding pattern in the control and cryopreserved plant materials.

## **Cryopreservation of embryogenic calli (EC).**

### *Tissue Culture Division*

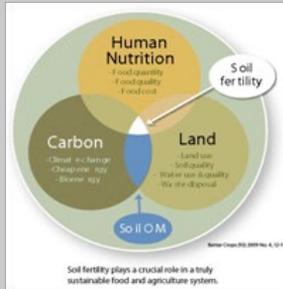
Best combination of pretreatment, duration of pretreatment and dehydration for the recovery of cryopreserved embryogenic calli was evaluated using encapsulated-dehydration method. Highest recovery was achieved when the calli were pretreated



Encapsulated embryogenic calli



# COCONUT PRODUCTION TECHNOLOGY



## A green manure based fertilizer mixture for organic coconut farming.

### Agronomy Division

*Tithonia diversifolia* has high potential as a green manure. It contains high concentrations of nitrogen (N), phosphorus (P) and potassium (K) in its green leaf biomass. A study was initiated to develop an *in-situ* green manure based fertilizer mixture to replace urea and MOP requirements in organic coconut farming systems using *T. diversifolia* and *Gliricidia sepium*. When green biomass of the two species were lopped and added to the manure circle of coconut palms, it increased soil moisture content by 59 - 80%, soil microbial activity by 30 - 41%, soil N by 25 - 37%, nut yield by 11 - 22 %, after four years of green manure application.



***Tithonia diversifolia* planted between coconut rows**



***Gliricidia sepium* planted between coconut rows**

## Mix cropping systems to increase the nut yield in dry zone coconut plantations.

### Agronomy Division

Low yields in coconut plantations in the dry zone areas are mainly due to long dry spells associated with high heat stress during the year. Coconut and forest species based mixed cropping system with *Artocarpus heterophyllus*, *Gliricidia sepium* and *Anacardium occidentale* was established in Maduruoya Genetic Resources Centre of the CRI with the objective of determining the ability of these mixed cropping systems to change the micro-climatic condition and yield of coconut plantation.

## Assessment of different leguminous cover cropping systems and agronomic practices on soil erosion.

### Agronomy Division

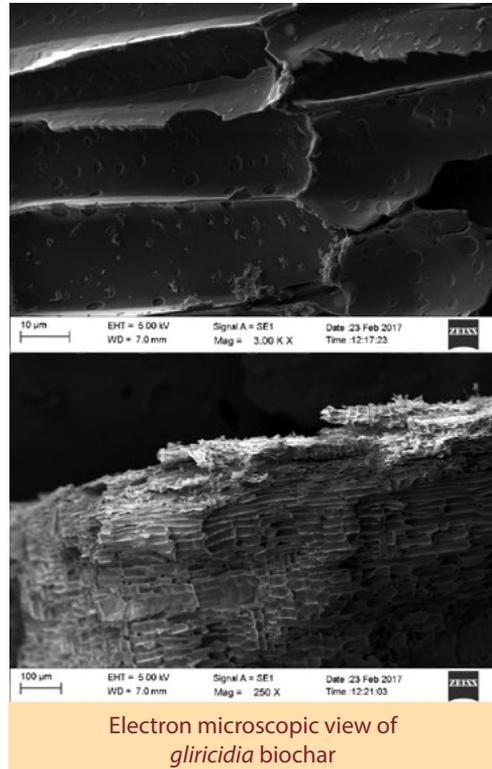
Application of different agronomic practices are very important to prevent soil degradation and to improve the soil fertility. A study was conducted to assess the soil erosion under different leguminous cover cropping systems with other agronomic practices in a coconut farming system. Soil erosion was assessed using  $^{137}\text{Cs}$ , which is a rapid, reliable and direct technique for the assessment of soil erosion. Establishment of contour drains, cover cropping with *Pueraria phasioloides* and Gliricidia live fence reduced soil erosion by 57%, 86% and 58%, respectively, compared to natural grass cover.

## Production of biochar by using different plant material and crop residues.

### Agronomy Division

Soil application of Biochar, made of biomass via pyrolysis, offers number of benefits for soil health, mainly due to its extremely porous nature. Various types of plant materials can be used to produce biochar. A study was initiated to check the possibility of using available plant materials and crop residues found in coconut plantations to produce biochar and evaluate them for physical and chemical properties. Coconut piths, leaves, husks, fronds, tender coconut/king coconut husk and shell, Gliricidia wood, Paddy husk, poultry litter, wood shavings, wood dust and weed slash were tested. Physical and chemical parameters were measured using standard methods and advanced procedures such as Scanning

Electron Microscopic (SEM) and Energy-dispersive X ray Spectroscopy (EXD). Among these plant materials, coconut husks, fronds, gliricidia wood parts, king coconut husk and shell parts were ideal to produce biochar in coconut plantations.



## Development of sustainable moisture conservation method by using biochar for coconut plantations.

### Agronomy Division

Soil moisture is considered as the most important cultural practice in coconut plantations under rain fed conditions, particularly in the intermediate and dry zones of Sri Lanka. Biochar improves the soil's performance by retaining moisture and making it available during drought conditions. This is possible because many biochar have very large internal surface area typically over 100 square meters per gram

that have good adsorption capacity. A field experiment was established in Nagansole Estate with the objective of developing a sustainable soil moisture conservation method for coconut plantations by using biochar in dry and intermediate zones.

### **Growth performance evaluation of CO-3 fodder grass under coconut plantations.**

#### *Agronomy Division*

CO-3 is one of the highest yielding perennial tropical fodder grasses and considered as cut and carry forage for stall feeder system for ruminants. The study was initiated to determine the CO-3 fodder biomass production under different management levels under coconut and to investigate the effects of growing CO-3 fodder grass on coconut production. CO-3 grass was established in between coconut rows by different methods and biomass was harvested at different intervals. The highest CO-3 biomass was recorded in five rows of CO-3 planting system with 30 days lopping interval. The amount of dry CO-3 biomass production was 20.05 mt/ha/year in 2016.



CO-3 fodder grass planted between coconut rows

### **Growth performance evaluation of fodder sorghum under coconut.**

#### *Agronomy Division*

Fodder sorghum is a perennial grass species, well known as high productive quality forage for livestock in tropics. This study was initiated to evaluate the growth performance of fodder sorghum in different environmental conditions with different management practices under coconut, in intermediate and dry zones. Fodder sorghum seeds were established in between coconut rows with different spacing and different nutrient sources. The highest fodder biomass of 3.68 Mt/ha was obtained for inorganic fertilizer treated 1ft x 1ft spacing system, under a moderate drought condition in 2016.



Fodder sorghum cultivated between coconut rows

### **Potential of Dragon Fruit (*Hylocereus undatus*) as an intercrop under mature coconut.**

#### *Agronomy Division*

Being a new fruit species recently introduced to the Sri Lankan agriculture, it is understood that dragon fruit has not been extensively studied under the local

growing conditions. The main advantage of this crop is that once planted, it will grow for about 20 years. The plant starts to produce fruits four years after planting and reach full production after five years. Agronomic practices for the management of this crop are easy and less expensive; maintenance cost is low and aftercare is minimal due to fewer pest and disease attacks. Therefore, an experiment was established to exploit the potential of dragon fruit as a companion crop under mature coconut cultivations to upgrade the productivity and profitability of coconut lands.



Dragon Fruit (*Hylocereus undatus*) intercrop under mature coconut

**Preliminary evaluation of high value resin crops under coconut.**

***Agronomy Division***

Coconut-based agroforestry is one of the strategies to overcome the low productivity by enhancing resource use and land productivity while raising return per unit land area. Resin plants such as Red Sandalwood (*Pterocarpus santalinus*), Wallapatta (*Gyrinops walla*) and Sandalwood (*Santalum album*) produce high prized plant products which can be used in fragrances,

incense, medicines, aromatherapy and religious ceremonies. An experiment was conducted in Makadura Estate to exploit the possibility of growing these high value resin crops under coconut.



Red Sandalwood (*Pterocarpus santalinus*)



Wallapatta (*Gyrinops walla*)



White Sandalwood (*Santalum album*)

### **Effect of buffalo grazing on soil physical and chemical properties on a silvo pastoral system under coconut.**

#### *Agronomy Division*

Silvo pastoral system comprises of pasture, livestock and coconut trees. This system increases the land productivity by recycling nutrients. This experiment was established at Maduru Oya Estate, Bogaswewa (dry zone) with the objective of determining the effect of incorporating animals on soil physical, chemical and biological properties of soil and the effect of this silvo pastoral system on yield of coconuts. Rearing buffaloes under coconut reduce the cost of weeding and also provide additional benefits such as milk and manure to the coconut palms. However, buffalo grazing can increase soil compaction, which in turn adversely affects palm growth. This is an essential system of nutrient recycling. This research will provide essential information related to the effect of livestock under coconut and the data could be used to update/revise the present

recommendations on organic/inorganic fertilization of coconut. According to the results in 2016, there were no effect of the system on coconut yield.

### **Use of King Coconut husk to produce an organic potassium source for agricultural use.**

#### *Soils & Plant Nutrition Division*

King coconut husk is a waste product from the king coconut water export industry as well as from the local consumption. As king coconut is harvested immaturity, the husk has no economic value to be used for coir pith and fiber, while these husks with immature shells become breeding grounds for mosquitoes during the rainy period. Therefore, an experiment was conducted to transform these immature king coconut husk into a useful nutrient supplementary material (NSM) from which industry can be benefited.



King coconut husk is dumped after extracting nut water

In the first phase of this experiment, the product was developed through combustion of husks at different conditions and analyzed them in the laboratory for assessing for their properties.

Potassium (K) content of the product made by fully-combusted semi-dry (moisture

content of 20-35%) king coconut husk gave the highest K content compared to the product made from dry and fresh husk. The K content ranged from 12-18%.

The product resulted from controlled combusted husk had lower K content. However, the product had a porous structure and could be used to enhance soil physical conditions than as a nutrient source.



Product from controlled-combustion of semi-dry tender husks



Product from full combustion of semi-dry tender husks

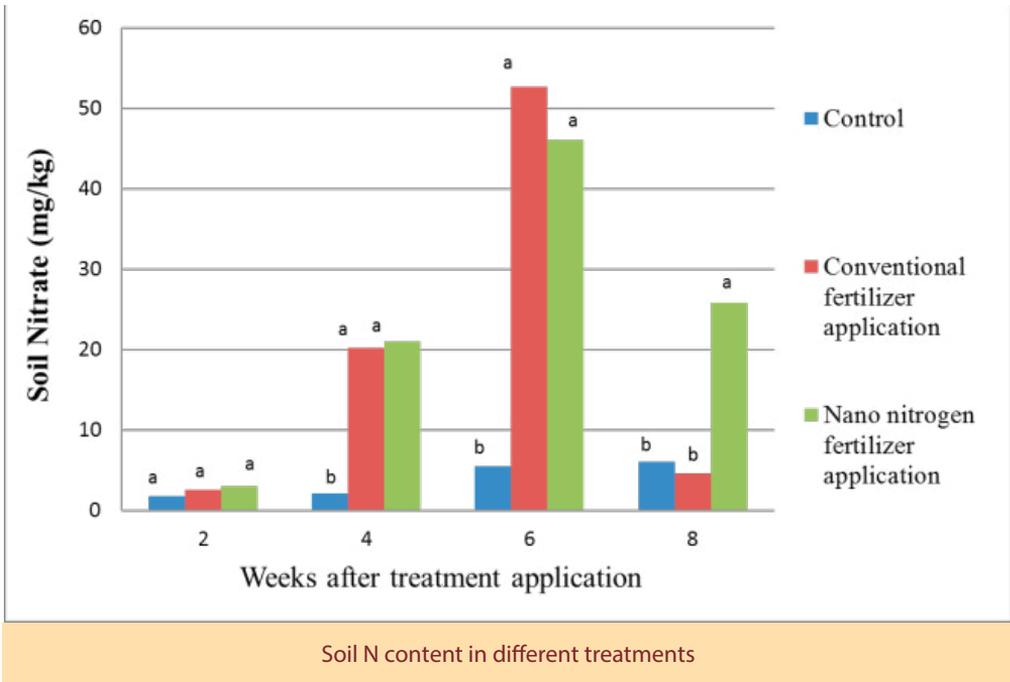
In the next phase of this experiment the product will be tested in the field for evaluating its potential to be used as a K nutrient supplementary material. Field testing is done in comparison with other K sources used in cultivation at present.

### **Quantifying and reducing nutrient losses under coconut cultivation.**

#### *Soils & Plant Nutrition Division*

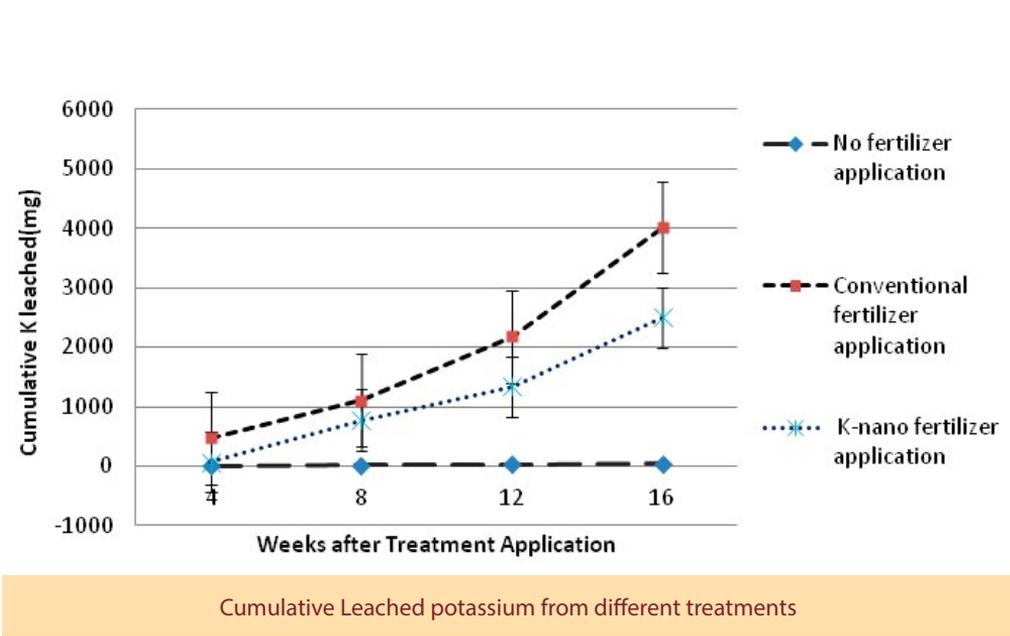
A pot experiment was conducted to investigate releasing pattern and leaching losses of nutrients from conventional fertilizer compared to nano fertilizer to supply of Nitrogen (N) and Potassium (K). Similar rates of nutrients were applied and moisture content was maintained at field capacity. Pots were equally watered and over-saturated once a month and leachate was collected and analysed to quantify nutrient losses. The highest nitrate levels recorded at 6<sup>th</sup> week after treatment application (WAT). There has been no difference up to 6<sup>th</sup> WTA, but by 8<sup>th</sup> week nitrate levels in the soil has reduced in the fertilizer applied treatments with a higher nitrate level in the nano fertilizer treated experiment.

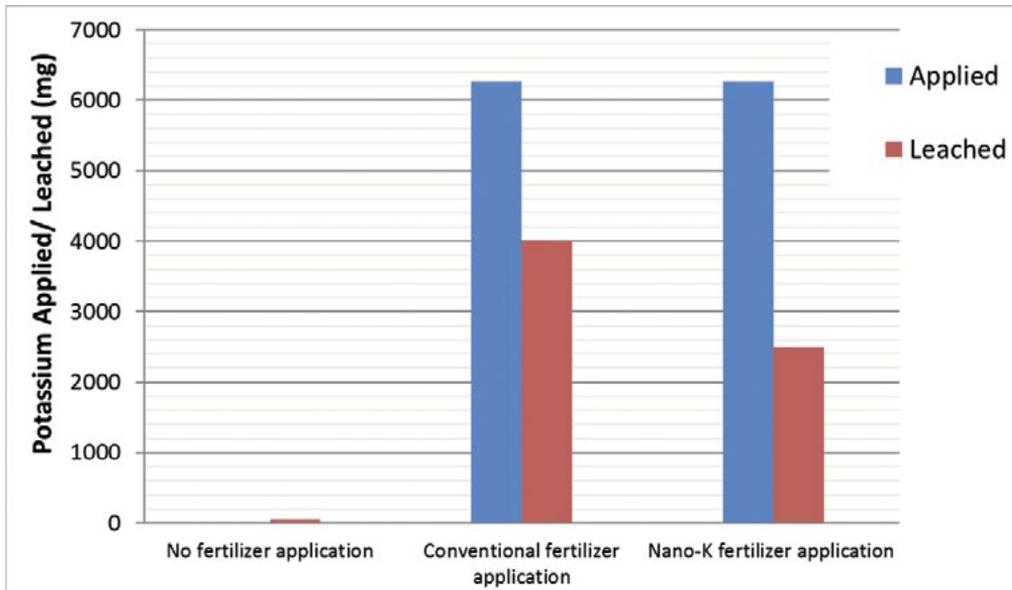
Soil exchangeable potassium levels were higher in Nano-K fertilizer applied Soils at 2<sup>nd</sup> and 4<sup>th</sup> week after treatment application while the soil without fertilizer had the lowest potassium levels throughout the experimental period. However, there was no difference after 4<sup>th</sup> week. Cumulative leached potassium was highest from the conventional fertilizer treatment by the end of 16<sup>th</sup> week after treatment application.



By 16<sup>th</sup> week of treatment application, 64.1 % of applied K has been leached from conventional fertilizer while the leached K from nano fertilizer treatment was 39.9%.

This indicates that potassium from Muriate of Potash (conventional fertilizer) has higher potential of leaching compared to potassium supplied through nano -fertilizer.





Leached quantity of K against applied amount from different treatments

**Investigation on status of Sulphur nutrient in soils and coconut palms in the coconut triangle.**

*Soils & Plant Nutrition Division*



Sulfur deficient adult coconut palm

Leaf Sulphur (S) contents of coconut estates in the Intermediate Zone of Sri Lanka ranged from 0.07% to 0.29% and out of the studied samples 27% showed low S content than the sufficiency range (0.15 – 0.20%) where as 20% of the leaf samples were in S deficient condition.

**Soil microbial population and activity affected by the addition of fertilizer and manure in a coconut growing Sandy Regosol.**

*Soils & Plant Nutrition Division*

The effect of inorganic fertilizer and organic-inorganic combinations of fertilizers on soil microbial population and activity in a coconut growing sandy Regosol soil was investigated. The addition of organic manure increases the soil organic carbon positively affecting the soil microbial population and activity. Current inorganic fertilizer application based on MOP has no adverse impact on soil microbial population. The sulfur containing SOP has a negative impact on microbial community compared to MOP added with manure.



Application of treatments to the pot experiment and soil sampling

## Risk assessment and removal of polycyclic aromatic Hydrocarbons (PAHs) and behavior of trace metals in biochar incorporated soil.

### *Soils & Plant Nutrition Division*

A pot experiment was commenced to assess the plant remediation of environmental organic toxicant Polycyclic Aromatic Hydrocarbons (PAHs) that could be added to coconut growing soil from different sources such as atmospheric fallout, biochar, any type of burning of organic matter etc. using a grass *Panicum maximum*. Preliminary investigations revealed that retardation of root growth of *Panicum maximum* at higher concentrations of PAHs.



Bacterial & Fungal colonies grown in plates from the soil samples of the pot experiment



Pot experiment in a greenhouse with grass





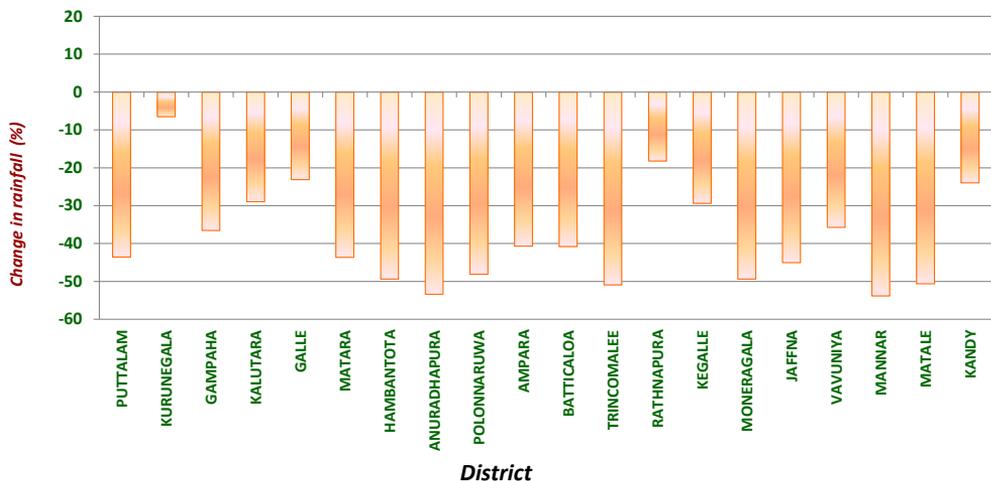
# CLIMATE CHANGE EFFECTS ON COCONUT PRODUCTION

## Changes in rainfall and maximum air temperature.

### Plant Physiology Division

More than 30% reduction in total annual rainfall was observed in all 20 districts where coconut is grown. These reductions were nearly 50% (half of the amount of 2015) in seven such areas namely, *Hambantota, Anuradhapura, Polonnaruwa, Trincomalee, Moneragala, Mannar* and *Matale*. Out of the major coconut triangle, *Puttalam* and *Gampaha* have received 43% and 37% of

the rainfall of previous year. Moreover, the distribution of this reduced rainfall within the year clearly revealed that the existence of 4-5 months rain-free dry spell from June – October in most parts of the country. Although the Maximum Air temperature ( $T_{max}$ ) exceeded the critical temperature of 33°C for about 4 months from January – April in 2016, Eastern, Northern, North-Central and Uva provinces experienced about 7-8 months period from March – October with high  $T_{max}$ . Both factors will affect negatively on the coconut yield in 2017.



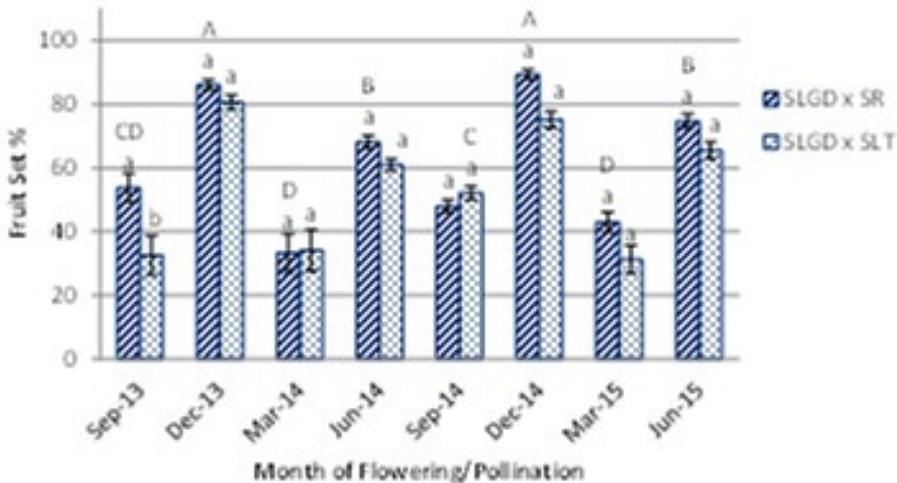
Percentage change in annual rainfall (mm) in 2016 with respect to that in 2015 in coconut growing areas

**A pollination strategy to increase the setting of dwarf x tall hybrid seed coconut under heat and water stress.**  
(NRC 13-032 funded project)

*Plant Physiology Division and Genetics & Plant Breeding Division*

The study assessed the possible influence of heat and water stress around critical development stages (3 months prior to opening) of female (Sri Lanka Green Dwarf, SLGD) and male (Sri Lanka Tall, SLT and San Ramon, SR) flowers on the fruit set of respective hybrids (SLGD x SLT and SLGD x SR), when pollination take place between similarly stressed parents and between stressed and non/low stressed parents, under controlled hand pollination. The number and carbohydrates of female flowers and germination, tube growth and carbohydrates of pollen varied with the stress level during the 3 months prior to inflorescence opening. When the SLGD

female flowers developed under “no-stress” were pollinated with the pollen developed under “no-stress” condition, the FS% in both crosses was higher (88% in SLGD x SR, 78% in SLGD x SLT) compared to those pollinated with “stressed” pollen (44% in SLGD x SR, 30% in SLGD x SLT). In contrast, when the female flowers developed “under stress” were pollinated with the pollen produced “under stress” the FS% was lower (39% SLGD x SR and 33% in SLGD x SLT) compared to those pollinated with “non-stressed” pollen (57% in SLGD x SR and 51% in SLGD x SLT). The results revealed two important aspects; one is the importance of quality of pollen for a successful fruit set in the production of dwarf x tall seed coconuts, and the other is an important strategy to increase the fruit set during stressed months by using non-stressed pollen to pollinate the stressed female flowers in controlled hand pollination.



Fruit setting (%) of two hybrids when SLDG female flowers produced under no-stress (December), moderate-stress (June) or severe stress (March and September) were pollinated with SR and SLT pollen produced in the same month



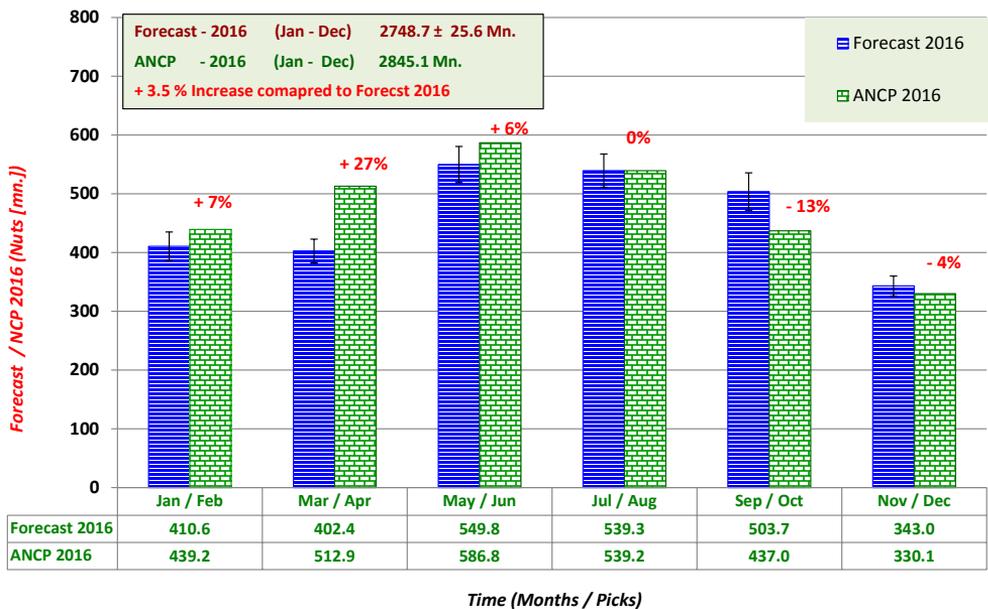
Successfully set nuts and aborted female flowers

conducted using more than 700 coconut plantations distributed in all coconut growing districts. The ANCP was 2845.1 Mn nuts in 2016 and this is a 6% reduction in yield compared to that of 2015 (3026.8 Mn nuts) which was one of the best yielded years in the recent past. Severe drought and heat stress prevailed from January to April and June to October period in 2016 significantly reduced the nut setting in 2016. The forecast for the year 2016 (2748.7 ± 25.6 Mn. Nuts) and the estimated actual ANCP (2845.1 Mn nuts) were matching very closely showing only 3.5% increase in yield compared to the forecast. This closeness between forecast and the estimated coconut production was observed in both annual as well as bimonthly (pick wise) records.

## Estimation of Annual National Coconut Production (ANCP) for 2016.

### Plant Physiology Division

The estimation of Annual National Coconut Production (ANCP) for the year 2016 was



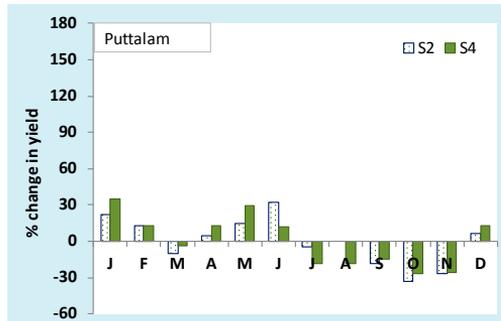
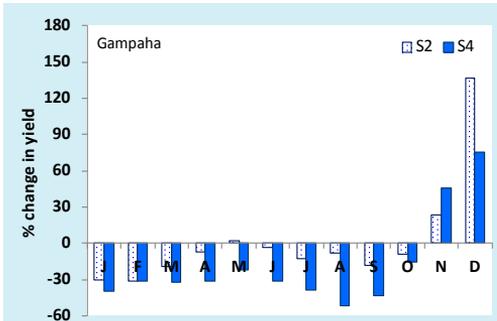
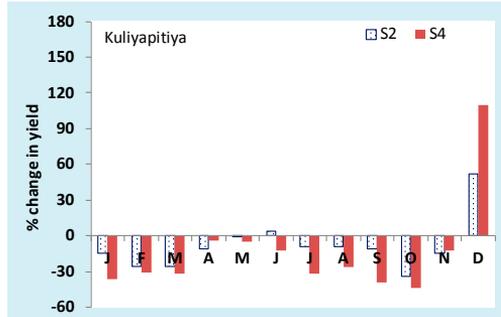
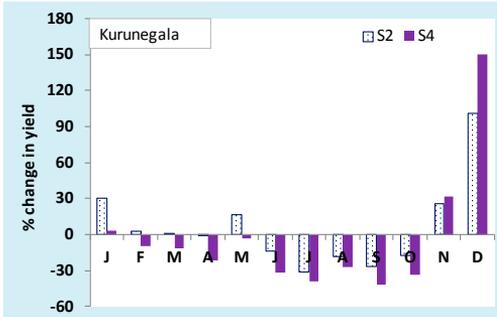
Comparison of forecast and the annual national coconut production (ANCP) on bi-monthly basis for 2016

**Yield forecast for major coconut growing districts for 2017.**

*Plant Physiology Division*

The expected change in monthly yield in 2017 compared to 2016 was forecast for the main coconut growing areas; Kurunegala, Kuliyapitiya, Gampaha and Puttalam districts.

Kuliyapitiya, Gampaha and Puttalam CCB Regions based on the fruit set data and the rate of survival of set fruits. There would be significant reductions in yield in all regions in 2017 and the reductions will be more prominent in S4 soils of Kurunegala, Kuliyapitiya, and Gampaha regions.



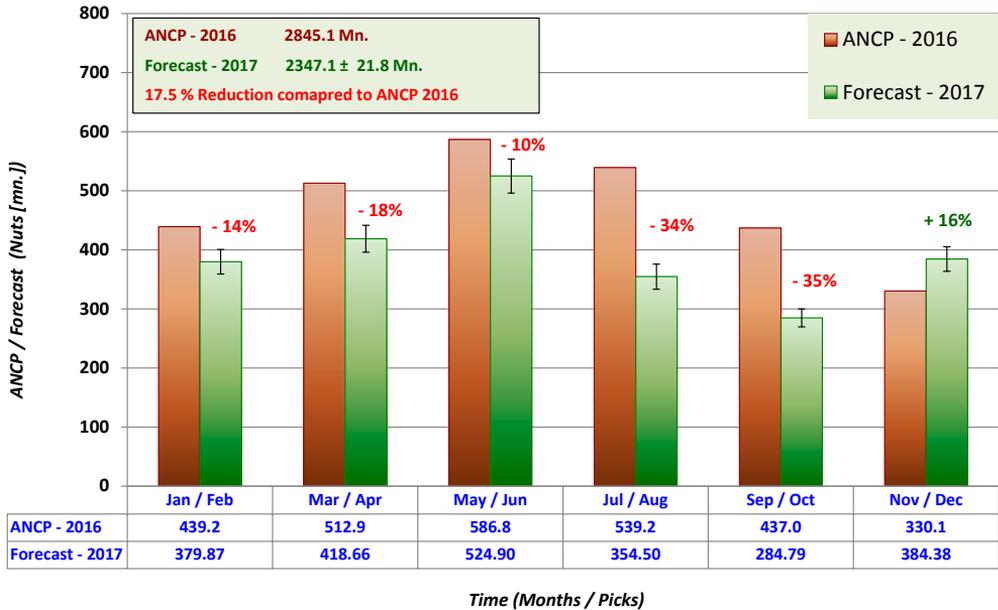
Monthly changes expected in coconut yield for the period from January to December, 2017 compared to 2016 in Kurunegala and Kuliyapitiya CCB Regions (Kurunegala District), Gampaha and Puttalam districts (S2-suitable soils, S4-Marginal soils)

## National Yield forecast for 2017.

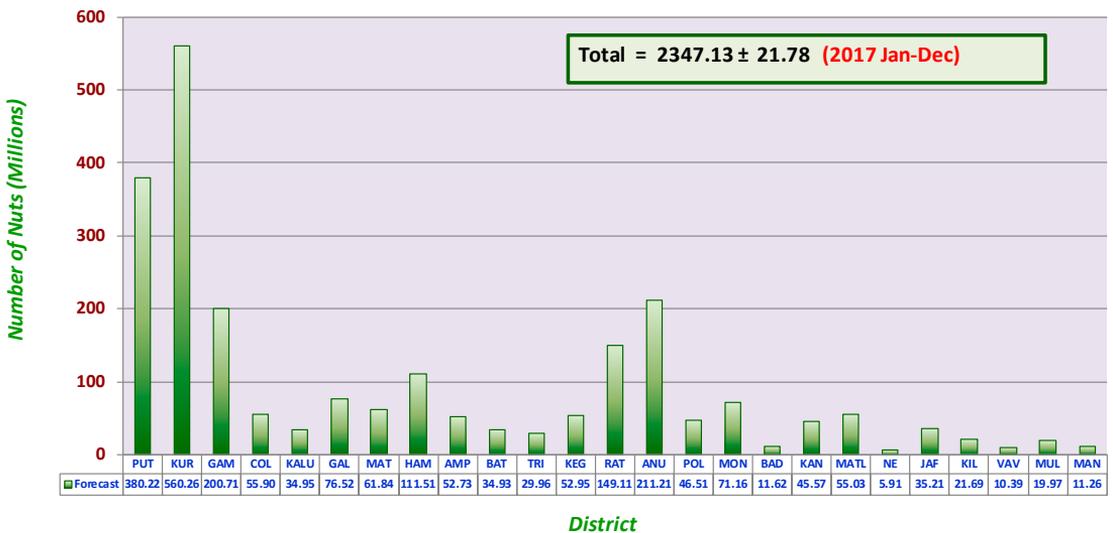
reduction compared to the Annual National Production in 2016.

### Plant Physiology Division

The National yield for 2017 was forecast as 2347 ± 22 Mn nuts and it is about 18%



### Pick wise comparison of coconut forecast for 2017 with production in 2016



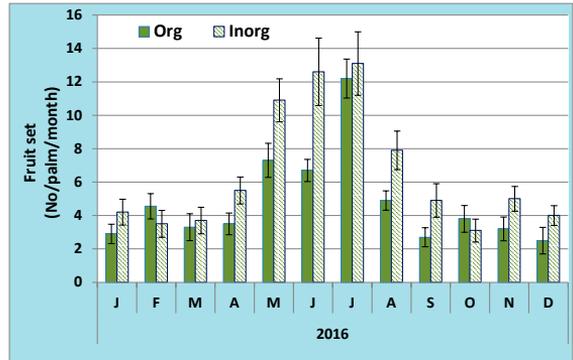
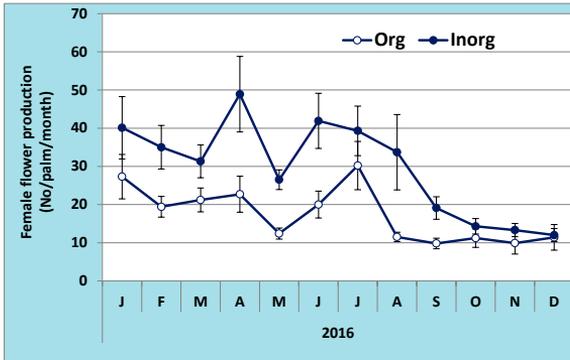
### District wise break down of coconut yield forecast for 2017

**Reproductive physiology of organically- and inorganically-grown coconut palms.**

*Plant Physiology Division*

Female flower production and fruit set of organically- and inorganically-grown adult

coconut palms in the intermediate zone was compared. Generally, the female flower production and fruit set were higher in inorganically-grown plantations compared to that of organic plantations during 6 out of 12 months in 2016.



Female flower production (left) and fruit set (right) of organically-and inorganically-grown coconut palms



# CROP PROTECTION

## Improvement of Weligama coconut leaf wilt disease (WCLWD) phytoplasma detection.

### Crop Protection Division

Research and management of the WCLWD received the highest priority of the Division. Experiments were continued to improve the detection of WCLWD phytoplasma by RT PCR and nested PCR and the storage period of diseased samples. DNA was extracted from 520 samples and part of it was used for testing with P1/P7 and Pc 399/P1694 primer pairs and remaining part stored to test the shelf life of phytoplasma under storage conditions. PCR results showed faint bands in 183 (35%) samples.

## Spreading pattern of WCLWD.

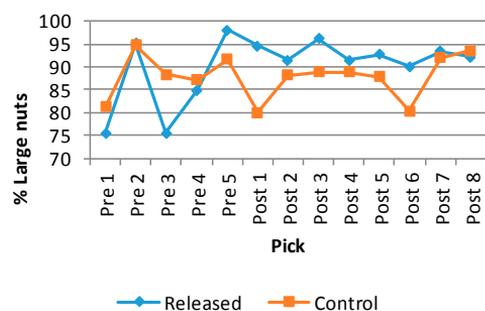
### Crop Protection Division

Spreading pattern of the WCLWD was investigated in three sites of 1 ha in mild, moderate and severely disease affected areas in the Southern Province. Recording of visual symptoms and mapping of palms (diseased and healthy) were done at 6 monthly intervals. The results revealed that the WCLWD is a slow spreading disease and it has no specific spreading pattern in the field. However, erratic spreading pattern of the diseased palms in the field suggests that the disease is vector-borne.

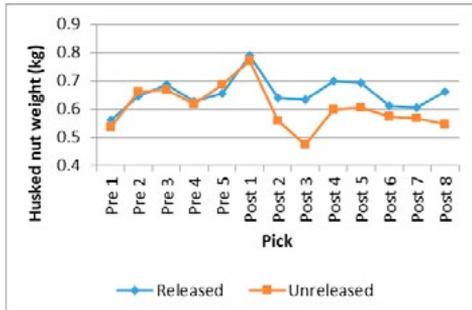
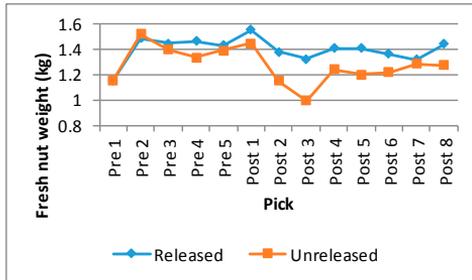
## Integrated management of coconut mite.

### Crop Protection Division

Multiple releases of the predatory mite, *Neoseiulus baraki* at 3-4 month interval on to coconut palms (Tall) in a block in Genetic Resource Center, Ambakelle were continued in 2016. Data collected on total nuts, infested nuts, large-sized nuts, small-sized nuts, fresh nut weight, husked nut weight and kernel thickness of the harvest at 45 day intervals revealed that the multiple releases of *N. baraki* increase the percentage of large-sized nuts, fresh nut weight and husked nut weight while decreasing the small-sized nuts in the harvest.

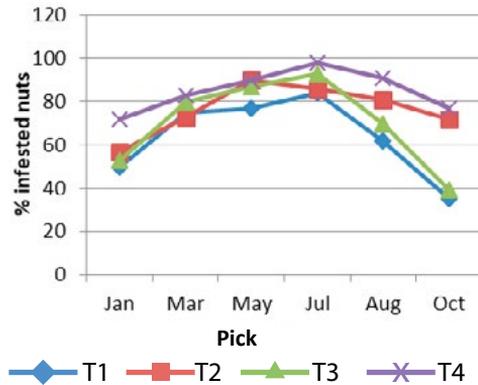


Effect of releasing *N. baraki* on percentage of large-sized nuts  
Pre : pre release / Post: post release



Fresh nut weight (Top) and husked nut weight (Bottom) (Pre 1-5: Picks prior to release of *N. baraki*, Post 1-8: Picks after release of *N. baraki*)

The study conducted to evaluate the integration of spraying palm oil + Sulphur mixture and the release of the predatory mite, *N. baraki* to manage the coconut mite was continued in Puliyankulama Estate in the Puttalam district. During the year, irrespective of the treatment, lower percentage of infested nuts was recorded in treated palms compared to the untreated palms. Percentages of large-sized nuts were higher and percentages of small-sized nuts were lower in treated palms compared to the untreated palms.



Effect of treatments on the percentage of infested nuts in the harvest (T1-Spraying of palm oil + Sulphur mixture, T2-Release of *N. baraki*, T3-Integration of T1 and T2, T4-Untreated control)

### Biological control of *Plesispa Beetle*, *Plesispa reichei*.

#### Crop Protection Division

The rate of parasitism of the new culture of *Tetrastichus brontispae*, the exotic parasitoid of the *Plesispa* beetle varied between 60-70% at laboratory level and the sex ratio (female: male) was about 70:30. Approximately 75,000~80,000 parasitoids were released at monthly intervals on to *Plesispa* infested seedlings in the field and the level of damage on seedlings was greatly reduced in the *T. brontispae* released block, compared to the unreleased block.

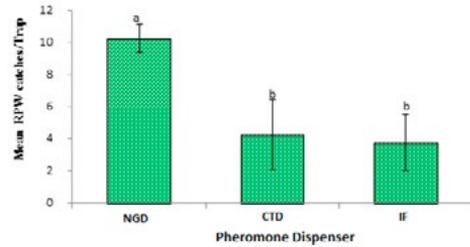
### Improving the effectiveness of Red Weevil pheromone.

#### Crop Protection Division

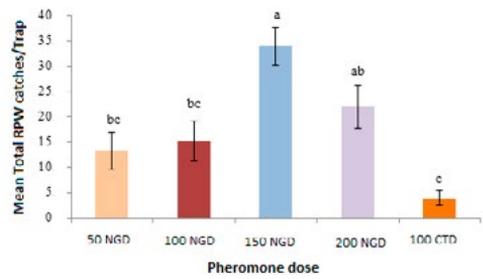
Suitable dispenser is a key component of pheromone mass trapping programme for management of Red Palm Weevil (RPW) (*Rhynchophorus ferrugineus* Olivier). Nano encapsulated new gel dispenser was synthesized and evaluated in the field. The

results revealed that the traps with new gel dispenser could catch significantly higher numbers of RPW ( $10.25 \pm 0.85$ ) than the traps with capillary tube dispenser (current recommendation in Sri Lanka) and Indian RPW pheromone formulation which commercially available in India ( $4.25 \pm 2.17$  and  $3.75 \pm 1.75$ ) respectively.

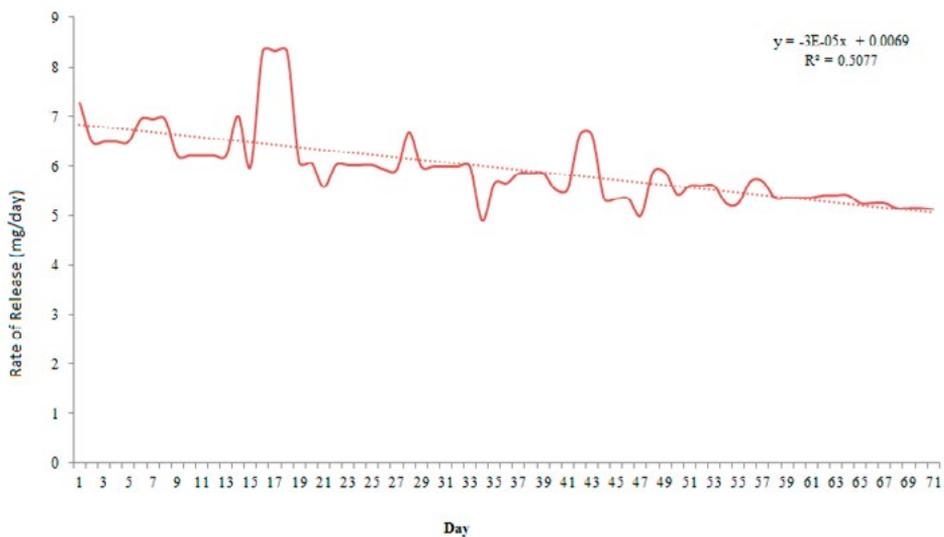
The trap catch was more than doubled by using the new gel dispenser and it remained low in the capillary tube dispenser which is currently used and the Indian formulation. Dose response evaluation revealed that 150  $\mu$ l was the best dose resulting in significantly higher number of trap catches than the other doses of gel dispenser. The rate of release of gel and capillary tube dispensers under different temperature levels (*i.e.* 28, 30, 32 and 35 °C) and under field condition indicated that, more constant rate of release could be obtained with gel dispenser at each temperature level than the capillary tube dispenser. In conclusion, the gel type dispenser with the dose of 150  $\mu$ l can be recommended for trapping RPW replacing existing glass capillary tube.



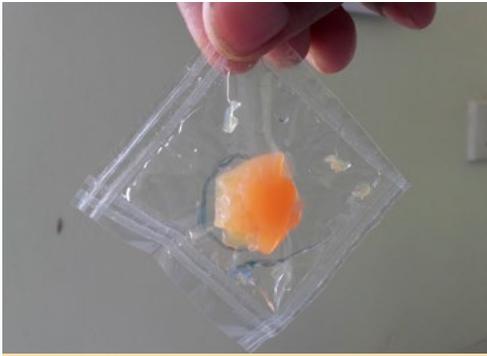
Red Palm weevil (RPW) catches on different dispensers; NGD = New gel dispenser, CTD = Capillary tube dispenser, IF = Indian formulation



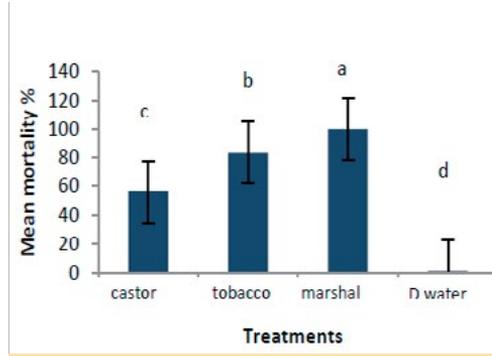
Red palm weevil catches under different doses of gel dispenser; 50  $\mu$ l, 100  $\mu$ l, 150  $\mu$ l, 200  $\mu$ l compared to capillary tube dispenser (CTD 100  $\mu$ l)



Rate of release of pheromone in gel dispenser under field condition



New pheromone gel dispenser

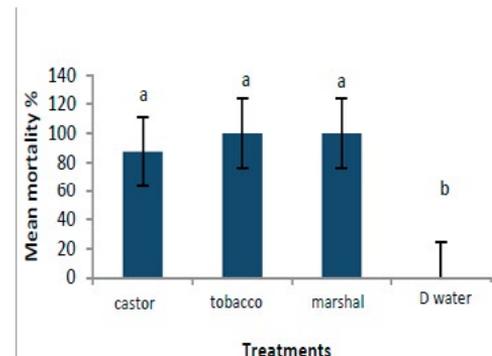


Mean mortality (%) of *P. reichei* larvae

**Population dynamics of Plesispa Beetle.**

**Crop Protection Division**

The study on population dynamics of Plesispa beetle was commenced in Pallama Genetic Resource Centre in Pallama, Gertland estate in Wellpalle, Bopitiya estates in Giriulla. The population density of Plesispa beetle was low during dry weather condition in all experimental sites.



Mean mortality (%) of *P. reichei* adults

**Effect of selected botanical extracts for the control of Plesispa reichei.**

**Crop Protection Division**

Bioassay of two botanical extracts, tobacco (*Nicotiana tabacum* L) and castor (*Ricinus communis* L) was conducted against *P. reichei* in the laboratory. Marshal 20 EC solution (4 ml/l water) and distilled water were used as positive and negative controls respectively. Aqueous extract of tobacco recorded a higher mortality of larvae (83.80%) and adults (100%) while that of castor was 56.46% and 87.50% for larvae and adults respectively, 72 hours after the application.

**Effect of CERO-BIT to repel Black Beetle.**

**Crop Protection Division**

CERO-BIT is an asphalt product with a strong odour, which is expected to repel the black beetle in field. The efficacy of CERO-BIT was evaluated in a black beetle infested field in the Horakelle estate, Kudawewa and the application of CERO-BIT on the base of the leaf axils of young coconut palms at monthly intervals reduced the beetle damage by 75% after 12 months.

## **Effect of application of Trichoderma spore suspension on growth of coconut seedlings**

### *Crop Protection Division*

An experiment was initiated to test the effect of application of spore suspension ( $10^5$  spores/ml) on the growth parameters and reduction of nematode population in

soils of coconut seedling nurseries. Initially plant parasitic nematode populations in the coconut seedling nurseries were assessed and very low borrowing nematode populations were found in many locations. More than 30 nematodes were found in 20 g of soil in Baddegama and Mattamagoda nurseries.





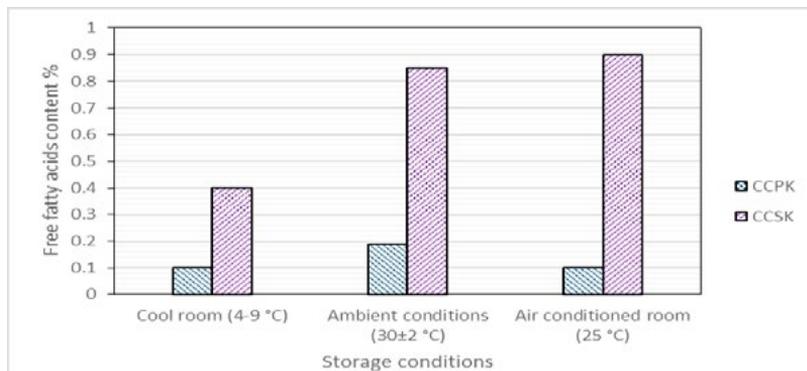
# COCONUT PROCESSING & PRODUCT DEVELOPMENT

## Improvements to storage time of copra.

### *Coconut Processing Research Division*

Coconut oil was expelled from copra produced using two types of kilns, coconut shell operated or charcoal powder operated, and stored at different storage conditions; viz cool room (4-9°C), ambient temperature (30 ± 2°C) and air conditioned room (25°C), in sealed polythene bags for nine weeks and the quality of oil was tested.

Good quality oil (with respect to free fatty acids and moisture) can be obtained after 9 weeks of storage, when copra was produced in a coconut shell charcoal powder operated kiln, stored in sealed conditions at all three temperature regimes. However, if the copra was produced using coconut shell operated kiln, that copra should be stored at 4 – 9 °C in sealed conditions to obtain good quality oil after 9 weeks of storage.



Free fatty acid content of Coconut oil expelled from copra produced in kilns operated with charcoal powder (CCPK) Coconut shell (CCSK) after 9 weeks of storage at three different temperature regimes.

## Improvement of extra VCO production.

### *Coconut Processing Research Division*

Extra virgin coconut oil (EVCO) was produced by modified kitchen method

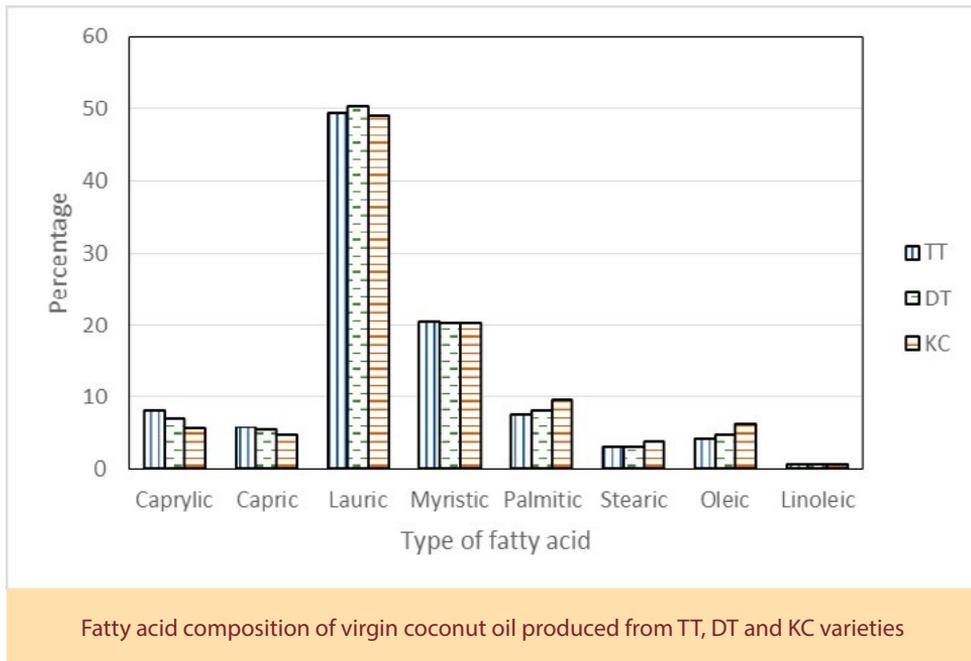
(MKM) which is the improved process of traditional kitchen method (TKM) of making coconut oil. The steps were optimized to obtain higher yield of oil with higher quality compared to oil obtained from TKM. Three crucial steps in coconut oil preparation:

coconut milk extraction, settling and cream separation of coconut milk and heat application to separate VCO were modified. The best method of milk extraction was adding water at 60°C into scraped coconut in 2:1 ratio. The best settling and cream separation treatment was the settling of milk for 3 hours at ambient condition, keeping in a refrigerator for overnight, and separating the upper cream layer. The best temperature application for VCO preparation was heating coconut milk/cream sample at 80°C for 10 min until oil separation is just observed, and then lowering the temperature to 60°C followed by maintaining this temperature until the oil separation is completed.

**Effects of varietal differences, maturity level and extraction method on the quality of virgin and white coconut oil.**

*Coconut Processing Research Division*

The quality parameters of virgin coconut oil (VCO) obtained from three different coconut varieties; CRIC 60 (TT), CRIC 65 (DT) and King Coconut (KC) were evaluated. VCO produced from KC has significantly higher palmitic, stearic and oleic acid compared to the VCO obtained from TT and DT. The lauric, caprylic and capric acid contents were lower in VCO prepared from KC compared to TT and DT.



## **Improvements to preservation technique of DC effluent coconut water.**

### ***Coconut Processing Research Division***

Mature coconut water, pre-processed according to the recommended procedure, was subjected to addition of different fruit flavours followed by carbonation. Batch pasteurization of coconut water at 90°C for 20 minutes was sufficient to achieve commercial sterility of the product. Addition of 3 % fruit juice (orange, black current and mango) and 97 % coconut water followed by 2.5 g/L carbon dioxide resulted a product with good overall acceptability with six month shelf life at refrigerated conditions.

## **Nutritional studies of coconut sap based sugar.**

### ***Coconut Processing Research Division***

Quality of coconut inflorescence sap collected using the device developed at Coconut Processing Research Division and the jaggery prepared from that sap were analysed.

In the fresh sap, total sugars was in the range of 15-17% of which 10.7% was sucrose, 3% was glucose and 2.1% was fructose, Na, K, Ca and Mg contents were 2.64 mg, 3.51 mg, 0.05 mg and 0.07 mg, respectively, per 100 ml of sap, antioxidant activity was 8.12 ppm and the ascorbic acid (vitamin C) content was 0.02 - 0.03%. In jaggery, ash content was higher than that of table sugar and glucose, Sucrose was the prominent sugar type and it accounts for 96.31% of total sugars, *in vitro* glycemic index was lower (38) compared to table sugar (50) and can be considered as low GI sweetener.

## **Adulteration of coconut oil in the market.**

### ***Coconut Processing Research Division***

Quality of coconut oil available at retail and wholesale shops in Kurunegala, Colombo and Puttalam districts was analyzed. The iodine value (IV) of the samples varied from 6 - 49 and 40% of the samples collected from wholesale shops and 60% of samples collected from retail shops exceeded SLS recommended level of IV indicating that they were adulterated.

Thirty six percent (36%) of samples collected from retail shops and 20% of samples from wholesale shops exceeded the SLS limits for Free Fatty Acid of 0.8% as lauric acid. Formation of peroxide was observed in 60% of samples collected from wholesale and 78% of samples collected from retail shops. High moisture content was observed in 30% of samples from wholesale and 33% from retail shops. The quality parameters of most of the coconut oil samples collected from the retail and wholesale shops in Kurunegala, Colombo and Puttalam districts were not conformed to the SLS standards. The information can be used by the Consumer Protection Authority to take necessary actions to protect consumers from purchasing adulterated coconut oil.

## **Chemical and physical changes of coconut oil by repeated frying.**

### ***Coconut Processing Research Division***

A study was conducted to find out changes occur during repeated frying of traditional coconut oil and virgin coconut oil. Traditional coconut oil and virgin coconut oil were subjected to deep frying of potato chips, dhal wade and salaya fish (*Goldstrip*

*sadinella*) for 6 times during a week and the quality of oil and food material were tested. Moisture contents, stable relative density and refractive indices, were lower and colour intensity and free fatty acids (FFA) were higher in repeatedly used oils (both in traditional and virgin coconut oil) compared to those of fresh virgin and traditional coconut oil (not used for frying). The values were in acceptable limits of the Sri Lanka Standard values of edible coconut oil. However, peroxide value of the oils reached 35 meq/kg which is not acceptable for edible use.

FFA content was higher in Salaya fish and dhal wade after deep frying using repeatedly used oil. Peroxide value of dhal wade and potato chips was always lower than 2 meq/kg while it was greater than 2 meq/kg for Salaya fish except for oil used once. Therefore, repeated use of coconut oil is not suitable for deep frying of fish but it can be used for frying dhal and potatoes even for 5-6 times.



Frying of potato chips

## Testing virgin coconut oil in the treatment of Alzheimer's Dementia.

### *Coconut Processing Research Division*

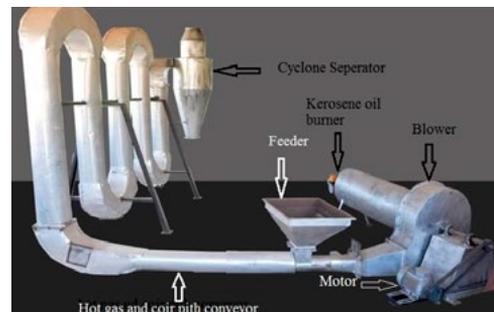
Patient recruitment was carried out at Lanka Alzheimer's Foundation, Colombo

and 29 participants were recruited and given consent for the study to date. The data collection (cognitive function tests, basic information, dietary information and anthropometric measures), biochemical assessments and CT scans of brain at Hemas Hospital, Wattala and genetics tests (at the Genetech Institute, Colombo) of the participants were continued.

## Performance evaluation of a flash dryer to dry coir pith.

### *Coconut Processing Research Division*

The flash dryer fabricated for drying wet coir pith was evaluated. Coir pith collected at the cyclone separator was recycled until the moisture content reached to 18% - 23% (w/w, dry basis). Scanning Electron Microscopic (SEM) analysis and microbial analysis of flash dried coir pith and the energy analysis in terms of specific moisture extraction rate (SMER) for the pilot scale flash dryer were examined. The effect of temperature on reduction of microbial count in flash dried coir pith was examined at the end of each cycle for the temperatures of 120, 140 and 160 °C.



Flash dryer with its components

Microstructural analysis of coir pith showed structural similarity between flash dried coir pith at drying temperatures < 140 °C and sundried coir pith. Although some

of the cells were ruptured at the drying temperature of 140 °C, the majority of cells were unaffected. Coir pith dried below or at 140 °C temperature resulted good quality coir pith. An increasing trend of SMER could be observed with increasing flash drying temperature. Flash drying technique effectively reduced the microbial count of coir pith with increasing temperature.

### **Development of a technology for coconut coir retting using consortium of micro organisms.**

#### *Coconut Processing Research Division*

The ret liquor samples collected from four different coir mills in Nattandiya and Marawila areas were cultured using four different microbial growth medium

(Nutrient Agar, Rose Bengal Agar, Tryptic Soy Agar and Yeast Extract Pectate Agar) to find out the efficiency of microbial growth. Nutrient Agar was found to be the most efficient growth medium among them.



Spectrum of microbes present in ret liquor





# SOCIO- ECONOMICS

## **Overall sector performance of kernel, fiber, and other products**

### *Agricultural Economics & Agribusiness Management Division*

Sri Lankan coconut industry, owing to its dynamic nature and the emerging both domestic and international market, is subjected to different policy changes more frequently in recent years than in the past. Time to time Ministry of Plantation Industries in consultation with respective Institutes adopted policy changes with the intention of improving the performance of the industry in order to gain a comparative advantage in the international market as well as to fulfill the domestic demand. Coconut industry being multi-industrial in nature, these policy adjustments would have different implications on different sub-sectors.

CRI observed a declining trend of farm gate nut prices in the country during the first half of 2016. This was mainly due to an increase of nut production, less utilization of nuts for coconut oil production, and restriction of fresh nut exports. Coconut oil production was reduced as coconut oil producers were not able to compete with low quality imported edible oils of low price. This situation affected seriously to the coconut growers as well as coconut oil producers. CRI reported this situation to the Ministry of Plantation Industries

and submitted proposals to mitigate this situation. Honorable Minister of Plantation Industries intervened to find a solution and implemented the following strategies to correct the situation.

A Committee was appointed comprising of representatives from CRI, CDA, CCB and the Ministry to continuously monitor the situation and propose necessary recommendations to properly function the coconut industry. Following policy recommendations were implemented by the Ministry and the Government.

As per the recommendations tariff levels for crude palm oil and palm kernel oils were revised on 13 May 2016. This revision applied for crude or refined soya bean oil, palm oil, sunflower oil, ground nut oil, coconut oil, palm kernel oil, margarine, and others. With this revision, crude palm oil tariff increased from Rs.110.00/kg to Rs. 130.00/kg and for refined palm oil from Rs. 130/kg to Rs. 150.00

Tariff levels for crude palm oil and palm kernel oils were further revised on 17<sup>th</sup> June 2016. This revision applied for crude or refined soya bean oil, palm oil, sunflower oil, ground nut oil, coconut oil, palm kernel oil, margarine and others. With this revision, crude palm oil tariff increased to Rs. 150.00/kg and for refined palm oil to Rs. 170.00/kg. As a result, edible oil imports were

reduced and coconut oil production tends to increase.

Further, CRI recommended CDA to reduce the registration fee for small scale fresh nut exporters (export less than 30,000 nuts per month) to Rs. 50,000.00, starting from 25<sup>th</sup> April, 2016 and to remove the handling fee of Rs. 5.00 paid to CDA by all exporters. This decision stimulated fresh nut exports and absorbed the excess nuts in the market.

### **Implications of edible oil imports to the local coconut industry.**

#### *Agricultural Economics & Agribusiness Management Division*

According to the consumer survey of Department of Census and Statistics, per-capita edible oil consumption is around 4.31 kg per year and the total national requirement for consumption is 90,440 MT. The half of this demand is fulfilled by the locally produced coconut oil and the balance is supplemented with the imported edible oils. According the consumer survey data, people satisfy their 94 % edible oil requirement through coconut oil and the balance 6% as other edible oils. The total oil demand for other industries is around 80,000 - 90,000 MT. According to the recorded quantities of edible oil imports, the year 2015 has marked large quantity of imports (184,102 MT) which was equal to the oil demand in the country while in 2016 it came down to the level of 108,192 MT. This was mainly due to adoption of correct policy decisions to manage the industry. This un-controlled imports inhibited the coconut oil production, as well as country has spent Rs. 12,160 million Rs. to import edible oils which was 26% of the total foreign exchange earnings from coconut

kernel products in the year 2016. Also, it is important to note that the locally produced palm oil also added to the local market which does not take into account for policy making process.

Un-controlled edible oil imports has created serious damages to the local coconut industry while discouraging local coconut growers in adopting management practices.

Therefore, even though palm oil has categorized under Special Commodity Levy, CRI recommended continuing higher tariff levels to minimize the damage to the coconut industry due to un-controlled imports of edible oil.

### **Knowledge of growers on pest and disease control in coconut cultivation: A case study in kurunegala district.**

#### *Agricultural Economics & Agribusiness Management Division*

The main objective of this study was to investigate coconut growers' knowledge on pest and diseases in Kurunagala district.

The growers were lack of knowledge on major pest and diseases and their adoption level for controlling major pests was low. Average knowledge indices which refer the total knowledge available and level of practiced on major pests and diseases were 42.3% and 37.5% respectively. Adoption index refer the total recommended and level of adopted on major pests was 22.3%. The damage severity for Black Beetle, Red Weevil and Plesispa was between 10-25% and for Coconut Leaf Miner, Caterpillar and Scale between 1-5%. It was revealed that communication methods and extension services should be strengthened

to disseminate knowledge on pest and diseases control.

## **Value Chain Analysis of Organic Coconut Industry in Sri Lanka.**

### *Agricultural Economics & Agribusiness Management Division*

Organic coconut cultivation is an emerging sector. Available knowledge and the specific constraints of this sector are not well identified and it will adversely affect further expansion of the industry. In addition, the value chain of organic coconut farming has not been clearly defined. Since the potential of organic coconut products in the international trade depends on the value chain, a comprehensive analysis of the value chain of organic coconut is very important for the growth of Sri Lankan organic coconut sector and for the future policy interventions. The main objective of this study is to identify the main stages in the value chain of organic coconut farming and the constraints that limit its full functioning, more specifically to describe the organizational and structural features of organic farming value chain and their impacts on the overall performance of the system and examine the behavior and operating procedure of the actors in the each stage of the value chain. Once the data collection is completed, qualitative and quantitative analysis will be used for mapping actors, their functions, and relationships and identifying constraints and opportunities in the value chain. Findings of the analysis will contribute to fill the gap of knowledge availability of the existing organic coconut industry, formulate national policy and development plans provide necessary guidance for other stakeholders in articulating strategies

and effective programs for the Sri Lankan organic coconut industry.

## **Cost of production of coconut (COP).**

### *Agricultural Economics & Agribusiness Management Division*

Cost of production of coconut was estimated using data collected during the year based on the different agro-climatic zones, land sizes, land suitability classes and levels of management.

The main cost components identified under management were, cost for fertilizer application, labour for weeding, agrochemicals, and harvesting. As a result of the removal of fertilizer subsidy, cost of fertilizer has become a burden to coconut growers. Further, prevailing drought condition has affected the coconut yield of individual estates resulting an increase of the cost of production. In general, the average COP of coconuts in the coconut triangle was Rs. 20.58 per nut. Cost of production of a nut in land suitability classes  $S_1$ ,  $S_2$ ,  $S_3$  &  $S_4$  was Rs. 14.00, 19.00, and 20.28, respectively.

## **Study of Economic Feasibility and Cost of Production of Oil Palm.**

### *Agricultural Economics & Agribusiness Management Division*

Ministry of Plantation Industries further strengthened to expand the area of oil palm cultivation to 20,000 ha. By now around 8,857 ha of oil palm extent has been established mainly by Regional Plantation Companies, at medium and large scale. The government has taken a decision to expedite the expansion program and Regional Plantation Companies have

identified the potential lands for oil palm cultivation.

The density of palms per hectare is around 140, palms start flowering after two years and from year 3 onwards the palms generate yields. Average bunch weight is around 10-45 kg and by year 6, trees produce 10-45 kg of bunches. When considering the crude palm oil, the revenue yield is around 15-20MT per hectare, out of the 20 MT, 27%

(5700 kg/ha) of crude palm oil and 2% palm kernel oil (400 kg/ha) was generated.

Cost of production of one kg of palm oil was recorded as Rs. 166.00, while cost of production of one kg of fresh fruit bunch was Rs. 12.55. The study was completed.



# DEVELOPMENTAL RESEARCH

## **Production of coconut hybrid seeds through controlled pollination for the home gardens of Northern Province.**

### *Genetics & Plant Breeding Division*

The importance of developing coconut in Northern Province (NP) has been well recognized given the situation that coconut in NP has been neglected for more than 25 years due to war. NP has a good potential for coconut both as plantations and home gardens. Hybrids are the best coconut cultivar for home gardens. The home gardens are more important in making Sri Lanka self-sufficient in coconut, because small land owners can be encouraged to plant coconut and manage them well for their own consumption. Therefore, at this reawakening era of the NP it was planned to implement a program for NP for planting hybrid coconuts in home gardens of NP.

It is essential however, to increase the coconut hybrid seed production capacity of CRI to meet the anticipated target of home gardens in NP. Hybrid coconut seeds are produced by the cross between dwarf and tall coconuts and hence hybrid seed production requires technical know how as these seeds cannot be produced in nature by farmers. Therefore a large scale hand (artificial) pollination was initiated at the Pallama Seed Garden to continue for a period of three years aiming at minimum of

100,000 hybrid seeds for the home gardens of NP. This will be sufficient to provide hybrid seedlings for minimum of 35,000 home gardens in NP at the rate of two seedlings per home garden.



Ceremonial initiation of the hand pollination programme at Palama Genetic Resource Centre

## **Improved coconut seed production and seedling certification.**

### *Genetics & Plant Breeding Division*

During the year a total of 1,098,610 and 96,861 CRIC60 and CRIC65 seed nuts were produced from the three seed gardens respectively. Further, 25,689 of CRISL98, 7630 of Kapruwana, 3781 of Kapsetha and 9242 of Kapsuwaya improved seeds were produced by the hand pollination programme. CRI assisted the Coconut Cultivation Board by selecting of 4022 Plus Palms for seed nut production. Under the seedling certification programme, 201,674 seedlings were certified by the staff of the Seed and Seedling Certification Unit.



Emasculating of a coconut inflorescence for the hand pollination

**Initiation of activities for the establishment of a mini seed garden at Weligama for the production of Weligama Coconut Leaf Wilt Disease tolerant hybrid seedlings.**

*Genetics & Plant Breeding Division*

An MOU was signed between the Coconut Research Institute and the Coconut Cultivation Board in December, 2016 to take over the Weligama CCB coconut nursery premises for the establishment of a mini coconut seed garden for the mass production of hybrid coconut seed nuts which are expected to be tolerant to Weligama Coconut Leaf wilt Disease. Suitable area for planting parent seedling was identified by a soil map and initial activities were undertaken for land clearance. It is expected to plant Green Dwarf seedlings at closer spacing to be used as female parents and several tall coconut genotypes at regular spacing as male parents. The method of artificial hand pollination will be practiced for the production of seed nuts. Approximately over 30,000 seed nuts of hybrid coconuts are expected upon the stability of seed production.

**Demonstrations of farming systems.**

*Agronomy Division*

**Bioenergy Production.**

Bio-energy generation in a model designed in one hectare of coconut lands comprised with 150 coconut palms, 2500 trees of gliricidia and externally supplied paddy straw fed to six buffaloes in Ratmalagara was studied. In this system gliricidia wood was used for gasification and buffalo dung was used for generation of bio-gas.



Bio-energy production unit at Ratmalagara Research Center

**Livestock integration.**

*Agronomy Division*

The demonstration of goat, sheep and buffalo farming systems under coconut was continued with the objective of increasing profitability of small holder farmers through livestock integration under coconut. Goat and sheep breeding and demonstrations

at Ratmalagara were also continued with success to popularize sheep and goat farming in coconut plantations. Both farming systems are very effective to control problematic weeds and improve soil fertility level in coconut



Goat and sheep farming demonstrations at Ratmalagara Research Center

**Pasture and fodder demonstrations.**

*Agronomy Division*

Two field pastures and fodder demonstrations containing fodder, pasture and cover crops were established in Ratmalagara and Bandirippuwa Research centres to upgrade the knowledge and awareness of local community, coconut growers, university, agriculture and school students on livestock management in coconut lands.



Pasture and fodder grass demonstrations at Ratmalagara Research Center

**Vermicompost production**

*Agronomy Division*



Vermicomposting demonstration at Ratmalagara Research Center

Vermicompost is the product or process of composting using various worm species. In this technology, the commonly available waste biomass in coconut plantations (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 need for paying attention to low cost environmental

friendly nutrient replenishment systems and soil improvement methods in present day coconut farming system. Under this project, one compost production unit was established to multiply worms. Worms were distributed among thirty two coconut growers and two farmers have started to produce vermi-compost at commercial level. These units were also used as demonstration for farmers, university, agriculture school and students.

**Intercropping demonstrations**

*Agronomy Division*



Intercropping demonstrations (Cocoa and Avocado) at Makadura Research Center

Three field demonstration blocks with intercropping including export agricultural, fruit, timber, fodder and tuber crops were maintained at Makandura, Rathmalagara and Bandirippuwa Research Centers to disseminate the knowledge and awareness to local community, coconut growers and university, agriculture and school students on inter cropping practice in coconut lands,.

Large number of students and farmers benefited through these demonstrations

**Dunkannawa Coir Research and Development Center**

*Coconut Processing Research Division*

The center for Coir Research and Development at Dunkannawa is being managed by the Coconut Processing Research Division. Research and development on coir and coir based products and improvements to machinery used in coir industry are the main functions of the center. Machinery in the continuous system of bristle fibre extraction process was renovated in 2016. The research program for coir development included Increasing efficiency and the quality of traditional Ceylon drum fabrication of a flash dryer system for drying coir pith in rainy season, acceleration of retting process by microbial and physical methods and development of coir composite boards for partitioning purpose. In addition to the research and development work, coir production was carried out at the centre. Coir ropes (Twin robes) were being manufactured in the center as a value added product. Daily coir production and twine making were done without interfering with research work.

**Production of coir products in the centre in 2016.**

Item	2016 (Kg)
Wet Bristle fibre	8,878
Dry mattress fibre	6,080
Coir pith	365,847
Dry mixed fibre	494
Twine	2041

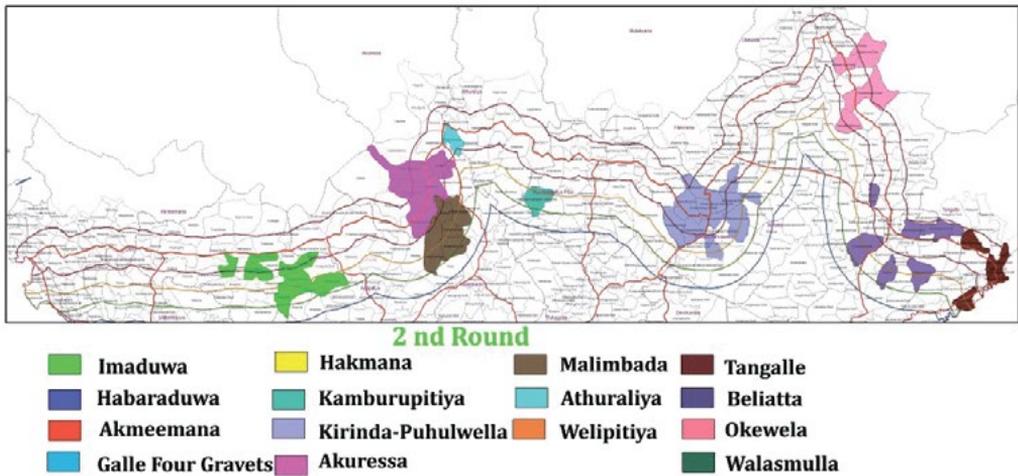
The twine ropes and coir pith are used in research stations (estates) of Coconut Research Institute

## Inspection of the WCLWD buffer zone

### Crop Protection Division

Crop Protection Division staff inspected 3 km wide and 86 km long disease free zone demarcated outside the WCLDW diseased area and marked 1,716 WCLWD affected palms in 12,713.65ac. A total of 1712

marked palms were removed during the year. Further, the divisional staff assisted the Coconut Cultivation Board in training their newly recruited field officers and Coconut Development Officers in identification of WCLWD affected palms.



Gramaniladhari divisions surveyed for WCLWD palms during 2016







## Product development and value addition

### *Coconut Processing Research Division*

Coconut Processing Research Division conducted several programs for transferring the technologies to Industrial Development Board at Kurunegala and Moratuwa, Kapruka Samithi of several districts and Vidhatha centers. Division participated in “Wewili sathiya gamata” organized by Ministry of Plantations and “Sri Lankan Food festival” organized by National food promotion board and Ministry of Agriculture.

## Technology Transfer on Coconut Processing

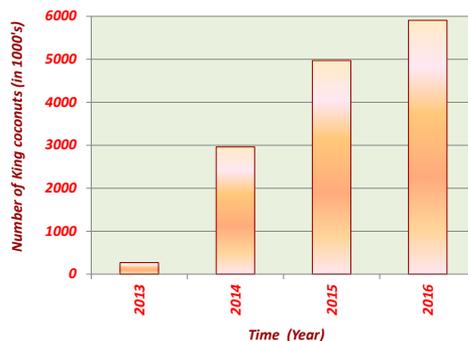
### *Coconut Processing Research Division*

Coconut Processing Research Division extended its services to stake holders by analyzing samples (204 VCO samples, 52 white coconut oil samples, 4 DC samples, 03 coconut flour and 05 poonac sample). The technologies for coconut water beverage production, coconut ice cream making and coconut oil production were obtained by stakeholders. Virgin coconut oil and coconut water were mostly sought technologies. One day training session was conducted for those interested in learning coconut products.

## Export of king coconut for beverage purposes

### *Plant Physiology Division*

The protocol for shelf-life improvement of tender king coconut for export purposes was demonstrated to 17 exporters and 2749 certificates were issued to export 5,917,894 tender king coconuts in 2016.



Exported volumes of king coconut during 2013 - 2016



King coconuts packed for export

## Certificate Course on Coconut Cultivation and Value Addition

### *Technology Transfer Division*

The training programme series on “Certificate Course for Coconut Cultivation and Value Addition” was conducted by the institute to upgrade the technical knowledge of coconut growers and the stakeholders. The programme schedule was advertised in newspapers requesting interested coconut growers to register for the programme in advance. The course includes eight one-day programmes on specific subject areas on coconut cultivation, management of estates and value addition. These programmes were conducted in CRI substations located in different areas. Technical presentations and

field demonstrations relevant to the specific subject were the major components of each programme. The course conducts

from April to November. The details of eight programmes conducted during the year were as follows.

Date	Venue	Topic	Participants
29 April	ISG, Ambakele	Replanting of coconut	269
27 May	Ratmalagara	Soil and moisture conservation	301
24 June	Head Office, CRI	Fertilizer recommendations	223
29 July	Makandura	Intercropping/ animal keeping	200
26 August	Head Office, CRI	Pest and diseases of coconut	161
30 September	Ratmalagara	Rehabilitation of palms	133
28 October	Head Office, CRI	Labor law and estate management	196
25 November	Head Office, CRI	New coconut based products and value addition	184



Conducting field demonstrations to coconut growers

**Training of Trainer (ToT) Programmes**  
*Technology Transfer Division*

During the year, division conducted 21 Training of Trainer programmes to the grass

root level trainers and extension personnel from different organizations such as members of farmer organizations, members of Vidatha centers, NGOs, Development officers, Field staff of estates etc.



Conducting ToT programmes

## Research Extension Dialogues

### Technology Transfer Division

Three research extension dialogues were conducted during the year for the CDOs of Galle, Matara, Hambantota, Kalutara, Ratnapura, Kegalle, Matale on 26<sup>th</sup> February 2016, Marawila, Kurunegala, Gampaha, Kuliypitiya on 5<sup>th</sup> August 2016 and Anuradhapura, Polonnaruwa, Jaffna, Trincomalee, Monaragala, Batticaloa, Ampara on 18<sup>th</sup> November 2016. The objective of this programme was to update the technical knowledge of CCB extension staff and familiarize with on-going research and development activities conducted by research divisions of CRI.



Conducting research extension dialogues to CDOs

## Training Programmes on Value Added Coconut Products

### Technology Transfer Division

Five training programmes were conducted

for rural entrepreneurs jointly with the Vidhtha Centers.

Date	Venue	Participants
16 <sup>th</sup> June	Kuliypitiya	37
27 <sup>th</sup> July	Polgahawela	53
18 <sup>th</sup> Aug.	Ibbagamuwa	36
29 <sup>th</sup> Nov.	Negombo	40
2 <sup>nd</sup> Dec.	Pannala	45



Conducting training programme to rural entrepreneurs

## School educational programmes

### Technology Transfer Division

Division conducted special educational programmes for school children and teachers. During the year, 26 schools including 3130 students were attended. Further, the division provided necessary information and guidance for 29 students who visited the institute in order to get the assistance for their GCE O/L and A/L student projects on coconut related fields.

Moreover, 8 teacher training programmes were conducted for Gampaha, Chilaw, Nikaweratiya, Kuliypitiya and Sri Jayawardhanapura educational zones.



Programme for school children

**Provide advisory services to growers**

*Technology Transfer Division*

The division received a large number of requests from coconut growers requesting to inspect their plantations and provide necessary advice for their field problems. Most of these requests are referred to CCB regional staff for necessary assistance. During the year, fifteen field inspections were made on special requests and reports were submitted with necessary recommendations. There are totally 650 growers visited the institute, contacted us through our hotline and inquired through mails. They were provided with the necessary advisory assistance by the staff of the division.



Solving grower problems

**Maintain CRI Web Site**

*Technology Transfer Division*

The CRI web site is maintained under the supervision of Technology Transfer Division and is mainly aimed at dissemination of information to the policy makers, stakeholders and coconut growers with a view to promote the industry. This website contains the latest information on coconut technologies, current research activities, staff, news and vacancies etc. During 2016, TTD has uploaded 290 updates to make the website up to date.



Home page of the CRI website

# CONTRIBUTION TO NATIONAL DEVELOPMENT THROUGH SERVICES TO STAKEHOLDERS





## Production of red weevil aggregation pheromone.

### *Crop Protection Division*

The division synthesized and produced 23,797 red weevil pheromone vials, which is 182% increase over the production in 2015. Coconut Cultivation Board used 81% of these pheromone vials in their special projects to trap red weevils in area wide red weevil management programmes.



Synthesis of red weevil aggregation pheromone in CPD laboratory

## Production of predatory mites for the control of coconut mite.

### *Crop Protection Division*

Mass production and issue of the predatory mite (*Neoseiulus baraki*) of the coconut mite were continued from the laboratories at Bandirippuwa and, Makandura Research Stations and the Genetic Resource Centre, Ambakelle. In 2016, a total of 21,193 sachets containing predatory mites were issued to the growers was an 8.6% increase compared to the releases in 2015. The Crop Protection Division also provided technical guidance to the predator mite laboratories maintained by the Coconut Cultivation Board, Chilaw Plantation Ltd. and Kurunegala Plantation Ltd. During the year, 2 visits were made to the laboratories managed by them and 3 sets of mother cultures were issued.



Predatory mite breeding in Crop Protection Division laboratory.

## Production and issue of parasitoids for the management of coconut caterpillar.

### *Crop Protection Division*

Mass production of parasitoids for the management of Coconut caterpillar continued in the insectary of the Crop Protection Division. A total of 1,269,600 parasitoids were released during 2016 to manage the coconut caterpillar out breaks which occurred due to the unfavourable weather conditions prevailed during the year.



Parasitoid breeding in the insectary of Crop Protection Division

### **Sale of electronic detectors for detection of red weevil infestations.**

#### *Crop Protection Division*

The division sold 15 Red Weevil Detectors to coconut growers who have young coconut plantations. The detector assists the coconut growers for early detection of the red weevil infestations, which, is of paramount importance for the management of the pest.

### **Importation of black beetle aggregation pheromone for black beetle control.**

#### *Crop Protection Division*

One thousand black beetle aggregation pheromone sachets were handed over to Coconut Cultivation Board to manage black beetle damage in susceptible young plantations.

### **Coordination of importation of Monocrotophos 60% SL.**

#### *Crop Protection Division*

Crop Protection Division facilitated the importation of 2,000 l of Monocrotophos 60% SL for red weevil control and the consignment was handed over to the Coconut Cultivation Board for distribution among the coconut growers.

### **Activities of Research Centers (Estates).**

#### *Crop Protection Division & Genetics & Plant Breeding Division*

#### **Matara Research Center**

Activities of the Matara Research Center were continued during the year and palm

marking in the buffer zone was monitored. Crop Protection Division staff inspected a total of 11,653 lands in the buffer zone and removed 1712 WCLWD affected palms. Assistance was given to CCB in identification of WCLWD palms at initial stage. Collected 520 bud leaf samples from WCLWD affected palms for experiments. Pollen collected from WCLWD resistant / tolerant coconut palms were processed and stored in the Matara Research Center. This pollen was used in hybridization work to produce resistant/ tolerant coconut seedlings. Activities of mini seed garden developmental work were coordinated during the year.

### **Recommendation of oil palm seed sources from Malaysia and Papua New Guinea.**

#### *Crop Protection Division*



Researchers from the Coconut Research Institute and the Department of Agriculture inspecting oil palm seed and seedling production facilities in Malaysia

CRI Research Officers, with the officials from the Department of Agriculture, visited Malaysia and Papua New Guinea respectively to inspect and recommend oil palm seed sources to Sri Lanka. Oil palm seeds from Applied Agricultural Resources Sdn. Bhd. and Felda Agricultural Services Sdn. Bhd. from Malaysia and New Britain

Palm Oil Ltd from Papua New Guinea were recommended as suitable seed sources for importation of oil palm seeds in to Sri Lanka. Both pre-heated and sprouted oil palm seeds were recommended.

## **Recommendation of oil palm seedlings.**

### *Crop Protection Division*



Inspection of oil palm seedlings in the 1<sup>st</sup> stage nursery

The division involved in inspection and recommendation of oil palm seedlings in the 1<sup>st</sup> stage nursery for transferring them to the second stage nursery. During the year more than 300,000 seedlings were recommended. In addition, advisory visits were made to oil palm plantations providing advices on pests and disease management, soil and moisture conservation. During the year, 4 visits to oil palm plantations were made and major problems that received advices were on black beetle management, rat and wild boar management, spider mite and fungal disease management in the 1<sup>st</sup> stage nursery, soil conservation in oil palm plantations in hilly areas, moisture conservation and selection of good seedlings in the 1<sup>st</sup> and 2<sup>nd</sup> stage nurseries.

## **Differential Fertilizer Recommendation (DFR) for Coconut.**

### *Soil & Plant Nutrition Division*

Differential Fertilizer Recommendation (DFR) for coconut plantations was continued based on the leaf nutrient status of the coconut palms. This service is provided on request of the growers and 31 DFR reports were issued during the year.



Estimation of K and Mg content in coconut leaf using Atomic Absorption Spectrophotometer (AAS)

## **Land Suitability Assessment for Coconut.**

### *Soil & Plant Nutrition Division*

Soil survey and land suitability assessments for coconut were undertaken on request of coconut the growers. In this assessment, soil survey is carried out to identify main soil characteristics; texture, drainage, depth, land form etc, which mainly contribute to yield potential of a land. Based on the soil characteristics, the suitability and unsuitability of the land for cultivation of coconut is assessed, the land suitability classes are identified and categorized according to the land suitability classification such as Highly suitable (S<sub>1</sub>) lands with potential yield of more than 15,000 nuts ha<sup>-1</sup> yr<sup>-1</sup>, Highly suitable to Suitable (S<sub>2</sub>) lands with potential yield of

12,500 to 15,000 nuts ha<sup>-1</sup> yr<sup>-1</sup>, Suitable (S<sub>3</sub>) lands with potential yield of 10,000 to 12,500 nuts ha<sup>-1</sup> yr<sup>-1</sup>, Moderately suitable (S<sub>4</sub>) lands with potential yield of 5,000 to 10,000 nuts ha<sup>-1</sup> yr<sup>-1</sup> and Marginally suitable (S<sub>5</sub>) lands with potential yield of 2,500 to 5,000 nuts ha<sup>-1</sup> yr<sup>-1</sup>. Twenty land suitability assessment reports were issued during the year 2016.



Identification of Soil Characteristics

**Test Reports.**

**Soils & Plant Nutrition Division**

Several test reports on coconut fertilizer material and coconut based products were supplied on request

Sample Type/ Division	No. of Samples Analysed
Analysis of Inorganic fertilizer for quality assurance 	275
Analysis of organic fertilizer for quality and to recommend organic manure packages 	34

Sample Type/ Division	No. of Samples Analysed
Quality assurance certificates for exportation of coir pith	81
Soil analysis for nutrient status	164
Leaf analysis for nutrient status	310
Coir pith analysis for quality assurance for exportation	405
Water analysis for suitability for irrigation	13



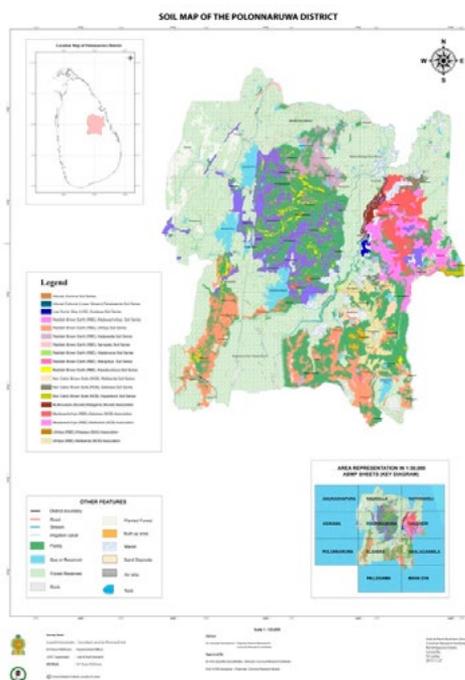
## Land Suitability Assessment for Coconut in Non Traditional Areas.

ha and 38,047 ha, respectively.

### Soils & Plant Nutrition Division

Preparation of soil maps and land suitability maps of Polonnaruwa district were completed. In this district soils belong to Great Soil Groups of Alluvial, Alluvial Colluvial, Low Humic Gley, Reddish Brown Earth and non-Calcic Brown.

Out of the total area of 343,817.82 ha in the Polonnaruwa district, 23% was identified as suitable for coconut cultivation. In this district, highly suitable (S1) and suitable to highly suitable (S2) lands with a potential yield of  $>15,000 \text{ ha}^{-1} \text{ yr}^{-1}$  and 12,500 to  $15,000 \text{ ha}^{-1} \text{ yr}^{-1}$  were not identified. Suitable (S3) lands with a potential yield of 10,000 to  $12,500 \text{ ha}^{-1} \text{ yr}^{-1}$ , moderately suitable (S4) lands with potential yield of 5,000 to  $10,000 \text{ ha}^{-1} \text{ yr}^{-1}$  and marginally suitable (S5) lands with potential yield of 2,500 to  $5,000 \text{ ha}^{-1} \text{ yr}^{-1}$  were identified that cover 5,156 ha, 37,088



Soil map of the Polonnaruwa district

**“Kapruka” SMS Service.****Technology Transfer Division**

Mobile phone is an ideal tool which could be used to deliver coconut information in an effective manner. During 2015, Technology Transfer Division introduced an e-agriculture project to disseminate coconut related information to the growers with the support of the Economics Division and Plant Physiology Division. Coconut growers receive messages on farm-gate price of coconut, DC, Copra and Coconut oil price bi weekly, yield prediction for the following month and information on training programmes on monthly basis and weather forecast details weekly. There are 700 growers registered as the recipients for the year 2016.

**Supply of information to other institutions and stakeholders.****Agricultural Economics & Agribusiness Management Division**

1. Provided information to update research database of Council for Research Policy
2. Provide coconut statistics to Central Bank of Sri Lanka, Sri Lanka Treasury and many other institutes and stakeholders
3. Provided valuation reports to value coconut trees removed for different purposes

4. Provided statistics and information on coconut for the Budget speech and the library of Sri Lanka Parliament
5. Served as a Centre for Coconut Based Socio-Economic Statistics
6. Issued the policy recommendations to the industry

**Supply of Meteorological data.****Plant Physiology Division**

Daily data of rainfall, air and soil temperature, relative humidity, wind velocity and sunshine hours of five research stations of CRI; BE, RE, ISG, MOSG and MRS were provided to the national database at the Meteorology Department. Monthly rainfall and temperature data were provided to growers, industry personnel, scientists, students and Divisional Secretariats of Wennappuwa, Mahawewa, Madampe and Dankotuwa, on their request.



Agro-meteorological station at Bandirippuwa Estate, CRI

**Dissemination of information on national coconut yield of 2016 and national coconut yield forecast in 2017.**

***Plant Physiology and Agricultural Economics & Agribusiness Management Divisions***

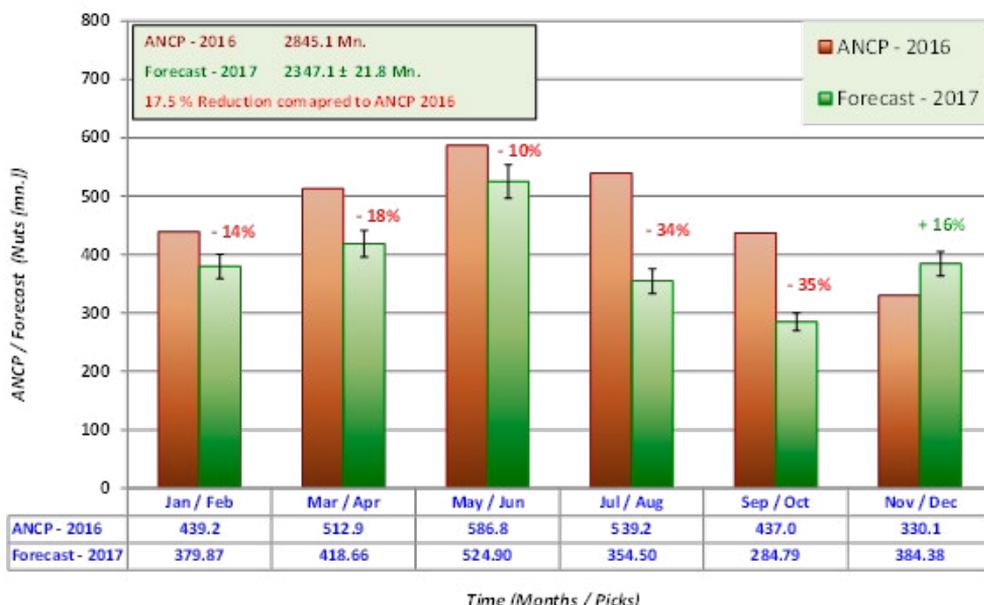
The information on Annual National Coconut Production (ANCP) in 2016 and the yield forecast for 2017 is disseminated to stakeholders. The ANCP in 2016 was 2845 Mn nuts. It is about 6% reduction compared to the production in 2015 (3026 Mn. Nuts)

The predicted coconut production for 2017 is 2347 Mn nuts; which will range from 2325 to a maximum of 2369 Mn nuts. It is about 18% reduction in National Coconut Production compared to 2016.

**Technology transfer on pest and disease management.**

***Crop Protection Division***

Divisional staff of the Crop Protection Division involved in conducting several technology transfer activities to the stakeholders such as coconut growers, students from the universities and Agriculture schools and groups of foreign delegates. Division successfully conducted the certificate course for coconut cultivation and value addition program for the coconut growers with more 120 participants. Lectures and demonstrations on pest and disease management were conducted.



Annual national coconut production (ANCP) in 2016 and coconut yield forecast for 2017



One Day training program of the Crop Protection Division

Undergraduate students from the Universities of Peradeniya, Kelaniya, Sabaragamuwa, Uva Wellassa, Wayamba, Sri Jayawardenapura and Rajarata visited Crop Protection Division and demonstrations were conducted on management of pest and diseases of coconut and production of biological control agents. Several students from various institutions studying for diploma in agriculture received in-plant training on crop protection in the division. Training was provided to several officers that were recruited for predatory mite breeding laboratories managed by the Coconut Cultivation Board as well as the private companies. Altogether 26 extension activities were carried out by the Crop Protection Division during 2016.



Undergraduate students from Wayamba University getting practical experience at CPD

**Educational Programme for higher educational institutions.**

*Technology Transfer Division*

Twenty practical training programs were conducted for students from universities and higher educational institutions.



Training program for undergraduate students

**Exhibitions and crop clinics.**

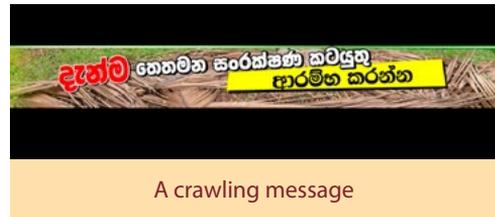
*Technology Transfer Division*



Participate at exhibitions

The division participated in the exhibitions and crop clinics to disseminate cultivation

and processing technologies. The division participated 11 exhibitions in Nikaweratiya, Colombo, Mannar, Polonnaruwa, Horana, Chawakachcheri, Ampara, Mahawewa, Handapanagala, Galle and Horowpothana during the year.



A crawling message

**Technology dissemination through mass media.**

*Technology Transfer Division*

Four newspaper articles were published in Rivira News Paper. These articles covered Biological control of Black beetle, Hybrid seed production, Black beetle pheromone trap and Utilization of soil parameters for effective coconut estate management.

A crawling message on moisture conservation was telecast on Swarnawahini TV channel for one week.



Newspaper article

**Printing and publications.**

*Technology Transfer Division*

The printing section of the division met the major printing requirements of the institute. The section undertook 85 printing and binding jobs which cost Rs. 1,91,805.00 including letters, survey forms, booklets, questionnaires, official forms, circulars and handouts etc. In addition, division has published eight booklets on different subject areas for certificate course on coconut cultivation and value addition, COCOS 2015 vol. 21 June issue, Advisory leaflet "C" (Sinhala), Leaflets namely, A new recommendation to overcome Mg deficiency (Sinhala, English and Tamil) Control of black beetle using pheromone trap (Sinhala), Technical guidelines to enhance shelf-life of tender king coconut for the export market, Coconut based farming systems in Sri Lanka, Benefits of agroforestry systems to coconut cultivation (Sinhala), "Apen Obata" (Sinhala), Technology Update 2016 vol.1 (Jan.-June) (English, Tamil and Sinhala), Inorganic fertilizer for coconut seedlings (Sinhala) and Advisory leaflet "B" (Sinhala).



Printing section



Publications

**Coconut Technology Park (CTP).**

*Technology Transfer Division*

The Coconut Technology Park (CTP) established with the purpose of demonstrating field application of cultivation and management technologies has now become a popular place among the coconut growers, school children and the general public. The CTP not only serves as an educational and information center, but also utilized to conduct technology promotion programmes, training programmes and exhibitions. During the year, CTP received 26,824 visitors.

There is a sales outlet at the CTP and the

annual income summary is listed below.

Annual Income summary of the CTP

Type of sales	Amount (Rs.)
Polybagged Seedlings	269,900.00
Different coconut based products	
From Technology Park (Ice cream, Banana, Dragon fruit, Papaw, Pineapple)	409,010.00
From others (Yoghurt, Vinegar, Treacle)	419,609.00
Books /Publications	83,067.00
Miscellaneous	21,842.00
<b>Total</b>	<b>1,203,428.00</b>



Coconut Technology Park

**LIBRARY SERVICES**

The library provided its services to the institute’s staff and the university students throughout the year. Lending and reference services were provided with limited staff

throughout the year for the information needs of internal and external clientele using in-house and outside resources. A number of literature searches were made by users on kernel based food products and non-kernel based products on coconut.

19 books were received from various donors on a complimentary basis. The total stock recorded 5917 books as at 31 December 2016.

In addition to the quick reference queries made by the staff, a total of 55 literature searches were made on the coconut database to cater to the information needs of users. Of these, 16 searches were made on behalf of the staff while 39 were made for outsiders and university students who were attached to the divisions of the CRI.

The library received inter-library loan requests for the supply of 11 articles from which 7 were supplied. Nineteen outsiders visited the library throughout the year for information purposes.

The library continued to be a member of the Agricultural information Network (AGRINET) with a view to share resources. Under the network, 03 searches on various subjects were done from member libraries on behalf of the research staff. The Council for Agricultural Research Policy, Industrial Technology Institute contributed in making the searches.

## **ENGINEERING SERVICES**

Following major Renovations & maintenance works had been offered by the Engineering Unit during year of 2016.

1. 04 Nos of Staff Quarters had been renovated within the allocated fund of Rs.6 million
2. Cycle shed had been constructed to the total cost of Rs.750,000/-
3. 05 Nos toilets in grade 05 quarters had been repaired at a total cost of Rs.1,140,187.50
4. 03 Nos Pavements in grade 01 quarters had been Constructed at a total cost of Rs.946,296.00





# INTERNATIONAL & NATIONAL COLLABORATIONS

The national collaborations for Studies on health effects of virgin coconut oil continued.

1. Randomized control trial of virgin coconut oil in the treatment of Alzheimer's Dementia with the University of Kelaniya.
2. Feasibility study of virgin coconut oil in ameliorating Type 2 diabetes in human with the University of Peradeniya
3. Determination of the efficacy of adjunctive extra virgin coconut oil / coconut products use in people with mild cognitive impairment and mild to serve Alzheimers disease; community based randomized, double blind, placebo controlled, pragmatic study with the Kothalawala Defense Academy.
4. The international collaboration to develop a coconut water beverage with Global Health Coconut Product Limited, Hong Kong completed.
5. Dr. N. S. Aratchige collaborated with Dr. P. Nguyen of the Biology Centre of the

Czech Academy of Sciences to study the chromosome evolution in the pests of the superfamily Gelechioidea where coconut caterpillar, *Opisina arenosella* was identified as a suitable model pest. Chromosome preparations were made and further analysis is being conducted at the Biology Centre of the Czech Academy of Sciences. Dr. Nguyen trained two Technical Officers of the Crop Protection Division on preparation of chromosomes of insects.



Dr. Nguyen inspecting coconut caterpillar parasitoid culture in insectary of CPD



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# LOCAL & INTERNATIONAL

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# ESTATE MANAGEMENT ACTIVITES





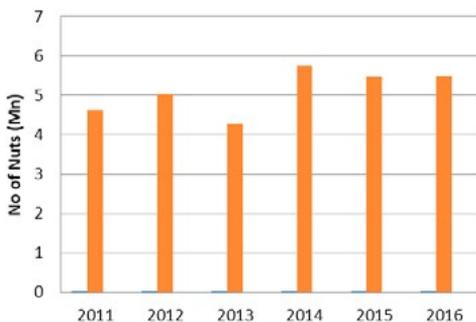
## ESTATE MANAGEMENT ACTIVITES

Coconut Research Institute owns eleven estates managed by the Estate Management Division. It comprises of 04 Genetic Resource Centers (GRC) and 07 Research Centers (RC) situated in various parts of the country. During the year the estates were satisfactorily maintained as self- financed units. The total extent of all CRI estates is 3,148 acres, out of which 1,980 acres are Genetic Resource Centers and 1,168 acres are Research Centers.

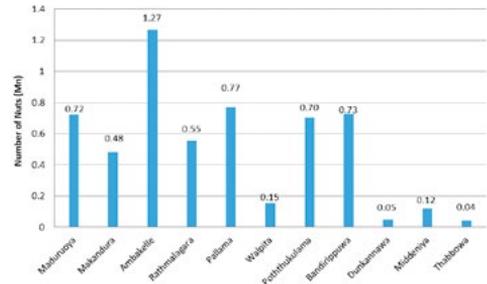
The primary objective of the Estate Management Division is to maintain the estates to produce high quality seed nuts to meet the national seedling requirement and facilitate research divisions to carry out field research under various management practices, different soil types and with different coconut cultivars. Further, live demonstrations are maintained for dissemination of new technologies to scientists, plantation managers, coconut growers, university students, school children and other visitors.

The total yield of all CRI estates in 2016 was nearly 5.5 million nuts.

For the fourth time, a bonus was given to permanent staff and Labours of the estates, from the profit made during the year.



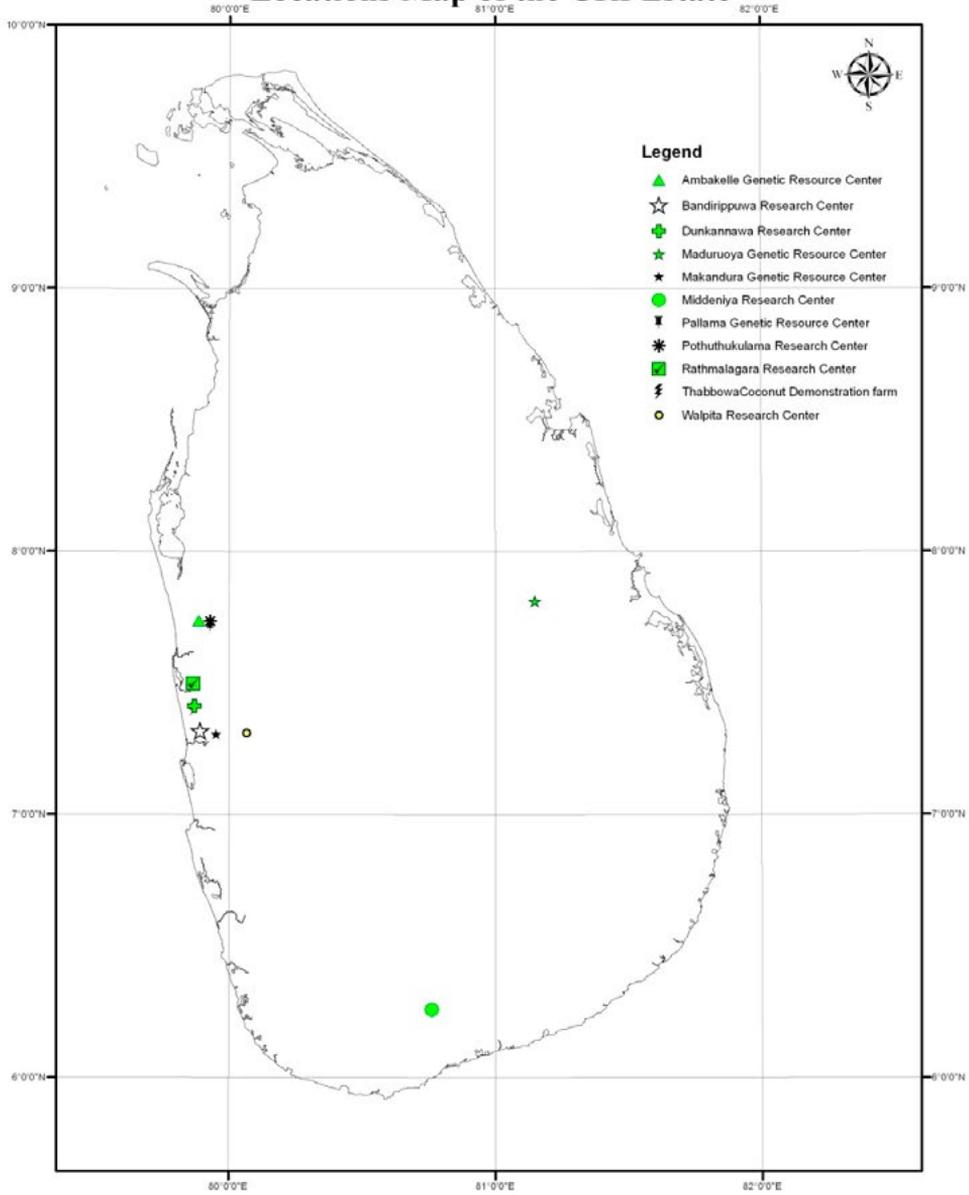
Coconut Yield (number of nuts) during 2011 - 2016 in CRI estates.



Coconut Yield (number of nuts) of different estates of CRI in 2016

## Cost of production (cop Rs/nut) in CRI estates

Estate	COP / Nut (Rs)
Makandura	17.26
Rathmalagara	24.68
Walpita	18.13
Poththukulama	14.84
Bandirippuwa	19.92
Dunnakannawa	29.03
Middeniya	30.41
Thabbowa	21.92
Ambakelle	19.90
Maduruoya	13.84
Pallama	20.59



Scale 1:2,000,000

Location Map of the CRI Estates

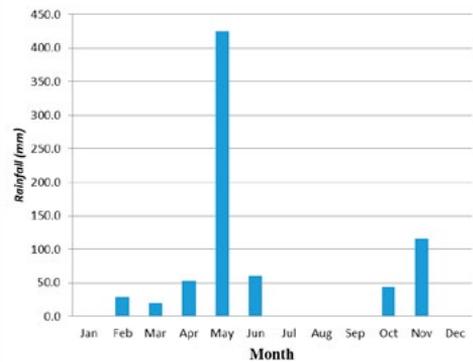
## Makandura Research Centre (MRC)

**Superintendent – W.M.U. Rathnayake**

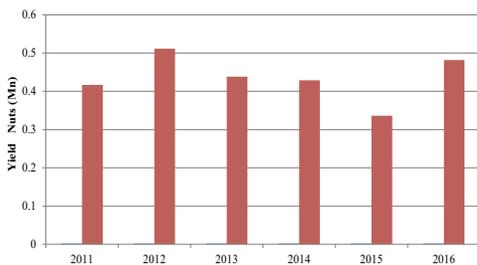


Makandura Research Centre with an extent of 56.28 ha is situated in Kurunegala district (NorthWestern Province) in the Intermediate Wet Zone. The estate is maintained as a live demonstration of intercroops and agro forestry systems and also a model coconut garden. The estate has 5,195 bearing palms and 2,407 non – bearing palms. The total nut production of the estate in 2016 was 481,872 nuts.

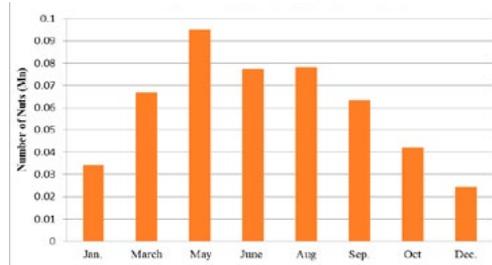
The estate gained an income of Rs. 14.76 mn (Including other income & stock variance Rs 0.18 mln) while the expenditure was Rs. 10.5 mln.



Monthly Rainfall at  
Makandura Research Centre in 2016



Coconut Yield (number of nuts) of  
Makandura Estate during 2011- 2016



Pickwise Yield data of  
Makandura Research Center in 2016

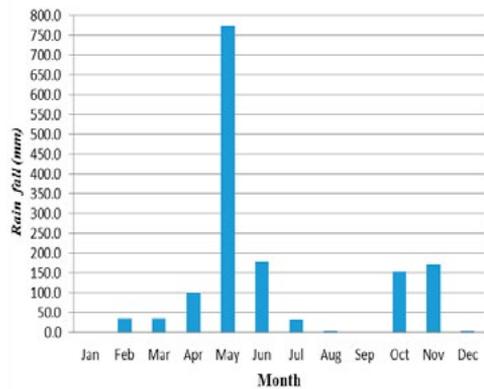
**Bandirippuwa Research Centre (BRC)**

**Superintendent - W. A. H. Upali**

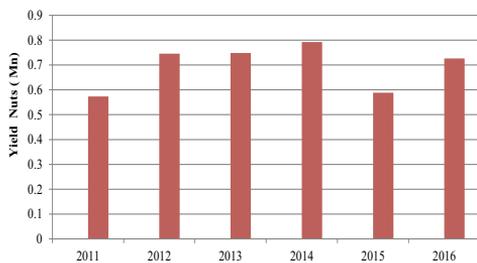


Bandirippuwa Research Centre (BRC) with an extent of 148.01 ha, is situated in the Puttalama district (North Western Province) in the Intermediate Wet Zone and houses the Head office of the Coconut Research Institute. Bandirippuwa Research Center has 10,905 bearing palms and 2,220 non-bearing palms and produced 726,287 nuts in 2016.

The estate produced 12,771.5 l of milk and 3,444 bottles of treacle during the year. The estate earned an income of Rs. 20.88 Mn (from coconut and other products and stock variance Rs.2 Mn) while the expenditure was Rs. 15.74 Mn.



Monthly Rainfall at Bandirippuwa Research Centre in 2016



Coconut Yield (number of nuts) of Bandirippuwa Estate during 2011- 2016



Pickwise Yield data of Bandirippuwa Research Center in 2016

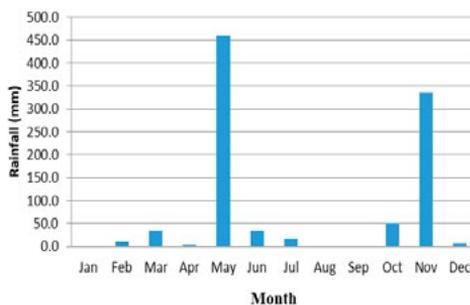
## Rathmalagara Research Centre (RRC)

Superintendent – D. P. S. K. Hettiarachchi

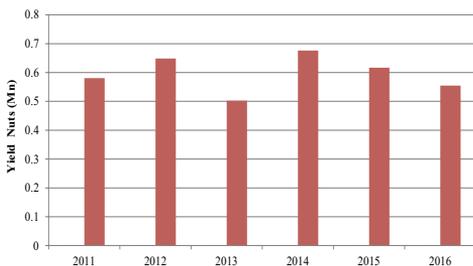


Rathmalagara Research Centre (RRC) with an extent of 110.53 ha is situated in the Puttalam district (North Western Province) in the Intermediate Dry Zone. The estate mainly supports field research studies and maintains demonstrations on animal farming systems including poultry, goat and cattle and a bio-energy generating plant. Under planting of 50 acres was completed this year. The estate has 12,380 bearing palms and 1,869 non-bearing palms and produced 554,787 nuts in 2016.

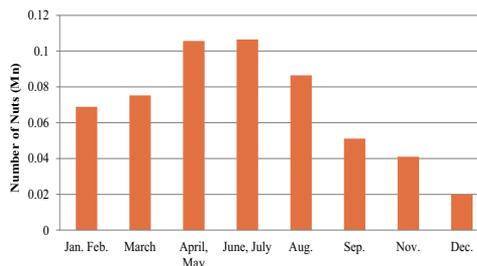
The total income of the estate was Rs. 16.02 Mn while the expenditure was Rs. 15.4 Mn.



Monthly Rainfall at Rathmalagara Research Centre in 2016



Coconut Yield (number of nuts) of Rathmalagara Estate during 2011- 2016



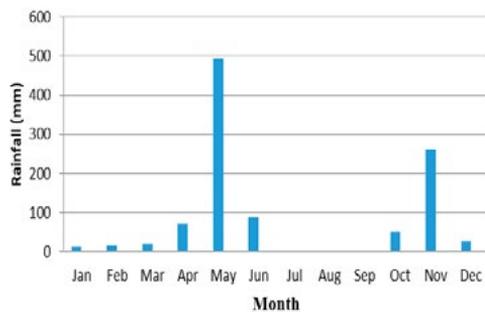
Pickwise Yield data of Rathmalagara Research Center in 2016

**Poththukulama Research Centre (PRC), Pallama**

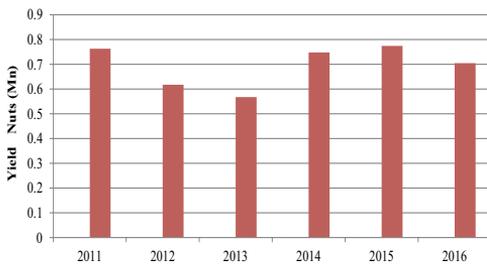
**Officer in Charge - W. W. A. P. R. Fernando**



Poththukulama Research Centre has an extent of 85.83 ha and situated in the Puttalam district in the Intermediate Dry Zone. The estate consists of 10,219 bearing palms and 352 non-bearing palms and in 2016, a nut yield of 704,064 was obtained which was the highest nut production compared to past years. The estate earned an income Rs. 18.92 Mn while the expenditure was Rs. 11.34 Mn.



Monthly Rainfall at Poththukulama Research Centre in 2016



Coconut Yield (number of nuts) of Poththukulama Estate during 2011- 2016



Pickwise Yield data of Poththukulama Research Center in 2016

## Walpita Research Centre (WRC) Walpita

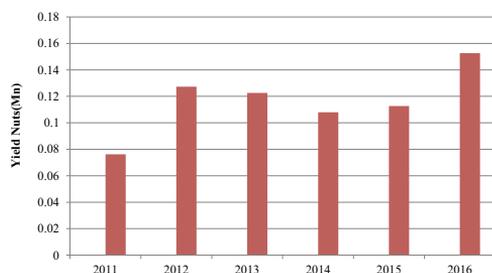
Officer in Charge – S. A. Sudath Kumara



Walpita Research Centre with an extent of 17.8 ha, in the Gampaha district, is the only estate located in the Wet Zone. The estate has some field research trials of the Genetics and Plant Breeding Division; a single population of a cross between Sri Lankan Tall x dwarf Red which is established in an area of 7 ha in the estate under irrigation and this is shown to be an early flowering and early bearing.

This estate achieved highest nut production of 152,584 in 2016 compared to past years.

The estate earned an income of Rs. 4.9 Mn. while the expenditure was Rs. 3.7 Mn.



Coconut Yield (number of nuts) of Walpita Estate during 2011- 2016



Pickwise Yield data of Walpita Research Center in 2016

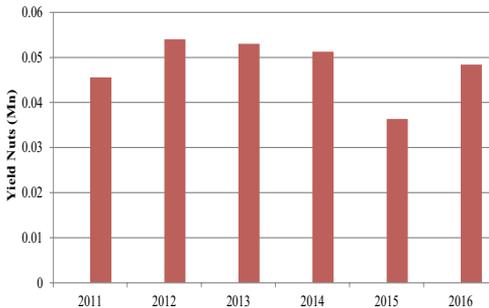
## Dunkannawa Research Centre (DRC), Naththandiya

Office in charge – Y. P. D. S. Pathiraja

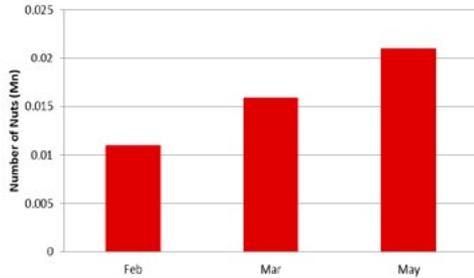


Dunkannawa Research Centre has an extent of 10.12 ha and located in Puttalam District of the Intermediate Dry Zone. There are 867 bearing palms and 254 non-bearing palms and a total of 48,401 nuts were harvested up to July 2016 and estate was handed over to Coconut Development Authority.

The estate recorded an income of Rs. 4.5 Mn while the expenditure was Rs 2.9 Mn. The estate maintains a large scale commercial nursery



Coconut Yield (number of nuts) of Dunkannawa Estate during 2011- 2016  
\* Only up to July in 2016



Pickwise Yield data of Dunkannawa Research Center in 2016  
\* Only up to May

## Middeniya Research Centre (MRC) Middeniya

Officer in Charge – E. A. Sanjeewa Kumara

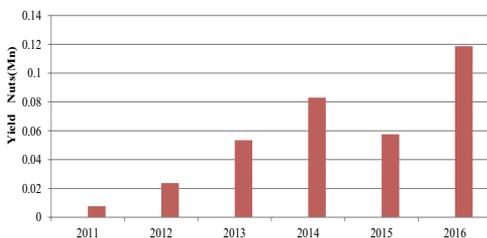


Middeniya Research Centre is located in the mini coconut triangle of Hambanthota district in the Intermediate Dry Zone; it has an extent of 30.37 ha. It consists of 1,699 bearing palms and 611 non – bearing palms. And the total nut production in 2016 was 118,701. The estate was established in 2005. Therefore all coconut palms are still below 15 years of age.

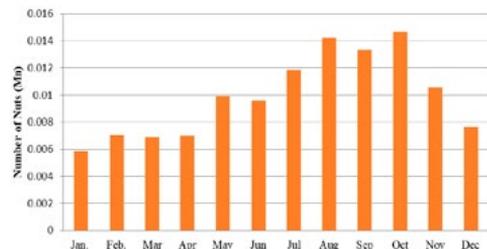
The estate conducts demonstrations and training programmers to coconut growers in the Southern Province and maintains research trials of Plant Physiology Division, Genetic & Plant Breeding Divisions on drought management of exotic crosses.



Monthly Rainfall at Middeniya Research Centre in 2016



Coconut Yield (number of nuts) of Middeniya Estate during 2011- 2016

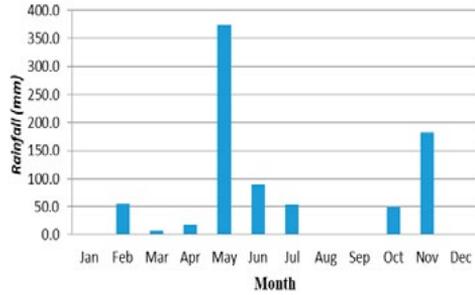


Pickwise Yield data of Middeniya Research Center in 2016

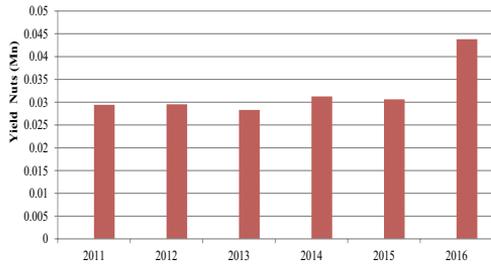
**Thabbowa Research Centre (TRC)**

**Officer in charge – H. M. Chinthaka Bandara**

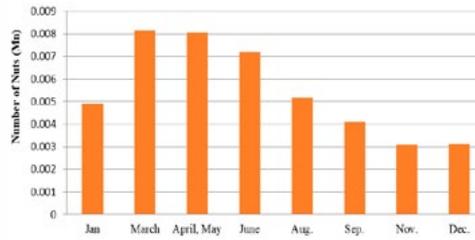
Thabbowa Research Centre is located in Puttalam district in the Intermediate Dry Zone; it has an extent of 2.5 ha. It comprises of 438 bearing palms and 05 non – bearing palms and the total nut production of the estate in 2016 is 43,812.



Monthly Rainfall at Thabbowa Research Centre in 2016



Coconut Yield (number of nuts) of Thabbowa Estate during 2011- 2016



Pickwise Yield data of Thabbowa Research Center in 2016

## Coconut Genetic Resource Centre Ambakelle (CGRC Ambakelle)

**Asst. Superintendent – Mr. Sumudu Wanasingha (BSC. Agric)**



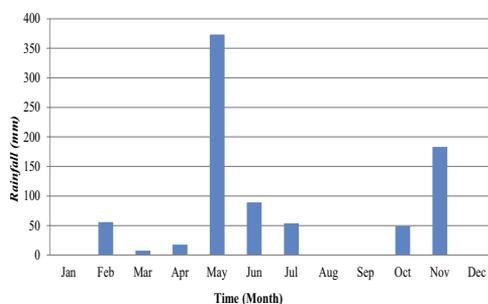
Ambakelle Isolated Seed Garden (ISG) was established in 1955 with the objective of supplying quality coconut planting material to the National Replanting Programme (NRP). Total extent of this seed garden is 456.2 ha. (1,140 ac). This seed garden is situated in Pallama AGA division of Puttalam district in North-Western Province of the country. Seed Garden is divided into 14 fields as follows.

Fields of Ambakelle Seed Garden

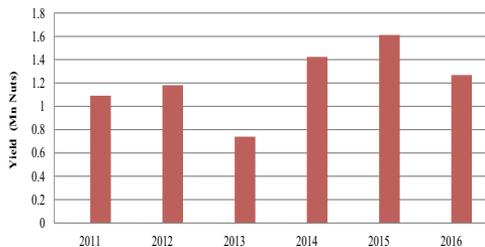
Field No	Year of Planting	Extent/ac
1	1955	4.5
2	1956	4
3	1956	4
4	1956 - 2013	34
5	1984 - 1992	7
6	1960	20
7	1961	20
8	1962 - 2015	20
9	1966 - 1969	25
10-A	1972	25
10-B	1973	25
11-A	1985 - 2005	30
11-B	1985	30
12	1985	22

13	1984	37
14	1992	37

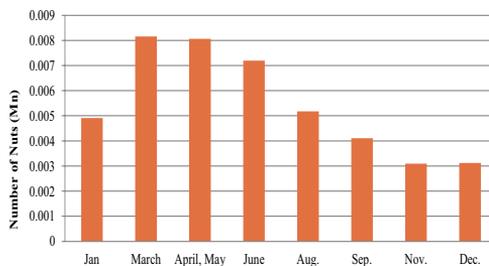
Ambakelle Isolated Seed Garden produces high quality Tall x Tall (CRIC 60) and Dwarf x Tall (CRIC 65) hybrid seed nuts in mass scale. Simultaneously the limited amount of Kapruwana (DGSR) and Kapsuwaya (TDB) seed nuts are produced by hand pollination. During the year 2016, 714,009 CRIC60 seed nuts, 96,893 CRIC 65 seed nuts, 1,925 Kapruwana seed nuts and 3,712 kapsuwaya seed nuts were produced in the seed garden. According to the annual census, there were 21,745 bearing palms and non-bearing palms in the seed garden.



Monthly Rainfall at Ambakelle Genetic Resource Centre in 2016



Coconut Yield (number of nuts) of Ambakelle Estate during 2011- 2016



Pickwise Yield data of Ambakelle Genetic Resource Center in 2016

### Coconut Genetic Resource Centre Pallama (CGRC Pallama)

Officer- In- Charge – W. W. D. R. Wijesinghe



This seed garden is situated in Rasnayakapura AGA division of Puttalam district in North-Western Province of the country and is Agro-climatologically intermediate dry zone. Extent of the Coconut Genetic Resource Centre Pallama (CGRC Pallama) is 243.32 ha. Estate has divided in to 11 fields as follows.

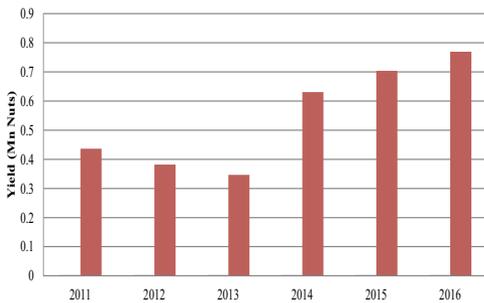
#### Fields of Pallama Genetic Resource Center

Field No.	Extent/ac.
1	49
2	51
3	55
4	81.5
5	65 Forest
6	41
7	112.75
8	44.75
9	22.5
10	41
11	27.5

Total estate can be divided in to two parts as seed garden area and the excluded area for seed garden. Field no 1, 2, 3, 4 and small part in 6 is the seed garden area. Total crop harvested from the estate in 2016 is 768,765. Addition to that following amount of seed nuts were produced by hand pollination in 2016,

- Kapruwana - 5,705
- Kapsuwaya - 5,530
- Kapsetha - 3,781
- CRISL98 - 25,689
- Plus Palm - 27,385

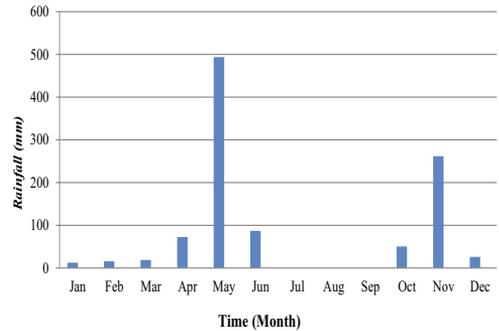
With the objective to increase the production of hybrid seeds, a new set of one thousand mother palms were prepared for hand pollination, in the seed garden in



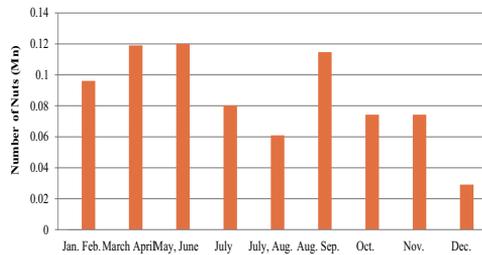
Coconut Yield (number of nuts) of Pallama Estate during 2011- 2016

2016 In addition to above seed production, the following research programme of the SPND is ongoing in the CGRC Pallama.

“Response of coconut palms to sodium chloride (NaCl) application.”



Monthly Rainfall at Pallama Genetic Resource Centre in 2016



Pickwise Yield data of Pallama Genetic Resource Center in 2016

**Coconut Genetic Resources Centre Maduruoya (CGRC Maduruoya)**

**Assistant Superintendent – L. S. Bharatha Liyanage (BSC. Agric)**



This seed garden is situated in Mahaweli System B area on the Polonnaruwa district of the Dry Zone. Extent of the Genetic Resource Centre Maduruoya (CGRC MOSG) is 86.64 ha. There are seven fields as follows.

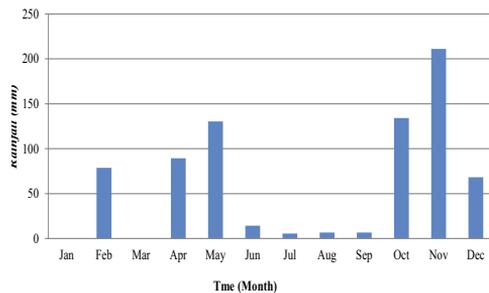
**Fields of Maduruoya Genetic Resource Center**

Field No.	Extent/ac.
01	21
02	30
03	34
04	30
05	36
06	16
07	27

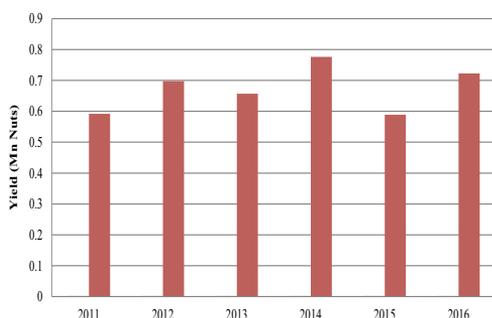
The palms are managed under flood irrigation system, and therefore most of the palms show heavy bearing condition even in the Dry Zone. CRIC60 is the only seed variety produced in CGRC Maduruoya. Seed nut production in 2016 was 396,945. Because of the only 56% of the seed nuts produced in the seed garden were selected as “seed nuts” and the balance 44% was rejected due to heavy mite damage.

Two the following research were conducted at the CGRC Maduruoya by the Agronomy Division.

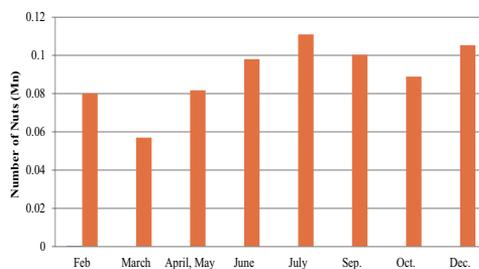
1. Effect of buffalo grazing on soil physical and chemical properties on a soil pastoral system under the coconut.
2. Development of a mix crop models for increasing coconut production in the dry zone by changing microclimatic conditions.



Monthly Rainfall at Maduruoya Genetic Resource Centre in 2016



Coconut Yield (number of nuts) of Maduruoya Estate during 2011- 2016



Pickwise Yield data of Maduruoya Genetic Resource Center in 2016

## Weligama Genetic Resources Centre (WGRC)

Officer in Charge – Mr. M. S. M. Faheem

Extent of this estate is 16.15 ac. earlier this was used as a coconut nursery belongs to the coconut cultivation board and then after this was required to Coconut Research Institute on 24 September 2016 with the

objective to develop as a seed garden to produce resistant/ tolerant coconut seeds to Weligama Coconut Leaf Wilt Diseases (WCLWD). There is a cinnamon cultivation



# STAFF







STAFF

## ACHIEVEMENTS

### Awards

Dr. C. S. Ranasinghe received the Award for life-time contribution to coconut sector at the 6<sup>th</sup> Symposium on Plantation Crop Research, Colombo, 2016.

Dr. S. A. C. N. Perera received an award at the 6<sup>th</sup> Plantation Crops Research Symposium for excellence in research at CRI during 2014-2015.

Dr. H. D. D. Bandupriya received an award for excellence in research at CRI during 2014-2015 at the 6<sup>th</sup> Plantation Crops Research Symposium.

Dr. H. M. I. K. Herath received a president's award for Scientific publications of the year 2014 at the ceremony held on 22<sup>nd</sup> November 2016

Dr. M. K. Meegahakumbura received the "Outstanding Student Award" from the University of Chinese Academy of Sciences for the academic year 2015-2016.

Dr. C. S. Ranasinghe received the best paper and best paper presentation award of the session on Crop Improvement at the 3<sup>rd</sup> international symposium on coconut research and development, Central Plantation Crops Research Institute, Kerala, India.

Dr. S. A. C. N. Perera received the Best paper and the presentation award in the coconut

sector at the 6<sup>th</sup> Plantation Crops Research Symposium.

Dr. A. D. N. T. Kumara received the best poster presentation award in the national meeting on "New /safer molecules and biocontrol technologies for Integrated Pest Management in crops" organized by the Society for Bio-control Advancement in India.

Dr. H. M. I. K. Herath received merit award for best presentation in the session on Agricultural Sciences for the paper on "Effect of Coconut - Based Agroforestry systems on soil physical and chemical properties in intermediate zone of Sri Lanka" at the 5<sup>th</sup> Young Scientist Forum Symposium held in 22<sup>nd</sup> January 2016.

Ms. G. S. Nirukshran received merit award for best presentation in the session on Agricultural Sciences for the paper on "Comparison of Plant and Soil Nutritional Status between organically and conventionally cultivated two Coconut Lands in the intermediate zone of Sri Lanka" at the 5<sup>th</sup> Young Scientist Forum Symposium held in 22<sup>nd</sup> January 2016.

The Analytical Laboratory of Soils & Plant Nutrition Division was awarded with the international standards for soil testing (ISO 17025) by the Sri Lanka Accreditation Board (SLAB).

## Research Grants

Dr. L. Perera as the Principal Investigator (PI): National Research Council of Sri Lanka funded research grant on “Investigation of the course of tapering disorder of coconut in Sri Lanka and molecular characterization of the pathogen”. National Research Council (Grant No. NRC/13/31), (2013-2016).

Dr. S. A. C. N. Perera as the PI: Bioersity International funded grant on ‘Comparative Analysis of Sri Lankan Coconut Germplasm with the Global Coconut Germplasm’ Data Available in the International Coconut Genetic Resources Database (CGRD)’ (2013-2016).

Dr. N. S. Aratchige as PI and Dr. A. D.N.T. Kumara, Dr. S.A.C.N. Perera and Dr. P. Ranasinghe (ITI) as Co –Investigators (Co-I): National Research Council funded research grant on “Assessment of behavioural and reproductive responses of coconut mites to coconut varieties and identification of volatile organic compounds, lipid profiles and phenolic compounds in coconut varieties with different susceptibility levels to coconut mite”.

Dr. C. S. Ranasinghe as the PI and Dr. L. Perera, Dr C. Abeysinghe and Ms A. Amarasinghe (Wayamba University) as Co-I: National Research Council of Sri Lanka funded research grant on “Determination of the effects of heat and water stress on fertility of female and male reproductive organs of coconut (*Cocos nucifera* L.)” in collaboration with Genetics and Plant Breeding Division. National Research Council (NRC 13-032), 2013-2016.

Dr. D. Bandupriya as PI and Dr. V Vidhanaarachchi Co-I: National Science

Foundation funded research grant on ‘Studies on cryopreservation of embryonic callus from unfertilized ovaries using the encapsulation – dehydration technique and post thaw plant regeneration coconut. (2014-2016).

Dr. D. bandupriya as PI and Dr. C Perera and D. C Yalegama, and Dr C S Ranasinghe as Co-I: National Research Council funded research grant on ‘Field performance and molecular evaluation of coconut (*Cocos nucifera* L.) palms regenerated from somatic embryogenic cultures’ in collaboration with the Tissue Culture Division (2015-2016).

Dr. A. D. N. T. Kumara: a grant of Rs. 5.0 million from the National Science Foundation for the purchase of Electrophysiological laboratory equipment for Insect Research (GC-EAD + SSR set up).

## Conferences, Workshops held

CRI organized the 6<sup>th</sup> Symposium on Plantation Crop Research in collaboration with Tea, Rubber and Sugarcane Research Institutes and the inaugural function was held at Waters Edge, Battaramulla on 2<sup>nd</sup> November 2017 and the Symposium was held at the BMICH from 3 – 4 November 2016.

## Postgraduate Studies Completed

Dr. M. G. M. K. Meegahakumbura, successfully completed his postgraduate studies leading to Ph.D. degree at the at the Kunming Institute of Botany, Chinese Academy of Sciences, Kunming, China on 21 May 2016.

## **Postgraduate Studies Continued**

Ms. H. D. M. A. C. Dissanayake, Research Officer continued her PhD degree at the University of Tsukuba, Japan with effect from 01 April 2013.

Mr. M. D. P. Kumarathunge, Research Officer, Plant Physiology Division continued his PhD studies at the University of Western Australia, Australia from 20<sup>th</sup> November 2015 – November 2018.

Ms. P. M. E. K. Pathiraja, Research Officer, Agricultural Economics and Agribusiness Management Division returned to the country after completing Ph.D. degree at the University of Melbourne, Australia (December 2012 to December, 2016)

Ms.K.V.N.N.Jayalath, Senior Research Officer, Agricultural Economics & Agribusiness Management Division continued her M.Phil. degree at the University of Queensland, Brisbane, Queensland, Australia from January, 2016.

Miss. M. K. F. Nadeesha, Research Officer, Soil & Plant Nutrition Division continued her M. Phil degree at the Post Graduate Institute of Science. University of Peradeniya, from 2015.

## **Local training programmes (More than 7 days)**

Mr. C. R. K Samarasinghe participated Certificate Course on Fundamental of Molecular Biology and Biotechnology, organizes by Agricultural Biotechnology Centre, University of Peradeniya (10 days in May, June July, 2016).

## **Served in Committees**

Dr. I. M. S. K. Idirisinghe served as a Committee Member of the National Committee on Socio Economics and Policy Analysis, Sri Lanka Council for Agricultural Research Policy.

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

Dr. I. M. S. K. Idirisinghe served as a member of the Board of Study of Agricultural Economics and Business Management, Postgraduate Institute of Agriculture, University of Peradeniya.

Dr. I. M. S. K. Idirisinghe served as a member of Pricing Committee appointed by Secretary to the Ministry of Plantation Industries.

Dr. L. Perera served as the Country Representative of the International Coconut Genetic Resources Network (COGENT).

Dr. L. Perera served as the Chairman of the Steering Committee of the International Coconut Genetic Resources Network (COGENT).

Dr. L. Perera served as the Chairman of the National Plant Breeding Committee of the Council of Agricultural Research Policy (CARP), Sri Lanka.

Dr. L. Perera served as a Member, Scientific Advisory Committee, Tea Research Institute, Sri Lanka

Dr. L. Perera served a member of the Steering Committee of the North and East Coconut Development Project, Coconut Cultivation Board of Sri Lanka.

Dr. S. A. C. N. Perera served as a member of the National Biotechnology Committee of the Council of Agricultural Research Policy (CARP), Sri Lanka.

Dr. N. S. Aratchige served as a member of the Pesticide Sub-Committee of the Department of Agriculture.

Dr. H. T. R. Wijesekara served as a member of the Plant Protection Committee of the Sri Lanka Council for Agricultural Research Policy.

Dr. N. S. Aratchige represented the Coconut Research Institute in the committee to inspect and recommend oil palm net houses and seedlings.

Dr. K. P. Waidyaratne served as the Assistant Secretary of the Applied Statistics Association of Sri Lanka.

Dr. D. M. D. I. Wijebandara served as member of Fertilizer Advisory Committee at National Fertilizer Secretariat of Ministry of Agriculture.

Dr. H. M. I. K. Herath served as a steering committee member of the Young Scientist's Forum (YSF), National Science and Technology commission.

Dr. H. M. I. K. Herath Served as a member of the executive committee of the Soil Science Society of Sri Lanka.

Dr. V. Vidhanaarachchi served as member of the National Biotechnology Committee of the Council of Agricultural Research Policy (CARP), Sri Lanka.

Dr. H. D. D. Bandupriya served as a member of the steering committee of Young Scientists Forum of National Science & Technology Commission, Sri Lanka.

## Overseas visits

Dr. L. Perera attended a familiarization study tour to Institute of Plant Protection, Chinese Academy of Agricultural Sciences, Beijing, China, 01-14 September, 2016.

Dr. L. Perera visited Asia Pacific Community for a scientific mission and also participated the COCOTECH international coconut meeting organized by Asia Pacific Community (APCC), 21 September- 01 October, 2016.

Dr. (Mrs.) H. M. I. K. Herath attended a seminar on Mitigation of Climate Change for Asian Countries from 17August to 06 September 2016 in Beijing, China.

Dr. H. D. D. Bandupriya attended the 47<sup>th</sup> APCC COCOTECH conference organized by the Asia and Pacific Coconut Community held from 26<sup>th</sup> – 30<sup>th</sup> September 2016 Bali, Indonesia.

Dr. H. D. D. Bandupriya participated as a resource person at the kick-off meeting for the project: "Developing cryopreservation protocols for sub-tropical crops and establishing cryo-genebank at RDA in coordination with Diversity International" held from 22-24 November 2016, Legazpi - the Philippines.

Dr. C. S. Ranasinghe, Dr. L. Perera, Dr. S. A. C. N. Perera and Dr. S. Senarathne attended the International Symposium on Coconut Research and Development (ISOCRAD-3), CPCRI, Kerala, India, 10-12 December, 2016.

Dr. I. M. S. K. Idirisinghe participated in the 3<sup>rd</sup> Annual Smart Plantation Management Conference held, Kuala Lumpur, Malaysia from 6 – 10 December 2016.



# ACADEMIC AND PROFESSIONAL ACHIEVEMENTS

## Members in Editorial Boards

Dr. V. Vidanaarachchi, Dr. H. M. I. K. Herath, Dr. M. K. Meegahakumbura and Dr. A. D. N. T. Kumara served as members of the Editorial Board of the Proceedings of the 6<sup>th</sup> symposium on Plantation Crop Research. "Plantation Agriculture Towards National Prosperity". 2016. ISBN 978-955-9013-19-8 (Volume-1) and ISBN 978-955-9013-20-4 (Volume-2).

Dr. S. A. C. N. Perera served as the editor of the Council of the Institute of Biology.

Dr. C. S. Herath served as a member of the Editorial board of the Journal of Agricultural Science published by the Canadian Center for Science and Education, Toronto, Canada.

Dr. C. S. Herath served as a member of Editorial board of "COCOS" journal published by the Coconut Research Institute.

Dr. C. S. Herath and Mrs. H. D. N. H. Fonseka served as members of the Editorial board of "Technology Update" magazine published by the Coconut Research Institute.

Mr. K. M. R. T. Wijekoon served as a member of the Editorial board of "CRI News" magazine published by the Coconut Research Institute.

Dr. L. Perera served as a member of the

advisory panel of the Journal of Plantation Crops, published by the Central Plantation Crop Research Institute, India.

Dr. S. A. C. N. Perera served in the editorial committee of the Sri Lanka Journal of Biology published by the Institute of Biology in Sri Lanka

## Supervision of Postgraduate students

Dr. C. S. Ranasinghe supervised the M.Phil research project of Ms A. Amarasinghe, a student of Wayamba University of Sri Lanka on 'Effect of heat and water stress on fertility of male and female flowers and fruit set in coconut'.

Dr. D. M. D. I. Wijewardana supervised M.Phil research project of Miss M.K.F. Nadeesha, Senior Research Officer, Soil & Plant Nutrition Division on "Risk Assessment and Removal of Polycyclic Aromatic Hydrocarbons (PAHs) and Trace Metals (Cu, Zn, Fe, Mn and Cd) Using Biochar Incorporated Coconut Growing Soils".

Dr. Chandi Yalagama supervised the M. Phil research project of Ms Eranga Samaranayake of Coconut Processing Research Division on "Determination of quality and the health effects of selected coconut products."

Dr. N. S. Aratchige and Dr. A. D. N. T. Kumara supervised the M. Phil. research project of Mr. N. T. P. Wijewardana, a student of the Postgraduate Institute of Science, University of Peradeniya on “Assessment of behavioral and reproductive responses of coconut mites to coconut varieties and identification of volatile organic compounds, lipid profiles and phenolic compounds in coconut varieties with different susceptibility levels to coconut mite”.

Dr. H. D. D. Bandupriya supervised the M Phil research project of Ms. W. W. M. A. Iroshini, a student of University of Colombo on ‘Studies on cryopreservation of embryogenic callus from unfertilized ovaries using the encapsulation-dehydration technique and post thaw plant regeneration in coconut (*Cocos nucifera* L.)’.

Dr. S. A. C. N. Perera supervised the PhD research project of Ms. K. N. S. Perera, of the Wayamba University of Sri Lanka on ‘Morphological, Molecular and Biochemical Characterization of Coconut Germplasm conserved in *Ex-situ* Gene banks in Sri Lanka’.

Dr. S. A. C. N. Perera was a Research Advisor of the PhD research project of Mr. Noel Piyasundera, of Post Graduate Institute of Agriculture, Peradeniya on ‘Reproductive Phenology, Floral Biology and Molecular Screening of Parent Cultivars in Tea seed Gardens’.

Dr. S. A. C. N. Perera supervised the PhD research project of Ms. P. W. Wakista of the University of Sri Jayawardenepura on Determination of Genetic Diversity and the Population Structure of conserved Finger millet (*Eleusine coracana* L.) germplasm accessions of Sri Lanka’.

## **Supervision of undergraduate students**

Dr. A. D. N. T. Kumara supervised the research project of Miss. H. M. C. N. Herath, a student of the Department of Agriculture Engineering, Faculty of Agriculture, University of Ruhuna on “Evaluation of New gel type pheromone dispenser as an enhancement of an environmental friendly management method for trapping Red plam weevil (*Rhynchophorus ferrugineus* Olivier)”.

Mrs. N. I. Suwandhrathne supervised the research project of Miss R.P.K.M. Rajapaksha a student of Department of Plantation Management, Wayamba University on “Effect of selected botanical extracts for the control of Plesispa beetle (*Plesispa reichei*, Coleoptera:Crysomelidae) in laboratory bioassays”.

Dr. C. Yalgama supervised the industrial training of Ms. Nadinika Miguntanna of faculty of Engineering, South Asian Institute Technology and Medicine, Sri Lanka.

Miss. D. M. P. D. Dissanayake supervised the research project of Mr. A. M. Nuwantha Adhikari a student from Faculty of Plantation Management, Wayamba University of Sri Lanka on ‘Investigation of status of sulphur in coconut growing areas in the Intermediate Zone of Sri Lanka’.

Dr. H. M. I. K. Herath supervised the research project of Mr. M. H. Dananjaya a student from Department of Plantation Management, Wayamba University of Sri Lanka on Mapping of Soil Organic Carbon in Different Soil Types of Trincomalee District

Dr. H. M. I. K. Herath supervised the research project of Ms. A. H. C Chandrakumara from

Uwa Wellassa University of Sri Lanka on Evaluation of Plant Nutrient Source Derived from Young Coconut Husk.

Dr. H. M. I. K. Herath supervised the research project of Ms. D. K. R. P. L. Dissanayake, a student from Department of Soil Science, Faculty of Agriculture, University of Peradeniya on Effect of King Coconut Waste Biochar on Selected Physical and Chemical Properties of Two Coconut Growing Soils.

Ms. M. K. F. Nadheesha Supervised the industrial training of Miss H. M. H. B. Chandrasiri Faculty of Applied Sciences, University of Kelaniya on "pH adjustment of five Trace metal solutions".

Ms. M. K. F. Nadheesha supervised the industrial training of Miss. N. P. Rajapaksha, and Miss. T. H. U. D. S. Gunasekara, Faculty of Applied Sciences, University of Peradeniya on "Soil macro nutrients status of coconut palm after poultry and chemical fertilizer application."

Dr. Chandi Yalgama supervised the research project of Ms. A. J. N. Gimasha, a student of Wayamba University of Sri Lanka on "Change of sensory and chemical properties of deep fried food due to repeatedly used coconut oil".

Ms. E. Samaranayake supervised the research project of Ms. W. H. J. Chandrasiri, a student of Wayamba University of Sri Lanka of Sri Lanka on "Improvements to the traditional wet process method for making extra virgin coconut oil and quality evaluation".

Ms. Dilani Hewa Pathirana supervised the undergraduate research project of Ms. G. S. S. Kumarasinghe, undergraduate student

of Ruhuna University of Sri Lanka on "Improvements to the natural fermentation method to produce extra virgin coconut oil and quality evaluation".

Ms. Dilani Hewa Pathirana supervised the research project of Ms. S. P. M. G. Gunawardena, a student of Ruhuna University of Sri Lanka on "Development of sap based beverage".

Dr. Chandi Yalgama supervised the research project of Ms. R. P. S. M. Rajapaksa, a student of Ruhuna University of Sri Lanka on "Preliminary study on centrifugal method for extra VCO production".

Dr. Chandi Yalgama supervised the research project of Ms. A. M. K. Athapaththu, a student of Ruhuna University of Sri Lanka on "Quality evaluation of repeatedly deep fried coconut oil".

Dr. S. H. S. Senarathne and Mr. A. A. A. Atapattu supervised the research project of Miss. R. J. M. D. T. Jayawardana, a student of University of Ruhuna on "Evaluation of root biomass and root distribution of coconut based cinnamon agro forestry systems".

Dr. L. Perera supervised the industrial training of Miss. R. P. U. Imaya Amarawansa, a student of the Department of Agricultural Biology, Faculty of Agriculture, University of Peradeniya.

Dr. C. S. Ranasinghe supervised the research project of Miss. U. V. P. N. Udadeniya, a student of Wayamba University of Sri Lanka on "Screening coconut varieties for temperature tolerance using physiological parameters".

Dr. I. M. S. K. Idirisinghe supervised the Industrial Training program of Miss. B. L.

D. R. N. Liyanage, a student of Department of Agriculture Economics, Faculty of Agriculture, University of Ruhuna.

Dr. I. M. S. K. Idirisinghe supervised the research project of Miss. B. L. D. R. N. Liyanage, a student of Department of Agriculture Economics, Faculty of Agriculture, University of Ruhuna on "Knowledge of growers on pest and diseases control in coconut cultivation".

### **Served as Visiting Lecturers**

Dr. C. S. Ranasinghe served as a visiting lecturer for the M. Sc. course on 'Physiology of Plantation Crops' at the Postgraduate Institute of Agriculture (PGIA), University of Peradeniya.

Dr. C. S. Ranasinghe served as a visiting lecturer for the B.Sc under graduate course of 'Climate change impacts on coconut and yield prediction' at the Department of Plantation Management at the Wayamba University of Sri Lanka, Makandura.

Ms. Kumudu Fernando served as a visiting lecturer for the B.Sc under graduate course of latex and palm technology at the Uva Wellassa University of Sri Lanka.

Dr. Chandi Yalagama served as a visiting lecturer for the B.Sc Processing technologies of coconut kernel at the Wayamba University of Sri Lanka.

Dr. H. D. D. Bandupriya served as a Visiting Lecturer at the Department of Aquaculture & Fisheries, Faculty of Livestock Fisheries and Nutrition, Wayamba University of Sri Lanka, Makandura.

Dr. H. D. D. Bandupriya served as a Visiting Lecturer at the Department of Plant

Sciences, Faculty of Science, University of Colombo, Sri Lanka.

Dr. S. A. C. N. Perera served as a visiting lecturer for the course on PBT 462 Plant Breeding at the University of Sri Jayawardenepura.

### **Served as referees**

Dr. N. S. Aratchige served as a referee for; the Journal Experimental and Applied Acarology, Proceedings of the Young Scientist Forum (YSF), Symposium of National Science and Technology Commission, Sri Lanka, and Proceedings of the Conference of Agricultural Sciences' of the Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

Dr. H. T. R. Wijesekara served as a referee for Proceedings of the Conference of Agricultural Sciences' of the Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

Dr. A. D. N. T. Kumara served as referee for the African Journal of Biotechnology.

Dr. C. S. Ranasinghe served as a referee for Journal of Agricultural Sciences and International conference of Agricultural Science of the Sabaragamuwa University of Sri Lanka.

Dr. H. M. I. K. Herath Served as a referee for Agriculture, Ecosystems and Environment Journal, Agricultural Water Management Journal, Agricultural and Forest Meteorology Journal, Journal of Cleaner Production, International Journal of Water Resources and Environmental Engineering, Tropical Agricultural Science and Proceedings of Young Scientist Forum

(YSF) Symposium of National Science and Technology commission.

Dr. Chandi Yalgama served as a reviewer for the Food Chemistry (Elsevier Journal, the Springer plus (on line journal) and the 3<sup>rd</sup> international conference of agricultural sciences of Sabaragamuwa University of Sri Lanka in 2016.

Dr. H. D. D. Bandupriya served as a referee for the Journal of Southeast Asian Regional Centre for Tropical Biology (SEAMEO BIOTROP).

Dr. C. S. Herath served as a referee for the Journal of Agricultural Science.

Dr. L. Perera served as a reviewer for the Journal of the National Science Foundation of Sri Lanka, Journal of the Tea Research Institute and a text book proposal on "coconut" submitted for the Springer publications, USA.

Dr. S. A. C. N. Perera served as a reviewer for Journal of the National Science Foundation of Sri Lanka, African Journal of agricultural Research, African Journal of Biotechnology, Issues in Biological Sciences and Pharmaceutical Research, International Journal of Agricultural Policy and Research, International Journal in Multidisciplinary Studies (IJMS), Journal of Biology and Nature, Journal of Plant Breeding and Crop Science, SABRAO Journal of Breeding and Genetics, Institute of Biology Annual sessions.

#### **Invitation as resource speaker:**

Dr. N. S. Aratchige made the keynote address on "Coconut mite management in Sri Lanka: Fifteen years after" at the Global Conference

in Entomology", held in Colombo, Sri Lanka.

Dr. I. M. S. K. Idirisinghe served as a resource person to deliver presentation on "Cost of Production of Coconut" for the Annual General Meeting of Coconut Growers Association 30 July, 2016.

Dr. H. D. D. Bandupriya was invited as a resource speaker in the 47<sup>th</sup> APCC COCOTECH Conference organized by the Asia and Pacific Coconut Community held from 26<sup>th</sup> – 30<sup>th</sup> September 2016 Bali, Indonesia.

Dr. L. Perera delivered an invited lecture at the Annual General Meeting of the Coconut Growers Association of Sri Lanka on "dwarf x tall coconut hybrids for reaching the 3.8 billion mark in national coconut production", Foundation Institute, Colombo. 30 July 2016.

Dr. S. A. C. N. Perera delivered a lead lecture in the session on Coconut Biotechnology on 'Application of DNA Technology in the Genetic Improvement of Coconut: Current Status and Future Possibilities' at the International Symposium on Coconut Research and Development (ISOCRAD-3) organized by the Central Plantation Crops Research Institute (CPCRI) in India, in parallel with the 100<sup>th</sup> Year Celebration of CPCRI.

Dr. S. A. C. N. Perera made a presentation on 'Current Status and Future Directions of Agricultural Biotechnology Research in Sri Lanka in Plantation sector' at the national workshop on 'Current Status & Future Directions in Agricultural Biotechnology Research in Sri Lanka, organized by the Council for Agricultural Research Policy and held in Colombo.

Dr. S. A. C. N. Perera made a presentation on 'Current Status and Future Directions of Coconut Breeding in Sri Lanka' at the national workshop on 'Current Status & Future Directions of Plant Breeding Research in Sri Lanka, organized by the Council for Agricultural Research Policy and held at Batalagoda.

Dr. M. K. Meegahakumbura delivered an invited lecture at the Open University Research Sessions on "Research towards future prosperity in coconut industry in Sri Lanka", 17-18 November, 2016, The Open University of Sri Lanka, Colombo.

Dr. H. D. D. Bandupriya served as a resource person for the Kick-off meeting of the project on Developing cryopreservation protocols for sub-tropical crops and establishing cryo-genebank at RDA in coordination with Bioversity International", co-organized by Bioversity International, Rural Development Administration (RDA) Republic of Korea, and the Philippines Coconut Authority (PCA), 22<sup>nd</sup> to 24<sup>th</sup> November, Legazpi, Philippines.

### Other Academic Activities

Dr. N. P. A. D. Nainanayake, served as the coordinator and many staff members worked as either Chairperson or members of the organizing committee of the Sixth Symposium on Planation Crop research held at the Waters Edge, Battaramulla and BMICH from 2 – 4 November 2016.

Dr. L. Perera and Dr. S. A. C. N. Perera served as reviewers and an evaluator of Project Proposals, Progress Reports of the Council of Agricultural Research Policy (CARP) funded projects.

Dr. L. Perera served as an evaluator for the

final project report on "Development of a molecular detection system of casual agents for controlling virus and virus-like diseases of Chili (*Capsicum annum L.*) in Sri Lanka" for the National Science Foundation of Sri Lanka.

Dr. N. S. Aratchige attended the meeting on 'Roundtable on Sustainable Oil Palm (RSOP)', held on 11<sup>th</sup> May 2016, in Colombo.

Dr. N. S. Aratchige, Dr. P. Waidyarathne, Dr. D. Bandupriya and Dr. H. M. I. K. Herath assisted in editing the Short Annual Report of the Coconut Research Institute for 2015.

Dr. A. D. N. T. Kumara attended the Round table discussion on "Role of Agrochemicals and Fertilizers: Their Benefits, Risks and Social Impacts" organized by Science and Technology Advisory Committee (STAC) - Sri Lanka Association for Advancement of Science (SLAAS).

Dr. H. M. I. K. Herath served as the session coordinator for the session on Agriculture and Food Science at the 6<sup>th</sup> symposium of the Young Scientist Forum (YSF) Symposium of National Science and Technology commission.

Dr. H. M. I. K. Herath served as a rapporteur for the session on Environment at the 8<sup>th</sup> Sri Lanka Biennial Conference on Science and Technology (BICOST- VIII) on the 25<sup>th</sup> November 2016.

Dr. H. D. D Bandupriya served as a session chairperson for the Agricultural Sciences session of the 5<sup>th</sup> YSF symposium of the National Science and Technology Commission, January 22<sup>nd</sup> 2016.

Dr. H. D. D. Bandupriya served as an External Examiner of the MSc viva-voice examination

of Mr. G. P. W. A. Prabhath, a PG student of University of Colombo, for the defense of the thesis titled '*In vitro* culture of the male flowers in *Musa balbisiana*'.

Dr. H. D. D. Bandupriya served as an External Examiner of the MSc viva-voice examination of Ms. W. A. S. D. P. Kumari, a PG student of University of Colombo, for the defense of the thesis titled '*In vitro micro propagation of Punica granatum (Delum) and Terminalia arjuna (Kumbuk)*'.

Dr. H. D. D. Bandupriya served as an External Examiner of the MSc viva-voice examination of Ms. K Pushpanjie, a PG student of University of Colombo, for the defense of the thesis titled '*In vitro* polyploidization of wild banana (*Musa balbisiana*).

Dr. L. Perera served as the chairperson of the technical session on coconut germplasm utilization and breeding at the XLVII APCC COCOTECH Conference, organized by the Asian Pacific Coconut Community (APCC), Ramada Bintang Bali Resort, Bali, Indonesia, 26-30 September 2016.

Dr. L. Perera served as a chairperson of the technical session on coconut germplasm utilization and breeding at the 3<sup>rd</sup> International Symposium on Coconut Research and Development (ISOCRAD 3), organized by ICAR-Central Plantation Crop Research Institute (CPCRI), CPCRI, Kasaragod, Kerala, India, 10-12 December 2016.

Dr. L. Perera served as a rapporteur at the technical session on plant breeding and germplasm conservation at the 6<sup>th</sup> Plantation Crop Research Symposium, Waters Edge hotel, Battaramulla, Colombo, 2-4, November 2016

Dr. S. A. C. N. Perera served as a Member of the Panel of Judges in the Biotechnology section of the Agriculture Research Symposium of the Wayamba University of Sri Lanka.

Dr. S. A. C. N. Perera served as a resource person at the Short Course in Plant Breeding conducted by the Open University of Sri Lanka.

Dr. S. A. C. N. Perera served as a chairperson for the session on biotechnology at the Wayamba International Symposium organized by the Wayamba University of Sri Lanka.

Dr. I. M. S. K. Idirisinghe served as an evaluator for the SLCARP to evaluate the research proposals for funding and for evaluation of project progress reports and presentations.

Dr. I. M. S. K. Idirisinghe served as an evaluator for the National Science Foundation (NSF) to evaluate the research proposal on Development of an efficient coconut de-husking machine for industry.

Dr. C. S. Ranasinghe served as a Chairperson of a Technical session at the Wayamba University International Conference, 19 Aug 2016.

Dr. N. P. A. D. Nainanayake participated as the judging panel member of the External Degree programme on Plantation Management of the Faculty of Agriculture and Plantation Management of Wayamba University.

Dr. D. M. D. I. Wijebandara and Dr. H. M. I. K. Herath served as panelists at the First Round Table Discussion on "Role of Fertilizer: Current Status, Benefits and Risks" organized

by the Science and Technology Advisory Committee (STAC) of Sri Lanka Association for the Advancement of Science (SLAAS) on 15<sup>th</sup> September 2016 at the SLAAS Council Chamber.

Staff of the research divisions participated as resource persons in Certificate course on coconut production (one day training series), Research Extension Dialogues with officers of Coconut Development Board, training programmes for Regional Managers and Coconut Development Officers of the CCB.



# STAFF MEMBERS OF THE COCONUT RESEARCH INSTITUTE

## CHAIRMAN

**Jayantha Jayewardene**

## DIRECTORATE

### Director up to April 26<sup>th</sup> 2016

**H. A. J. Gunathilake**

B.Sc (Agric), Ph.D (University of Wales, UK)

### Director from June 2016

**Mrs. L. C. P. Fernando**

B.Sc (Agric), Ph.D (University of Queensland, Australia)

### Additional Director up to June 2016

**Mrs. L. C. P. Fernando**

B.Sc (Agric), Ph.D (University of Queensland, Australia)

### Additional Director from December 2016

**Mrs. C. S. Ranasinghe**

B.Sc., Ph.D (University of Sussex, UK)

### Deputy Director (Research) up to June 2016

**N. A. Tennakoon**

B.Sc (Agric), M.Phil (Kelaniya), Ph.D (University of Aberdeen, UK), M I Biol

### Deputy Director (Admin.) from April 2016

**K. W. B. M. P. Wijesundera**

B.Com. (Special), Master of Business Administration

## AGRONOMY DIVISION

### Head

**R. P. H. S. H. S. Senaratne**  
B.Sc (Agric,) M.Sc (Agric), Ph.D (Peradeniya)

### Senior Research Officer

Miss. S. C. Somasiri, B.Sc (Agric), M.Sc,Ph.D  
(Massey University, New Zealand)

### Research Officers

A. A. A. J. Atapattu, B.Sc (Agric)  
S. A. S. T. Raveendra, B.Sc (Agric. & Tech. Mgt)

### Experimental Officer

M. J. I. Costa

### Technical Officers

J. A. A. Gunasekara Dip. (Agric)  
W.M. Nuwan

### Management Assistant

Mrs. W.J.M.D.M.A. Dias, Dip (Productivity)

### Lab & Field Assistants

M. A. N. A. Kumara  
B. A. A. Ranganath

### Senior Lab & Field Attendant

H. K. Prasanna

### Lab & Field Attendant

S. M. R. C. Subasinghe

### Office Attendant

A. K. D. L. Jayathissa

### Driver

Mr.S.Krishnathas

## GENETICS AND PLANT BREEDING DIVISION

### Head

**A. A. F. L. K. Perera**  
B.Sc (Agric.), M.Sc (Agric), Ph.D (Peradeniya)

### Principal Research Officer

Miss. S. A. C. N. Perera, B.Sc (Agric), Ph.D  
(University of Birmingham, UK)

### Research Officers

M. G. M. K. Meegahakumbura, B.Sc (Sci),  
M.Sc (Bio)\*

Miss. H. D. M. A. C. Dissanayake, B.Sc (Agric),  
M.Sc\*

S. V. G. C. R. Kumara, B.Sc (Agric), M.Sc

### Seed & Seedling Production & Certification Officer

L. M. S. R. Jayathilake, B.Sc (Agric), M.Sc  
(Agric)

### Seed & Seedling Production & Certification Assistants

P. G. R. S. Premathilake, B.Sc (Agric)

R. I. B. C. T. Herath, B.Sc (Agric), M.Sc (Crop  
Science)

M. N. Nadeeranga, B.Sc (Agric)

R. C. M. Wijayaratne, B.Sc (Agric)

L. J. Saman, B.Sc (Agric)

A. S. Jayasundara, B.Sc (Agric)

D. M. L. Amarasiri, B.Sc (Agric)

### Experimental Officers

Mrs. W. B. M. S. S. Fernando

M. S. M. Faheem

### Senior Technical Officer

H. M. N. B. Herath

### Technical Officers

S. A. S. Chandrasiri

A. A. Fernando, Dip. (Agric)

U. D. C. S. Kumara, HNDT (Agric)

M. M. Hettiarachchi

### Senior Management Assistant

Mrs. I. N. Jayawardena

### Senior Lab & Field Assistant

W. Wimalasiri

### Lab & Field Assistants

S. M. R. T. Senaratne

### Lab & Field Attendants

G. D. A. Milroy

J. M. A. S. Kumara

T. A. S. R. T. Thenuwara

M. M. T. Kumara

### Office Attendant

Mrs. D. M. R. Chandani

## SOILS AND PLANT NUTRITION DIVISION

### Head

**Mrs. D. M. D. I. Wijebandara**  
B.Sc (Sci), M.Phil (Peradeniya),  
M I Biol, Ph.D (University of Agric.Sci., Dharwad, India)

### Senior Research Officer

Mrs. H. M. I. K. Herath, B.Sc (Agric), M.Sc, (Soil Management), Ph.D (Massey University, New Zealand)

Miss. M. K. F. Nadheesha, B.Sc (Chemistry), M.Sc (Food Technology)

### Research Officers

Mrs. P. G. Scynthiya, B.Sc (Agric) M. Phil. (Environmental Soil Science)

Miss. D. M. P. D. Dissanayaka , B.Sc (Agric. Tech. Mgt)

### Experimental Officers

Mrs. C. P. A Kurundukumbura, B.Sc (Agric)

K. P. I. E. Ambagala, Dip. (Agric)

K. P. A. Pathirana, Dip. (Agric)

### Technical Officers

B. S. V. J. Perera, Dip. (Agric)

Mrs. H. L. A. Padmini, Dip. (Agric)

Mrs. G. A. M. Samanthi, Dip. (Agric)

Miss M.Y.G. Perera

### Management Assistant

Miss T. M. D. Abeyratne

### Senior Lab & Field Assistants

W. Gunasena

### Lab & Field Assistants

J. A. R. T. Jayasinghe

Mrs. B. M. A. U. Amarathunga

### Lab & Field Attendants

W. R. P. Tissera

H. M. S. Nayanakumara

L. M. G. D. Liyanage

M. A. G. Pathiraja

Miss. R. K. K. H. J. Jayasinghe

## CROP PROTECTION DIVISION

### Head

**H. T. R. Wijesekara**

B.Sc (Agric), Ph.D University of IARI (India, Delhi)

### Principal Research Officer

Mrs. N. S. Aratchige, B.Sc (Agric), Ph.D  
(University of Amsterdam, Netherlands)

### Research Officers

A. D. N. T. Kumara, B.Sc (Agric), M.Sc (Crop  
Protection)\*

P. H. P. R. De Silva, B.Sc (Agric)

Mrs. N. I. Suwandaratne, B.Sc (Agric), M. Sc.  
(Zoological Science)

Mr. N. Jeyadharshan

### Experimental Officers

K. A. S. Chandrasiri

K. F. G. Perera

P. H. A. P. Siriwardena, B.Sc (Agric)

### Technical Officers

S. P. Manoj

Mrs. W. D. T. Mihiranthi, HNDD (Agric)

M. T. M. Wijewardena

Mr. T. B. K. H. Neranjana

### Lab & Field Assistants

C. W. S. P. Yapa

Miss. C. A. N. Anthony

### Lab & Field Attendants

R. K. M. S. N. Rajapaksha

K. M. G. C. Kumarasinghe

P. M. G. S. Shelton

J. A. S. Niroshan

Mrs. T. S. Abeyratne

A. M. P. Sanjaya

### General Workers

M. A. S. Chandana

Mrs. H D Suseetha

### Driver

A. K. Pemadasa

## TISSUE CULTURE DIVISION

### Head

**Mrs. V. R. M. Vidanaarachchi**

B.Sc (Agric), Ph.D (University of Kagoshima, Japan)

### Senior Research Officer

Mrs. H. D. D. Bandupriya, B.Sc (Botany), Ph.D  
(University of Reading, UK)

### Lab & Field Assistants

Mrs. T. D. A. A. Keerthisinghe  
Miss. E. M. N. Maduwanthi

### Experimental Officer

E. S. Santha

### Lab & Field Attendants

R. M. N. Sandasiri  
R. S. Nalin Kumara  
Mrs. M. S. M. Dharmaratne

### Technical Officer

Mrs. T. R. Gunathilake, Dip. in Science

## COCONUT PROCESSING RESEARCH DIVISION

### Head

**Mrs. L. L. W. C Yalegama**

B.Sc (Chem), M.Sc (India),  
Ph.D (University of Peradeniya, Sri Lanka)

### Research Officers

Mrs. H. A. E. Samaranyake, B.Sc (Food Sci.  
& Tech)  
Miss. H. P. D. T. Hewapathirana, B.Sc (Agric)

### Lab & Field Assistants

Mrs. S. H. K. G. Kumarasiri  
Mrs. W. N. M. Fernando  
N. A. C. Udayasiri

### Assistant Chemical Engineer

Mrs. J. A. K. M. Fernando, B.Sc (Engineering)

### Lab & Field Attendant

W. M. G. Jayawardena

### Experimental Officers

G. R. A. Dharmasena, B.Sc (Sci)  
S. S. Rajapaksa Dip. (Agric)

### Office Attendant

Mrs. S. H. M. Chandrawathie

### Technical Officers

Mrs. T. M. S. G. Weerasinghe, Dip. (Agric)  
J. A. D. Madusanka  
I. G. M. W. Imbulegama

### General Worker

S. A. K. Sanjeewa

## PLANT PHYSIOLOGY DIVISION

### Head

**Mrs. C. S. Ranasinghe**

B.Sc., Ph.D (University of Sussex, UK)

### Principal Research Officer

N. P. A. D. Nainanayaka, B.Sc (Sci), M.Phil (Peradeniya), Ph.D (University of Essex, UK)

### Senior Research Officer

Mrs. K. P. Waidyaratne, B.Sc (Agric), Ph.D(Lincoln University, New Zealand)

### Research Officer

M. D. P. Kumarathunga, B.Sc (Agric).  
Miss. T. H. Chandarathilaka

### Experimental Officers

R. D. N. Premasiri  
W. A. S. Wickramarachchi

### Technical Officers

A. P. C. Pradeep, Dip. (Agric)  
W. K. M. K. Herath

### Management Assistant

Miss. H. M. S. K. Herath

### Senior Lab & Field Attendants

J. H. U. Jayamaha  
M. M. N. Jayathissa

### Lab & Field Attendants

R. D. A. Lenard  
Miss. A. M. J. N. Arthanayaka

### Office Attendant

J. A. R. Malintha

## AGRICULTURAL ECONOMICS AND AGRIBUSINESS MANAGEMENT DIVISION

### Head

**I. M. S. K. Idirisinghe**

B.Sc (Agric), M.Sc (Peradeniya),  
Ph.D (Tomas Bata University, Czech Republic)

### Senior Research Officer

Mrs. K. V. N. N. Jayalath, B.Sc (Agric), M.Phil (Peradeniya)

### Research Officer

Mrs. P. M. E. K. Pathiraja, B.Sc (Agric) MPhil (Peradeniya) \*

### Experimental Officer

S. D. J. N. Subasinghe, Dip. (Agric)

### Lab & Field Assistant

Miss. W. A. S. Fernando

### Lab & Field Attendant

Miss S. M. A. Chiranthi

## TECHNOLOGY TRANSFER DIVISION

### Officer-in-Charge

**C. S. Herath**

B.Sc (Agric), M.Sc (Peradeniya),  
Ph.D (Tomas Bata University, Czech Republic)

### Technology Transfer Officers

Mrs. H. D. N. H. Fonseka, B.Sc (Agric), M.Sc  
(Peradeniya)

K. M. R. T. Wijekoon, B.Sc (App. Sci. USJP),  
M.Sc (Peradeniya)

Mrs. W. G. R. Subhathma, B.Sc (Agric), M.Sc  
(Ruhuna)

### Assistant Extension Officer

E. M. T. Bandaranayake, B.Sc (Agric), M.Sc  
(Agric) (Peradeniya)

### Superintendent

I. A. N. Hemasiri

### Technical Officer (Audio/Visual)

M. A. P. Sanjeewa

### Technical Officer

M. D. M. Perera

### Senior Lab & Field Assistant

N. A. W. Jayasiri

### Lab & Field Attendants

Mrs. W. S. S. Fernando

Miss K. P. A. Sanjeewani

### Binder

I. H. D. Senarath

### Senior Office Attendant

K. A. S. C. N. Fernando

### General Workers

K.A.A. Kumara

S. A. A. Viraj

## LIBRARY

### Librarian

**Mrs. P. D. U. C. Dharmapala**  
FELE, BLE

### Senior Lab & Field Attendant

J. H. Premaratne

### Lab & Field Attendants

Miss K. R. M. P. Gayadari

G.A.S. Nuwanpriya

## ESTABLISHMENT UNIT

### Assistant Director (Administration)

A. S. Nanayakkara

#### Procurement Officer

M. C. H. N. Fernando – BLE, Dip. in HRE-ACBRE

#### Personal Assistant to the Director

Mrs. M. P. Premaratne

#### Personal Assistant to the Chairman

Mrs. H. M. A. Herath

#### Administrative Officer

Mrs. K. P. S. Jayathilake, Dip. (HRM)

#### Human Resource Officer

Mrs. W. S. R. Fernando, Dip. (HRM)

#### Senior Management Assistant

Mrs. U. I. Abeysinghe

#### Management Assistants

W. M. S. Lowe

P. C. P. K. Fernando, B.Com

P. D. Kathriarachchi

Miss W. A. H. Shenali, AAT

Mrs. M. A. N. Dilrukshi, BA (Special)

Miss U. A. D. N. K. Chathurani

Mrs. D. T. D. Dhanapala

Miss P. D. Wickramanayake

#### Telephone Operator/Receptionist

Miss. W. M. S. M. Rathnayake

#### Lab & Field Assistant

W. M. M. Gihan

#### Lab & Field Attendants

K. K. A. Mendis

Mrs. R. A. P. Jayamanna

#### Office Attendant

J. K. J. Perera

#### General Workers

D. K. S. Senarath

Mrs. H. A. T. Thilakumari

D. W. K. Madushanka

K. A. M. Indika

M. P. S. Fernando

Mrs. R. D. Shiroma

Mr. P. V. N. W. Kumara

#### Drivers

T. M. C. Peiris

J. M. C. Apphamy

C. N. Luxman

J. Amarasinghe

K. P. S. Dissanayaka

J. A. D. B. D. Appuhamy

I. P. K. P. Perera

P. G. . S. Karunarathna

H. M. Jayathunga

K. D. L. Gunawardena

E. G. N. Bandara

H. M. D. N. Herath

E. G. A. P. Jinadasa

T. P. J. Chamendra

C. S. Basnayaka

W. M. Jayarathna Banda

Mr. W. M. Sudantha Kumara

Mr. H. C. Pradeep Thirimanna

Mr. M. Ranjith Rupasinghe

#### Vehicle Attendants

D. W. Nevil

T. M. A. P. Kumarasinghe

S. H. A. M. Premarathna

## INTERNAL AUDIT UNIT

### Internal Auditor

**P. W. A. Fernando**

B.B. Mgt. (Accounting)

### Senior Management Assistant (Auditng)

Mrs. M. M. J. R. Fernando

### Management Assistant (Auditing)

H. S. S. S. De Seram, AAT

### Senior Management Assistant

Mrs. S.N. Gunathilake

### Management Assistant

G. P. K. Madhusanka

### Office Attendant

Mr. R.P. Newil

## ACCOUNTS UNIT

### Senior Accountant

**R. M. U. Chandranath**

B.Sc [Management (Public)],  
PgD (Public Administartion), Fellow of APFA

### Accountant

Mrs. B.A.D.C.S. Bulathsinhala, B.Com (Special)

### Senior Management Assistant (Accounting)

Mrs. A. S. M. S. Abeywickrama

### Management Assistants (Book Keeping)

A. H. M. J. S. Abeyrathne, HNDBS  
Mrs. W. D. P. Fernando, AAT, B.Sc (Accountancy & Business Finance)  
H. P. S. V. Herath

### Management Assistant (Accounting)

Mrs. W. A. N. K. Wijesinghe

### Management Assistant (Shroff)

Mrs. R. D. S. Priyadarshani, AAT

### Management Assistant (Store-Keeping)

S. M. R. B. Subasinghe, AAT

### Management Assistants

J. A. S. Indika

### Office Attendants

P. K. C. Sampath  
R. K. S. Wimalasiri

### General Worker

K. M. V. C. P. Kumarasinghe

## ENGINEERING UNIT

### Resident Engineer

**A. L. D. K. Amarasinghe**

Dip. (Eng. Science), NDES (Civil)

### Works Superintendent

P. H. D. T. S. Wimalaratne

### Tinker

C. M. S. F. Leslipulle

### Technological Officer (Electrical)

S. T. Rajapaksha

### Electrical Helper

H. M. N. Jayarathna

### Management Assistant

Miss. P. P. D. T. N. Dayanisious

Miss. H. M. Mallikarachchi

### Building Helper

K. J. J. Appuhamy

### Senior Motor Mechanic

R. M. S. G. Rathnayaka, NTC, NAB

### Plumber

B. R. D. Silva

### Motor Mechanic

Y. P. N. D. Wijesinghe

### General Workers

E. M. U. Nishantha

R. P. S. J. Manchanayake

### Senior Electricians

K. H. A. Chandrasiri

J. R. C. R. Perera

W. A. S. S. Weerasinghe

P. D. Perera

### Lab & Field Attendant

W. M. R. Sisira

B. M. L. Dharmasiri

## ESTATE MANAGEMENT DIVISION

### Manager (Estates)

**V. P. M. Prasantha**

B.Sc (Agric)

### Senior Management Assistant

Mrs. M. G. Karunawathie

### Office Attendants

M.A.G. Ananda

### Management Assistant (Book Keeping)

H.M.I.C. Ekanayake

W A T Arunasiri

## BANDIRIPPUWA RESEARCH CENTER

### Superintendent

W. A. H. Upali, Dip. (Plantation Management)

### Assistant Estate Superintendent

H. M. P. N. Herath

### Senior Supervisor

A. A. Sirinimal

### Management Assistant

Mrs. J. A. D. R. U. Jayasinghe

### Lab & Field Attendant

H. A. C. P. Hettarachchi

Miss. R. M. S. S. Rathnayaka

### Office Attendant

W. A. S. Jayathilake

## RATMALAGARA RESEARCH CENTRE

### Superintendent

D. P. S. K. Hettiarachchi, Dip.(Agri. & EM)

### Senior Supervisor

A. G. B. G. Silva

### Management Assistant

D. M. Jayawardena

### Lab & Field Attendant

J. C. P. Jayamanna

## AMBAKELLE GENETIC RESOURCES CENTRE

### Superintendent

I. P. S. A. Wanasinghe, B.Sc (Agric)

### Senior Supervisor

M. P. W. Fernando

### Senior Pollination Labour

J. A. D. N. Stanly

### Supervisor

T. M. N. Menaka

### Watcher

D. M. L. Jayarathna

### Senior Driver

M. J. A. Mirando

## MADURUOYA GENETIC RESOURCES CENTRE

### Assistant Superintendent

L. S. B. Liyanage, B.Sc (Agric)

### Supervisor

Mr. W.L. Thushara

### Office Attendant

W. G. Mallika Manike

### Watcher

S. M. U. D. Singhabahu

## MIDDENIYA RESEARCH CENTRE

### Assistant Superintendent

Y. P. D. S. Pathiraja, B.Sc (Industrial Studies)

## DUNKANNAWA RESEARCH CENTRE

### Lab & Field Assistant

E. A. S. Kumara

## WALPITA RESEARCH CENTRE

### Officer-in-Charge

S. A. S. Kumara

### General Worker

D. M. T. Sampath

## POTHTHUKULAMA RESEARCH CENTRE

### Officer-in-Charge

W. W. A. P. R. Fernando

### Management Assistant

R. M. N. K. Ratnayaka

### Lab & Field Attendant

H. J. M. P. Nilanga

## MAKANDURA RESEARCH CENTRE

### Assistant Superintendent

W. M. U. Ratnayake, Dip. (Plantation Management)

### Supervisor

W. M. N. G. Wijayatunga

### Driver

K. K. Piyatissa

### Office Attendant

Mrs. P. M. Kamalawathie

## PALLAMA GENETIC RESOURCES CENTRE

### Officer-in-Charge

W. M. D. R. Wijesinghe

### Supervisor

K. G. Wasantha

### Lab & Filed Attendant

Mrs. S. A. Sumanawathie

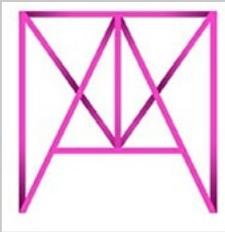
## THABBOWA DEMONSTRATION FARM

### Lab & Field Assistant

H. M. C. Bandara

\* Study Leave    \*\* No pay Leave





# STAFF : RECRUITMENTS, RESIGNATIONS, RETIREMENTS, PROMOTIONS & TRANSFERS

## Recruitments

Name	Designation	Date of appointment
Mr. S. T. Rajapaksha	Technical Officer (Electrical)	01.02.2016
Mrs. J. A. D. R. U. Jayasinghe	Management Assistant	01.02.2016
Mr. H. M. I. C. Ekanayake	Management Assistant (Book Keeping)	08.02.2016
Dr. C. S. Herath	Principal Technology Transfer Officer	06.04.2016
Dr. K. P. Waidyaratne	Senior Research Officer	06.04.2016
Mr. M. D. M. Perera	Technical Officer	18.04.2016
Mr. I. G. M. W. Imbulegama	Technical Officer	18.04.2016
Mr. M. R. I. B. Madduma	Technical Officer	18.04.2016
Mr. T. B. K. H. Neranjana	Technical Officer	18.04.2016
Mr. M. M. Hettiarachchi	Technical Officer	18.04.2016
Mr. E. M. I. D. K. Ekanayake	Technical Officer	18.04.2016
Mr. W. M. Nuwan	Technical Officer	18.04.2016
Mr. B. M. N. P. Jayasinghe	Technical Officer	02.05.2016
Mr. H. M. P. N. Herath	Assistant Estate Superintendent	18.04.2016
Miss M. Y. G. Perera	Technical Officer	25.04.2016
Mr. K. W. B. M. P. Wijesundera	Deputy Director(Admin)	25.04.2016
Dr. L. C. P. Fernando	Director	08.06.2016
Mr. S. A. K. Sanjeewa	General Worker	05.07.2016
Mr. P. V. N. W. Kumara	General Worker	05.07.2016
Mr. B. M. L. Dharmasiri	Lab & Field Attendant	05.07.2016
Mr. A. M. P. Sanjaya	Lab & Field Attendant.	05.07.2016
Miss W. A. H. Shenali	Management Assistant	05.07.2016
Miss T. M. D. Abeyratne	Management Assistant	05.07.2016
Mrs. B. A. D. C. S. Bulathsinhala	Accountant	05.07.2016
Mrs. M. A. N. Dilrukshi	Management Assistant	25.07.2016

<b>Name</b>	<b>Designation</b>	<b>Date of appointment</b>
Miss U. A. D. N. K. Chathurani	Management Assistant	25.07.2016
Mr. A. A. C. Dhammika	General Worker	25.07.2016
Mrs. W. S. R. Fernando	Human Resource Officer	22.08.2016
Mrs. K. P. S. Jayathilaka	Administrative Officer	22.08.2016
Miss. M. K. F. Nadeesha	Senior Research Officer	22.08.2016
Mr. P. H. D. T. S. Wimalarathne	Work Superintendent(Civil)	25.08.2016
Mr. W. M. Sudantha Kumara	Driver (Transport)	24.10.2016
Mr. H. C. Pradeep Thirimanna	Driver (Transport)	24.10.2016
Mr. M. Ranjith Rupasinghe	Driver (Transport)	24.10.2016
Mr. S. Krishnathas	Driver (Transport)	25.10.2016
Miss. T. H. Chandarathilaka	Research Officer	07.11.2016
Mrs. H. A. N. Subhashini	Management Assistant(Acc)	19.12.2016
Dr. C. S. Ranasinghe	Additional Director	14.12.2016

## Resignations

<b>Name</b>	<b>Designation</b>	<b>Date</b>
Mr. Y. P. D. S. Pathiraja	Assistant Estate Superintendent	24.03.2016
Mr. N. M. Piyasena	Technical Officer	31.05.2016
Mr. E. M. I. D. K. Ekanayake	Technical Officer	15.06.2016
Mr. W. A. D. I. Perera	Technical Officer	20.06.2016
Mr. D. M. S. Ramesh	Lab Field Attendant	01.08.2016
Mr. S. N. Jayaweera	Lab & Field Assistant	03.10.2016
Mr. S. N. R. M. V. B. Herath	Lab & Field Assistant	03.10.2016
Mrs. K. P. K. J. Ranathunga	Management Assistant	05.10.2016
Mr. L. B. P. Niroshan	Lab & Field Attendant.	03.10.2016
Mr. B. M. N. P. Jayasinghe	Technical Officer	01.10.2016
Mr. M. R. A. B. Madduma	Technical Officer	25.10.2016
Mr. E. M. A. Thilakarathne Banda	Senior Technical Officer	01.11.2016
Mrs. H. M. W. S. Athauda	Senior Management Assistant (Steno)	09.12.2016
Mr. H. M. H. P. Herath	Lab & Field Assistant	18.09.2015
Miss. R. M. L. N. Ratnayake	Management Asst.(Book Keeping)	19.10.2015

## Retirements

Name	Designation	Date
Mr. J. A. R. Reginold	Management Assistant	23.02.2016
Mr. A. A. K. Amarasinghe	Senior Carpenter	27.02.2016
Mrs. R. M. S. Ratnayake	Senior Draughts Management Assistant	18.03.2016
Dr. H. A. J. Gunathilaka	Director	26.04.2016
Mr. S. R. P. Jayamanna	Linesman	07.05.2016
Mr. B. Dharmasiri	Driver	25.05.2016
Dr. N. A. Tennakoon	Deputy Director (Research )	13.06.2016
Mr. H. K. A. N. Appuhamy	Driver	21.06.2016
Mr. W. M. Dhanapala	Meson	31.07.2016
Mrs. N. H. R. M. De Silva	Experimental Officer	11.08.2016
Mr. M. H. L. Padmasiri	Experimental Officer	29.09.2016
Mr. H. M. Podirathne	Management Assistant	07.12.2016

## Transfers

Name	Designation	Date
J. A. S. L. Jayasinghe, Lab & Field Attendant	From - Soil & Plant Nutrition Division To - Tissue Culture Division	15.02.2016
W. Wimalasiri , Senior Lab & Field Attendant	From - Soil & Plant Nutrition Division To - Genetics & Plant Breeding Division	15.02.2016
R. M. N. Sandasiri , Senior Lab & Field Attendant	From - Tissue Culture Division To- Soil & Plant Nutrition Division	15.02.2016
M. A. G. Pathiraja, Lab & Field Attendant	From - Genetics & Plant Breeding Division To - Soil & Plant Nut Division	15.02.2016
S. M. A. Chiranthi, Lab & Field Attendant	From - Soil & Plant Nutrition Division To- Agri Economic Division	15.02.2016
W. S. S. Fernando, Lab & Field Attendant	From - Agri Economic Division To- Soil & Plant Nutrition Division	15.02.2016
M. A. G. Ananda, General Worker (Office Attendant)	From - Establishment Unit To- Estate Management Division	15.02.2016
J. K. J. Perera, General Worker (Office Attendant)	From - Internal Audit Unit To - Establishment Unit	15.02.2016
R. P. Newil, General Worker (Office Attendant)	From - Estate Management Division To - Internal Audit Unit	15.02.2016
K. A. A. Kumara, General Worker	From - Accounts Division To- Technology Transfer Division	15.02.2016
K. M. V. C. P. Kumarasinghe, General Woker	From - Technology Transfer Division To- Accounts Division	15.02.2016

Name	Designation	Date
K. R. M. P. Gayadari, Lab & Field Attendant	From -Technology Transfer Division To- Library	15.02.2016
K. P. A. Sanjeevani, Lab & Field Attendant	From - Bandirippuwa Research Center To-Technology Transfer Division	15.02.2016
W. M. U. Ratnayake, Estates Superintendent	From - Bandirippuwa Research Center To- Makandura GRC	18.02.2016
W. A. H. Upali, Estates Superintendent	From - Ambakelle GRC To- Bandirippuwa Research Center	15.02.2016
I. P. S. A. Wanasinghe, Assistant Estates Superintendent	From - Makandura GRC To- Ambakelle GRC	15.02.2016
W. L. Thushara, Field Supervisor	From - Bandirippuwa Research Center To- Maduruoya GRC	15.02.2016
D. T. D. Danapala, Mgmt.Assistant	From - Agronomy Division To- Soil &Plant Nutrition Division	01.03.2016
W. J. M. D. M. A. Dias, S.Mgmt. Assistant	From - Internal Audit Unit To- Agronomy Division	01.03.2016
S. N. Gunathilake, S. Mgmt. Assistant	From - Library To- Internal Audit Unit	01.03.2016
M. S. M. Faheem, Experimental Officer	From - Genetics & Plant Breeding Division To - Genetics & Plant Breeding - Matara	15.03.2016
H. M. C. Ranganath, Lab & Field Attendant	From - Estate Management Division To- Agronomy Division	23.03.2016
R. A .P. Jayamanne, Lab & Field Attendant	From - Oil Palm Research Division To- Establishment Unit	29.04.2016
M. M. Hettiarachchi, Technical Officer	From - Genetics & Plant Breeding Division To- Genetics & Plant Breeding - Ambakelle	16.05.2016
S. M. T. R. Senaratne, Lab & Field Attendant	From - Genetics & Plant Breeding - Ambakelle To- Genetics & Plant Breeding Division	01.06.2016
M. A. N. A. Kumara, Lab & Field Attendant	From - Pallama GRC (Agronomy) To- Agronomy Division	17.06.2016
J. A. D. R. U. Jayasinghe, Management Assistant	From - Pallama GRC, Bandirippuwa RC	08.07.2016
G. A. S. Nuwanpriya, Lab & Field Attendant	From - Oil Palm Research Division To- Library	14.07.2016
W. M. M. Gihan, Lab & Field Attendant	From - Oil Palm Research Division To- Establishment Unit (DDA)	14.07.2016

Name	Designation	Date
E. A. S. Kumara, Lab & Field Attendant	From - Dunkannawa RC To- Middeniya Rd	20.02.2016
N. Jeyadharshan, Research Officer	From - Oil Palm Research Division To- Crop Protection Division	01.08.2016
P. H. P. R. De Silva, Research Officer	From - Crop Protection Division ( Matara) To- Crop Protection Division (H/O)	01.09.2016
D. T. D. Danapala, Management Assistant	From -Soil &Plant Nutrition Division To- Establishment Unit	02.09.2016
T. M. D. Abeyratne, Management Assistant	From -Establishment Unit To-Soil &Plant Nutrition Division	05.09.2016
A. K. Pemadasa, Driver	From - Crop Protection Division ( Matara) To- Middeniya RC	01.09.2016
M. G. Karunawathi, Senior Management Assistant	From -Establishment Unit To- Estate Management Division	17.10.2016
P. D. Wickramanayake, Management Assistant	From -Estate Management Division To- Establishment Unit	14.10.2016



## Significant Accounting Policies

### 1. General

- 1.1. 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 Coconut Research Institute.
- 1.2. The government body of the institute is the Coconut Research Board. In terms of Coconut Development Act, the board consists of 11 board 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.
- 1.3. Principal Activities and Nature of Operations.
  - Conduct further scientific research on growth and cultivation of coconut palm, growing other crops, engages in animal husbandry in coconut plantation and prevent & cure of pests and diseases.
  - Conduct further scientific research on coconut processing, utilization of coconut products and value addition.
  - Establish and maintain pilot plants for processing of coconut products and fabricate coconut processing equipment.
  - Conduct and further scientific research on growth and cultivation of coconut palm. Growing other crops and engages in animal husbandry in coconut plantations and prevents and cures of diseases and pests.
  - Conduct and further scientific research on processing and utilization of coconut products and value addition.
  - Establish and maintain institutes’ seed gardens and experimental stations.
  - Train advisory and extension workers to assist the coconut industry.
  - Guide and advise coconut industry on all matters of technical nature.
  - Conduct R & D activities for development of the oil palm industry.
  - Establish and maintain institutes’ seed gardens and experimental stations.

- Train advisory and extension workers to assist the coconut industry.

## General Policies

### 1.4. Statement of Compliance

Statement of financial position, Statement of financial performances, Statement of changes in net assets/ equity, Cash flow statement, Approved budget column in the financial statement and Notes, comprising a summary of significant accounting policies and other explanatory notes have been prepared in accordance with the Institute of Chartered Accountants of Sri Lanka .

### 1.5. Basis of Preparation

The financial statements presented in Sri Lanka rupees have been prepared on a historical cost basis.

### 1.6. Changes in Accounting policies and adoption of new Public Sector Accounting Standards during the year.

The accounting policies adopted are consistent with those of the previous financial years.

The Coconut Research Institute has adopted the following new SLPSAS that are effective in the current year and the accounting policies of the Institute have been revised where relevant to reflect the changes in the provisions of these SLPSAS.

The adoption of the new standards has resulted in changes to the method of presentation and additional disclosures being made in the Financial Statement.

SLPSAS - 01 Presentation of Financial Statements

SLPSAS - 02 Cash Flow Statement

SLPSAS - 03 Accounting Policies, Changes in Accounting Estimates & Errors Statements

SLPSAS - 04 Borrowing Cost

SLPSAS - 05 Effects of Changes in Foreign Exchange Rates

SLPSAS - 06 Events After the Reporting Data

SLPSAS - 07 Property, Plant & Equipment

SLPSAS - 08 Provisions, Contingent Liabilities and Contingent Assets

SLPSAS - 09 Inventories

SLPSAS - 10 Revenue from Exchange Transactions

### 1.7. Comparative Information

The Accounting Policies applied by the Institute are, unless otherwise stated, consistent with those used in the previous year. Previous year figures and

phrases have been rearranged wherever necessary to conform to the current year presentation.

#### 1.8. Event After the Balance Sheet Date.

All material post financial position events have been considered and appropriate adjustments or disclosures have been made in the respective notes to the Financial Statements.

#### 1.9. Foreign Currency Translation.

The Financial Statements are prepared in Sri Lanka rupees which is the institute functional and presentation currency.

#### 1.10. Tax

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

#### 1.11. Infrastructure Plant & Equipment

Infrastructure Plant & Equipment are stated at cost or fair value less accumulated depreciation.

The carrying values of Infrastructure Plant & Equipment are reviewed for impairment when events or changes in circumstances indicate that the carrying value may not be recoverable.

The provision for depreciation is calculated by using a straight- line method on the cost or valuation of all Infrastructure Plant & Equipment, other than freehold land, over the estimated useful economic life of such assets.

The estimated useful life of assets are as follows:

<u>Assets</u>	<u>Years</u>
Buildings	25
Machinery & Laboratory Equipments	10
Field equipments	10
Vehicles	05
Office & Computer Equipments	05
Other Equipments	05
Furniture, fittings & Fixtures	20

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.

#### **Lease 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 Research Centre as operational lease 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.

An extent of 75 acres from the 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.

#### 1.12. Improvements to estates

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

#### 1.13. Biological Assets

All biological assets are valued at the lower of cost and net realizable value. Net realizable value is the price at which live stocks can be sold in the ordinary course of business less the estimated cost of completion and the estimated cost necessary to make the sale.

These stock are valued base on the National Live stock Development Board rates which is authorized institute of the livestock.

#### 1.14. Working- in- Progress

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.

#### 1.15. Inventories

Inventories are valued at the lower of cost and net realizable value. Net realizable value is the price at which live stocks can be sold in the ordinary course of business less the estimated cost of completion and the estimated cost



employee arises only on completion of 05 years of continued service.

The gratuity liability is neither externally funded nor actuarially valued

#### 1.20. Provisions, Contingent Assets and Contingent Liabilities.

Provisions are made for all obligations existing as at the balance sheet date when it is probable that such an obligation will result in an

Outflow of resources and a reliable estimate can be made of the quantum of the outflow. All contingent liabilities are disclosed as a note to the financial statement unless the outflow of resources is remote.

Contingent assets are disclosed, where inflow of economic benefit is probable.

### **Statement of Financial Performance**

#### 1.21. Revenue Recognition.

- i) The total grant received from the Treasury for the year is recognized as income and the for that year.
- ii) The second high income received from the Genetic Resource Center and Research Center (Estates) for the year is recognized as income and the for that year.
- iii) Other Income

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

Other income is recognized on an accrued basis.

#### 1.22. Expenditure Recognition.

Expenditure are recognized in the statement of financial performance on the basis of a direct association between the cost incurred and the earning of specific items of income. All expenditure incurred in the running of the business and in maintaining the property, plant and equipment in a state of efficiency has been charged to the statement of financial performance.

For the purpose of presentation of the statement of financial performance, the “function of expenses” method has been adopted, on the basis that it presents fairly the elements of the institutional performance.

#### 1.23. Intangible Assets (Research & Development Cost) .

Cost of product development, processes, production of new or substantially improved materials for research development are capitalized which is written off against the profit and loss account as amortisation of research & development cost during the period.

Research & Development Expenditure in the previous year's 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

The previous practice was total Research and Development expenditure disclose as assets of the Balance Sheet and the presently theses expenses during the year under review have been charged against the Statement of Financial Performance.





# STATEMENT OF FINANCIAL PERFORMANCE

FOR THE YEAR ENDED 31 <sup>ST</sup> DECEMBER 2016	NOTES	2016	2016	2015
		APPROVED BUDGET	ACTUAL	ACTUAL
		Rs.	Rs.	Rs.
<b><u>OPERATING REVENUE</u></b>				
TRANSFERS FROM OTHER GOVERNMENT ENTITIES	03	255,000,000	214,320,000	193,712,000
GENETIC & RESEARCH CENTER REVENUE	04	192,213,000	189,229,594	211,583,056
OTHER REVENUE	05	15,000,000	118,556,060	80,881,360
<b>TOTAL REVENUE</b>		<b><u>462,213,000</u></b>	<b><u>522,105,654</u></b>	<b><u>486,176,416</u></b>
<b><u>OPERATING EXPENCES</u></b>				
WAGES SALARIES AND EMPLOYEES' BENEFITS	06	193,233,000	169,130,651	174,669,390
SUPPLIES & CONSUMABLES USED	07	57,215,000	53,094,480	45,504,658
DEPRECIATION & AMORTISATION EXPENCES	10	-	24,074,206	25,358,573
GENETIC & RESEARCH CENTER EXPENCES	04	149,213,000	159,468,773	142,064,944
RESEARCH & DEVELOPMENT EXPENCES WRITE OFF	08	-	50,181,224	35,943,713
OTHER EXPENSES	09	19,552,000	37,423,224	17,115,538
<b>TOTAL EXPENSES</b>		<b><u>419,213,000</u></b>	<b><u>493,372,558</u></b>	<b><u>440,656,815</u></b>
<b>SURPLUS /(DEFICET) FOR THE PERIOD</b>		<b>43,000,000</b>	<b>28,733,096</b>	<b>45,519,601</b>

The Accounting Policies on pages 07 to 14 and Notes on pages 15 to 26 from an integral part of these Financial Statements. The Coconut Research Board of Directors is responsible for the preparation and presentation of these Financial Statements. These Financial Statements were approved by the Board of Directors and signed on their behalf.

CHAIRMAN  
COCONUT RESEARCH BOARD

DIRECTOR  
COCONUT RESEARCH INSTITUTE

SENIOR ACCOUNTANT  
COCONUT RESEARCH INSTITUTE

# STATEMENT OF FINANCIAL POSITION

AS AT 31<sup>st</sup> DECEMBER 2016

	NOTES	2016 APPROVED BUDGET Rs.	2016 ACTUAL Rs.	2015 ACTUAL Rs.
<b><u>NON CURRENT ASSETS</u></b>				
INFRASTRUCTURE PLANT & EQUIPMENT	10	208,000,000	1,991,507,712	1,970,660,608
BIOLOGICAL ASSETS	11		6,777,231	9,981,386
OTHER NON FINANCIAL ASSETS	12	1,000,000	2,875,563	2,822,373
OTHER NON CURRENT ASSETS	13		15,304,439	13,913,990
		<b><u>209,000,000</u></b>	<b><u>2,016,464,945</u></b>	<b><u>1,997,378,357</u></b>
<b><u>CURRENT ASSETS</u></b>				
CASH & CASH EQUIVALANTS	14			143,646,147
RECIEVABLES	15			9,933,206
INVENTORIES	16			68,862,600
PREPAYMENTS	17			-
OTHER CURRENT ASSETS	18			69,889,906
			- 292,331,859	263,188,781
<b>TOTAL ASSETS</b>			<b><u>2,308,796,804</u></b>	<b><u>2,260,567,138</u></b>
<b><u>LIABILITIES</u></b>				
<b><u>CURRENT LIABILITIES</u></b>				
PAYABLES	19		53,463,429	30,638,266
EMPLOYEE BENEFITS	20		114,856,361	121,300,245
			- <b><u>168,319,790</u></b>	<b><u>151,938,510</u></b>
<b><u>NON CURRENT LIABILITIES</u></b>				
CAPITAL CONTRIBUTED BY DONOR FUNDED PROJECTS	21		46,227,573	46,038,995
			- 46,227,573	46,038,995
<b>TOTAL LIABILITIES</b>			214,547,363	197,977,505
<b>NET ASSETS</b>			<b><u>2,094,249,441</u></b>	<b><u>2,062,589,633</u></b>
<b><u>NET ASSETS/EQUITY</u></b>				
CAPITAL CONTRIBUTED BY THE OTHER GOVERNMENT ENTITIES		209,000,000	404,086,966	401,160,254
RESERVES		-	1,689,612,303	1,689,612,303
ACCUMULATED SURPLUS/(DEFECIT)		-	550,173	(28,182,923)
		209,000,000	2,094,249,441	2,062,589,633
<b>TOTAL NET ASSETS/EQUITY</b>		<b><u>209,000,000</u></b>	<b><u>2,094,249,441</u></b>	<b><u>2,062,589,633</u></b>

The Accounting Policies on pages 07 to 14 and Notes on pages 15 to 26 from an integral part of these Financial Statements. The Coconut Research Board of Directors is responsible for the preparation and presentation of these Financial Statements. These Financial Statements were approved by the Board of Directors and signed on their behalf.

  
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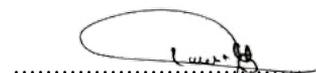
CHAIRMAN

COCONUT RESEARCH BOARD

  
.....

DIRECTOR

COCONUT RESEARCH INSTITUTE

  
.....

ACCOUNTANT

COCONUT RESEARCH INSTITUTE

## CASH FLOW STATEMENT

FOR THE YEAR ENDED 31<sup>st</sup> DECEMBER 2016

	<b>2016</b> <b>Rs.</b>	<b>2015</b> <b>Rs.</b>
<b>CASH FLOW FROM OPERATING ACTIVITIES</b>		
<b>SURPLUS/(DEFICIT)</b>	28,733,096	45,519,601
NON-CASH MOVEMENTS		
DEPRECIATION & AMORTIZATION	38,421,554	39,009,502
ASSETS & RESEARCH EXPENCE WRITE OFF	(56,472,656)	(32,028,086)
FIXED DEPOSIT INTEREST	(3,260,242)	(996,534)
PROVISION FOR DOUBTFUL DEBTS	-	(1,468,230)
INCREASE/(DECREASE) IN PAYABLES	22,825,164	(8,284,044)
INCREASE IN PROVISIONS RELATING TO EMPLOYEE COSTS	6,537,776	28,827,983
EMPLOYEE GRATUITY PAYMENT	(12,981,660)	(13,040,399)
(GAINS)/LOSSES ON SALE OF PROPERTY, PLANT & EQUIPEMENT	(963,616)	(403,847)
INCREASE IN OTHER CURRENT ASSETS	(4,474,096)	3,150,044
DECREASE IN INVENTORIES	10,076,780	1,251,237
DECREASE IN RECEIVABLES	4,160,263	11,352,038
DECREASE IN PREPAYMENTS	11,823	
<b>NET CASH FLOW FROM OPERATING ACTIVITIES</b>	<b><u>32,614,185</u></b>	<b><u>72,889,264</u></b>
<b>CASH FLOW FROM INVESTING ACTIVITIES</b>		
PURCHASE OF PLANT & EQUIPEMENT TREASURY FUND	(60,403,557)	(57,204,639)
PURCHASE OF LIBRARY BOOKS & PERIODICALS	(53,190)	(71,812)
PURCHASE / SALE OF BIOLOGICAL ASSETS	3,204,156	(1,160,294)
PROCEEDS FROM SALE OF PLANT & EQUIPEMENT	2,098,515	1,738,936
ISSUED LOANS	(8,897,650)	(8,052,279)
SETTLEMENTS OF LOANS	7,349,948	7,110,268
INTEREST ON INVESTMENT	920,996	1,091,068
INVESTMENT IN FIXED DEPOSIT	(35,000,000)	
<b>NET CASH FLOW FROM INVESTING ACTIVITES</b>	<b><u>(90,780,783)</u></b>	<b><u>(56,548,751)</u></b>
TREASURY CAPITAL GRANT	2,926,712	7,978,201
DONOR FUNDED PROJECTS CAPITAL GRANT	188,578	28,157,457
RESEARCH & DEVELOPMENT AND ASSETS WRITE OFF	56,472,656	32,028,086
<b>NET CASH FLOWS FROM THE FINANCING ACTIVITES</b>	<b><u>59,587,946</u></b>	<b><u>68,163,744</u></b>
NET INCREASE / (DECREASE) IN CASH & CASH EQUIVALENTS	1,421,348	84,504,257
CASH & CASH EQUIVALENTS AT BEGINNING OF PERIOD	142,224,799	57,720,542
CASH & CASH EQUIVALENTS AT END OF PERIOD	<b><u>143,646,147</u></b>	<b><u>142,224,799</u></b>

	<b>2016 Rs.</b>	<b>2015 Rs.</b>
BANK OF CEYLON - DANKOTUWA - A/C NO 3002507	19,057,536	4,549,429
BANK OF CEYLON - DANKOTUWA - A/C NO 3002942	8,897,469	5,658,892
BANK OF CEYLON - DANKOTUWA - A/C NO 3002556	53,308,396	36,878,058
BANK OF CEYLON - DANKOTUWA - A/C NO 3003088	59,155,717	91,910,641
BANK OF CEYLON - DANKOTUWA - A/C NO 3002557	-	-
BANK OF CEYLON - DANKOTUWA - A/C NO 3001528	355,726	1,201,138
BANK OF CEYLON - DANKOTUWA - A/C NO 75852571	2,020,782	2,021,532
	<b><u>142,795,626</u></b>	<b><u>142,219,690</u></b>
NSB - NEGOMBO	-	1,000
BOC - NEGOMBO	5,000	4,000
CASH IN TRANSIT	845,521	109
	<b><u>143,646,147</u></b>	<b><u>142,224,799</u></b>

## STATEMENT OF CHANGES IN NET ASSETS/ EQUITY

NOTE	CAPITAL CONTRIBUTED BY THE GOVERNMENT	REVALUATION RESERVE	ACCUMULATED SURPLUS/DEFICIT	TOTAL EQUITY
BALANCE AS AT 01-01-2016	401,160,254	1,689,612,303	(28,182,923)	2,062,589,633
CAPITAL GRANT-TREASURY	83,600,000	-	-	83,600,000
SURPLUS/DEFICIT FOR THE YEAR	-	-	28,733,096	28,733,096
ASSETS WRITE OFF FOR THE CURRENT YEAR	(30,492,064)	-	-	(30,492,064)
R & D WRITE OFF FOR THE CURRENT YEAR	(50,181,224)	-	-	(50,181,224)
BALANCE AS AT 12-31-2016	404,086,966	1,689,612,303	550,173	2,094,249,441

Figures in brackets indicate deductions

The Accounting Policies and Notes as Set out on the pages 7 to 27 from an integral part of these Financial Statements.



**GENETIC RESOURCE CENTER & RESEARCH CENTER (ESTATES) R**

	<b>Bandirippuwa Research Station</b>	<b>Rathmalaraga Research Center</b>	<b>Ambakelle Genetic Resource Center</b>	<b>Potthukulama Research Center</b>	<b>Walpita Research Center</b>	<b>Makandura Genetic Resource Center</b>
	<b>Rs.</b>	<b>Rs.</b>	<b>Rs.</b>	<b>Rs.</b>	<b>Rs.</b>	<b>Rs.</b>
<b>REVENUE</b>						
SALES OF COCONUT	19,711,662	14,741,011	36,461,637	15,734,564	3,591,818	12,752,984
SALES OF COPRA	124,360	-	8,500	889,712	52,000	83,700
SALES OF SEEDLING	-	1,221,275	4,008,375	323,021	673,200	1,288,325
SALES OF SUNDRIES	1,953,064	1,807,478	3,667,982	1,152,029	587,579	808,966
SALE OF ANIMALS PRODUCE & ANIMALS	1,090,758	90,106	642,175	826,965	-	11,400
FD INTEREST INCOME	-	-	-	-	-	-
<b>TOTAL REVENUE</b>	<b>22,879,844</b>	<b>17,859,871</b>	<b>44,788,669</b>	<b>18,926,291</b>	<b>4,904,597</b>	<b>14,945,375</b>
<b>STOCK VARIANCES</b>						
STOCK AS AT 01-01-2016	3,478,141	5,789,644	13,912,409	5,983,747	1,275,753	2,619,406
STOCK AS AT 31-12-2016	1,442,560	3,946,480	13,979,004	5,450,238	687,411	2,437,661
	(2,035,581)	(1,843,165)	66,595	(533,509)	(588,343)	(181,745)
<b>ESTATE REVENUE</b>	<b>20,844,263</b>	<b>16,016,706</b>	<b>44,855,264</b>	<b>18,392,782</b>	<b>4,316,254</b>	<b>14,763,630</b>
<b>GENERAL CHARGES</b>						
GENERAL CHARGES	3,889,727	6,194,921	8,147,942	4,614,190	808,065	2,892,063
STAFF SALARIES	4,087,472	2,835,545	4,897,914	1,633,293	1,124,954	2,756,179
UPKEEP	2,052,827	2,885,069	9,863,297	1,183,911	1,129,499	2,490,928
CUTIVATION	1,199,082	1,051,036	2,233,744	1,037,098	191,449	657,762
HARVESTING	2,782,312	1,204,476	3,240,765	1,409,307	333,814	725,723
DEPRECIATION	98,273	470,063	495,869	331,082	54,253	268,220
<b>TOTAL COST OF PRODUCT.</b>	<b>14,109,692</b>	<b>14,641,110</b>	<b>28,879,532</b>	<b>10,208,882</b>	<b>3,642,034</b>	<b>9,790,875</b>
<b>CURING INTO COPRA/ DISPOSE</b>						
	197,562	202,383	58,235	240,492	35,774	147,761
ANIMAL HUSBANDRY	784,694	396,928	649,074	667,226	7,460	28,127
AMORTIZATION	652,801	221,634	511,698	224,906	78,065	208,448
<b>TOTAL EXPENDITURE</b>	<b>15,744,749</b>	<b>15,462,055</b>	<b>30,098,538</b>	<b>11,341,505</b>	<b>3,763,333</b>	<b>10,175,210</b>
<b>NET SURPLUS/(DEFICIT)</b>	<b>5,099,514</b>	<b>554,651</b>	<b>14,756,726</b>	<b>7,051,278</b>	<b>552,921</b>	<b>4,588,419</b>

Head Office Administration Expences



## Notes to the Financial Statements

As at 31 December

	<b>2016 BUDGET Rs.</b>	<b>2016 ACTUAL Rs</b>	<b>2016 ACTUAL Rs</b>
<b>Note 03 TRANSFERS FROM OTHER ENTITIES</b>			
RECURRENT GRANT	255,000,000	206,320,000	186,212,000
ESTATE PROFIT TRANSFER		8,000,000	7,500,000
	<b>255,000,000</b>	<b>214,320,000</b>	<b>193,712,000</b>
<b>Note 05 OTHER REVENUE</b>			
INTEREST ON LOAN & INVESTMENT	600,000	883,127	790,522
INCOME FROM MOTOR VEHICLES	750,000	642,689	475,152
SUNDRY INCOME	13,450,000	7,824,716	8,566,101
SALES CENTER INCOME	-	1,164,832	1,150,441
SALES OF PHEROMONE	150,000	1,376,155	509,019
SALES OF MONOCROTOPHOSE	50,000	10,660	20,680
INCOME PROJECTS	-		1,397,647
RESEARCH & DEVELOPMENT WRITE OFF	-	50,181,224	35,943,713
ASSETS WRITE OFF	-	30,492,064	32,028,086
PROJECTS EXPENSES WRITE-OFF		25,980,592	-
	<b>15,000,000</b>	<b>118,556,060</b>	<b>80,881,360</b>
<b>Note 06 WAGES SALARIES AND EMPLOYEES' BENEFITS</b>			
SALARIES ALLOWENCES & OVER TIME	153,063,000	131,203,876	123,696,259
BOARDS CONTRIBUTION TO ETF/EPF	24,344,000	17,131,793	21,977,484
BOARDS CONTRIBUTION TO MEDICAL AID	5,219,000	5,043,745	4,550,842
COCONUT ALLOWANCES	1,607,000	953,207	372,286
GRATUITY	9,000,000	14,798,030	24,072,519
	<b>193,233,000</b>	<b>169,130,651</b>	<b>174,669,390</b>
<b>Note 07 SUPPLIES AND CONSUMABLES USED</b>			
SUPPLIERS AND CONSUMABLES	12,821,000	17,910,468	13,005,767
CONTRACTUAL SERVICES	24,384,000	8,162,465	9,404,355
MAINTENANCE	20,010,000	27,021,547	23,094,537
	<b>57,215,000</b>	<b>53,094,480</b>	<b>45,504,658</b>

	<b>2016 BUDGET Rs.</b>	<b>2016 ACTUAL Rs</b>	<b>2016 ACTUAL Rs</b>
<b>Note 09 OTHER EXPENSES</b>			
TRAVELLING	2,247,000	240,534	190,580
EXPENSES- PROJECTS	-	29,329,365	10,316,243
EXPENSES- CESS	-	3,803,178	3,950,111
BOARD MEMBERS FEES	900,000	614,236	345,003
WELFARE	2,400,000	2,160,743	1,027,928
OTHER OPERATING EXPENSES	14,005,000	1,275,168	1,285,673
	19,552,000	37,423,224	17,115,538

Notes to the Financial Statements (Contd...)

**Note 08 Research & Development Expenses Write Off**

Description (Thrust Area)	CODE	WRITE OFF YEAR 2016	WRITE OFF YEAR 2015
<b>(1) Crop Protection</b>			
<b>1.1 Crop Protection Division</b>			
Major Pests	257	3,072,031.91	2,766,001
Minor Pests	258	-	498
Diseases	259	721,187.65	500,333
Protection services	260	5,218,589.60	1,621,563
Waligama Leaf Wilt Disease	287	5,347.50	2,625
Maintenance of Predator Lab	289	572.69	83,023
Plesisps Beetle	290	125,580.00	150,720
		9,143,309.35	5,124,763
<b>(2) Crop Production</b>			
<b>2.1 Agronomy Division</b>			
Soil Moisture Conservation	261	407,670.26	284,055
Low Yielding Palms	262	2,408,251.63	729,820
Farming System	263	430,418.08	340,854
Bio-energy Production	264	939,962.93	636,161
Inter Cropping	265	342,291.19	171,235
Weed Management	266	151,993.84	137,314
Poverty Alleviation Studies	267	1,269,122.48	1,086,296
Animal Husbandry	268	424,307.10	347,277
Vermi Culture	269	113,458.88	77,224
Coconut Planting Systems	270	576,539.13	339,544

<b>Description (Thrust Area)</b>	<b>CODE</b>	<b>WRITE OFF YEAR 2016</b>	<b>WRITE OFF YEAR 2015</b>
Organic Farming	271	369,574.05	273,203
Coconut Sheep Intergrated Farm	445	498,194.51	-
		<b>7,931,784.08</b>	<b>4,422,983</b>
<b>2.2 Oil Plam</b>			
Oil farm research	291	835.12	143,807
Land Suitability Assessment	292	61,692.11	59,055
Land & Field Management	293	66,447.41	66,058
Genetic Improvement	294	61,979.00	46,804
Clonel Sudies	295	98,477.60	66,859
Soil & Fertilizer Studies	296	49,254.00	113,201
Environment Physiology Studies	297	10,500.00	11,868
Pest & Diseases Management	298	-	1,125
Processing Studies	299	-	-
Socio-Economic Studies	300	-	32,196
		<b>349,185.24</b>	<b>540,973</b>
<b>2.3 Soil &amp; Plant Nutrition Div.</b>			
Low cost Material	272	829,119.36	568,278
Fertilizer Mixture	273	745,203.85	514,935
D.F.R.	274	452,882.26	55,826
Micronutrients	275	868,483.79	904,498
Fertilizer Application	276	-	-
Irrigation	277	238,686.78	425,311
Nutrient Mapping	278	877,823.93	197,009
Organic Manure	279	934,856.85	484,050
Land suitability assesment	288	1,040,424.87	234,272
		<b>5,987,481.69</b>	<b>3,384,179</b>
<b>(3) Crop Improvement-GPBD</b>			
Evalu. Exis. Co. Cultivars	280	2,512.00	3,706
Dev. New co. Cultivars	281	1,599,678.50	2,188,443
Conse. Eva. Co. Germplasm	282	1,531,882.79	1,582,414
Tolerance to Aceria mite	283	-	2,600
Research Nursery	284	-	-
Miscellaneous Research	285	-	-
		<b>3,134,073.29</b>	<b>3,777,162</b>

Description (Thrust Area)	CODE	WRITE OFF YEAR 2016	WRITE OFF YEAR 2015
<b>(4) Coconut Processing-CPRD</b>			
Improv.Kernal Based Product	225	797,931.46	949,100
Sap Based Product	226	622,800.76	315,174
Charcol making Process	227	-	-
Testing of Abrasive Feeling Machanism	228	-	-
Project on Coconut Oil	255	2,323,947.05	1,060,314
Project on Product Develop.	256	-	99,690
		<b>3,744,679.27</b>	<b>2,424,277</b>
<b>(5) Agriculture Economics</b>			
Socio Economy Studies	286	854,010.31	816,326
		<b>854,010.31</b>	<b>816,326</b>
<b>Total</b>			<b>20,490,663</b>
<b>(6) Development &amp; Services Related to Crop Production</b>			
Drought Study - Middeniya (PPD)	400	667,525.54	905,740
Phosphate Sources - Middeniya (PPD)	401	2,380,099.14	1,123,586
Monthly Harvesting Impact(PPD)	402	884,710.48	669,848
Devlopment & Maintenance of Middeniya R.C.(ME)	403	365,257.00	132,331
Assessment & Improv. Of soil Quality Dep.Co.Land	404	103,952.51	124,434
Yield Improv. Co. Land by Rain Water Harve. Tech.	407	1,894,247.13	548,971
Consumer survey Nut Consumption & coco. Oil	408	127,609.52	29,047
Production of Dihaploids (TCD)	409	547,870.37	58,226
Predication of husk weight / copra weight (Bio )	427	-	-
<b>Balance c/f</b>		<b>6,971,271.69</b>	<b>3,592,183.44</b>
Biofertilizer for co.Indigenouse arbuscular mycorriza	428	-	-
Appling Zn & Cu sources for coconut palm	429	-	-
Formulation of an Effective Fertilizer Mix.Young Coco.	430	-	-
Use of locally K sources as Fertilizer for coconut( Bio)	431	22,065.00	693,199
Improv. of soil Ferti.coco. Land Through Vermiculture	446	-	-
		<b>6,993,336.69</b>	<b>4,285,382.67</b>
<b>(7) Development &amp; Services Activities Related to Genetical Improvement of Coconut (Gpb)</b>			
Assessment of Biodiversity in Unawatuna (PPD)	410	-	-
Construction of a Coconut Genome map	411	1,651,161.91	303,886

<b>Description (Thrust Area)</b>	<b>CODE</b>	<b>WRITE OFF YEAR 2016</b>	<b>WRITE OFF YEAR 2015</b>
Constr. Of a Population for Mpping QTL Acaria Mite	412	135,131.18	716,874
Molecular Diagnosis of coco. Disorders	413	3,321.00	303,855
Estab. P.S.G. for mass Production of CRISL98	414	69,149.07	45,908
Upgrading ISG to Increase the Produ. Of CRIC 65	415	160,035.91	253,031
Germplasm Importation	416	31,272.00	67,412
Function of the Seed Production Unit	417	3,505,050.51	3,012,357
Estab. Seed Garden for mass Produ. Of Kapruwana	432	-	-
		<b>5,555,121.58</b>	<b>4,703,324</b>
<b>(8) Development &amp; Services Related to Crop Protection</b>			
Coconut Mite Research & Development (CPD)	418	485,569.45	120,252
Extension Programs for Mite Management	419	-	4,050
Impact of mite damage on yeild at spatial & temp. scale	420	-	-
Determi. Proba. Casues of palm decline multidis. Project	421	-	-
Manag. Of black beetal using pherom. & Oryctes(CPD)	433	132,387.60	126,779
Power driven sprayer to tall coconut plams	434	-	-
		<b>617,957.05</b>	<b>251,081</b>
<b>(9) Development &amp; Services Related to Coconut processing &amp; Value Addition (CPRD)</b>			
Dev. & Popula.organic Pro. & Processing Of Coconut	405	-	-
Vergine oil - value addition	422	65,838.00	47,573
Dev.& Impro. Co. coir retting thro. Intrudu.Cons. Micro	423	855,729.66	305,180
Dev.& Impro. Coconut fibre based Products	424	302,805.80	64,803
Dev. Prod. Of high qua. Charcoal & Copra	425	-	-
		<b>1,224,373.46</b>	<b>417,557</b>
<b>(10) Development &amp; Services Related to Coconut processing &amp; Value Addition</b>			
Develop. Farm machinery for coconut sector (CPRD)	435	2,672.00	18,702
Coconut milk pouch for household use(CPRD)	436	-	-
Coconut water vinegar manufacturing method(CPRD)	437	-	-
		<b>2,672.00</b>	<b>18,702</b>

Description (Thrust Area)	CODE	WRITE OFF YEAR 2016	WRITE OFF YEAR 2015
<b>(11) Agricultural Economics</b>			
Mechanization & the demand of machinery co. Indus.	438	125,444.95	30,316
Increasing farmers through toddy tapping	439	-	-
Fertilizer use in incre. Productivity & Profitability C. P.	440	-	-
		<b>125,444.95</b>	<b>30,316</b>
<b>(12) Transfer of Technology</b>			
Coconut Technology Village	426	56,124.28	2,159,040
Electronic print media & Techn. transfer Prog (TTD)	441	3,112,568.53	2,828,109
Development of field models & exhibits (TTD)	442	210,226.60	195,556
Farmer field school Expansion (TTD)	443	4,504.44	60,152
Impro. farm practices in mini coco. Triangle Hambantota (TTD)	444	1,134,370.85	503,831
		<b>4,517,794.70</b>	<b>5,746,688</b>
<b>Total</b>		<b>50,181,223.66</b>	<b>15,453,049</b>
<b>GRAND TOTAL</b>		<b>50,181,223.66</b>	<b>35,943,713</b>

## **Note 09 OTHER EXPENSES**

	2016 BUDGET Rs.	2016 ACTUAL Rs.	2015 ACTUAL Rs.
TRAVELLING	2,247,000	240,534	190,580
EXPENSES- PROJECTS	-	29,329,365	10,316,243
EXPENSES- CESS	-	3,803,178	3,950,111
BOARD MEMBERS FEES	900,000	614,236	345,003
WELFARE	2,400,000	2,160,743	1,027,928
OTHER OPERATING EXPENSES	14,005,000	1,275,168	1,285,673
	<b>19,552,000</b>	<b>37,423,224</b>	<b>17,115,538</b>

## Notes to the Financial Statements ( Contd)

As at 31 December

### Note 10 - INFRASTRUCTURE PLANT & EQUIPMENT

	MATURED LAND	BUILDINGS	IMPROVEMENT TO ESTATES	FIELD, AUDIO, WATER & LABORATORY EQUIPMENTS
	Rs.	Rs.	Rs.	Rs.
<b><u>COST</u></b>				
AS AT 01-01-2015	1,522,283,874	235,604,110	117,696,774	223,432,314
ADDITIONS	-	9,106,911	8,973,670	29,797,429
DSPOSALS	-	-	-	4,155,936
<b>AS AT 31-12-2016</b>	<b>1,522,283,874</b>	<b>244,711,022</b>	<b>126,670,444</b>	<b>249,073,807</b>
<b><u>ACCUMULATED DEPRECIATION</u></b>				
AS AT 01-01-2016	-	65,369,688	24,447,004	101,152,504
ADDITIONS	-	9,495,521	5,941,911	10,999,512
DSPOSALS	-	-	-	3,326,716
<b>AS AT 31-12-2016</b>	<b>-</b>	<b>74,865,209</b>	<b>30,388,914</b>	<b>108,825,300</b>
<b>CARRYING VALUE</b>		65,369,688	24,447,004	97,825,788
WORKING PROGRESS				-
<b>AS AT 31 DECEMBER 2016</b>	<b>1,522,283,874</b>	<b>169,845,813</b>	<b>96,281,530</b>	<b>140,248,507</b>
<b>AS AT 31 DECEMBER 2015</b>	<b>1,522,283,874</b>	<b>170,234,423</b>	<b>93,249,770</b>	<b>122,279,810</b>

AMORTIZATION - ESTATE IMPROVEMENT	5,941,911
ASSETS DEPRECIATION - HEAD OFFICE	24,074,206
ASSETS DEPRECIATION - ESTATES	2,614,680
ASSETS DEPRECIATION - CESS PROJECTS	3,803,178
ASSETS DEPRECIATION - DONOR PROJECTS	1,987,579
	<b>38,421,554</b>



## Notes to the Financial Statements (Contd)

As at 31 December

	2016 Budget Rs.	2016 ACTUAL Rs.	2015 ACTUAL Rs.
<b>Note 11</b>	<b><u>BIOLOGICAL ASSETS</u></b>		
		6,777,231	9,981,386
		<b>6,777,231</b>	<b>9,981,386</b>
<b>Note 12</b>	<b><u>OTHER NON FINCIAL ASSETS</u></b>		
		2,875,563	2,822,373
	1,000,000		
	<b>1,000,000</b>	<b>2,875,563</b>	<b>2,822,373</b>
<b>Note 13</b>	<b><u>OTHER NON CURRENT ASSETS</u></b>		
		14,428,266	13,177,365
		876,173	736,625
		<b>15,304,439</b>	<b>13,913,990</b>
		<b>2015</b>	<b>2014</b>
		<b>ACTUAL</b>	<b>ACTUAL</b>
		<b>Rs.</b>	<b>Rs.</b>
<b>Note 14</b>	<b><u>CASH &amp; CASH EQUIVALANTS</u></b>		
		19,057,536	4,549,429
		8,897,469	5,658,892
		53,308,396	36,878,058
		59,155,717	91,910,641
		355,726	1,201,138
		2,020,782	2,021,532
		142,795,626	142,219,690
		<b>142,219,690</b>	<b>57,323,251</b>
	<b><u>SAVINGS DEPOSITS</u></b>		
		845,521	109
		5,000	5,000
		850,521	5,109
		<b>143,646,147</b>	<b>142,224,799</b>
	<b>TOTAL</b>	<b>142,224,799</b>	<b>57,720,542</b>
<b>Note 15</b>	<b><u>RECIEVABLES</u></b>		
		7,626,762	11,783,524

	<b>2016</b>	<b>2016</b>	<b>2015</b>
	<b>Budget</b>	<b>ACTUAL</b>	<b>ACTUAL</b>
	<b>Rs.</b>	<b>Rs.</b>	<b>Rs.</b>
<b>LESS</b> - BAD & DOUBTFUL DEBTS PROVISION FOR THE YEAR		(554,737)	(554,737)
		7,072,025	11,228,787
POST MASTER GENERAL		31,620	31,620
INTEREST RECIEVABLE ON FD		2,817,562	478,315
SALARY CONTROL		12,000	15,500
		<b>9,933,206</b>	<b>11,754,222</b>

**Note 16 INVENTORIES**

COCONUT	23,814,645	27,262,104
COPRA	441,900	248,315
GENERAL STORES/ESTATE	5,182,882	4,433,292
FERTILIZER	4,202,095	4,127,212
CHEMICAL & GLASSWARE	18,704,153	25,613,097
SEEDLING STOCKS	12,359,910	15,110,770
STOCK OF PUBLICATIONS	4,157,015	2,144,590
	<b>68,862,600</b>	<b>78,939,380</b>

**Note 17 PREPAYMENTS**

INSURENCES	-	11,823
	-	<b>11,823</b>

**Note 18 OTHER CURRENT ASSETS**

ADVANCE TO LOCAL SUPPLIERS	159,936	213,126
ADVANCE TO STAFF	50,000,000	15,000,000
MOBILIZATION ADVANCE & ADVANCE TO FOREIGN SUPP:	245,650	245,650
TREASURY BILL	5,682,962.00	5,376,411
SECURITY DEPOSIT RECIEVABLE	420,375.00	569,673
DISTRESS LOAN	29,894	2,839
TRANSPORT LOAN	497,550	551,050
WAGES ADVANCE	400	1,600
FESTIVAL ADVANCE	172,500	216,700
SPECIAL ADVANCE	363,025	365,801
SPECIAL SALARY ADVANCE	100,090	121,437
FESTIVAL ADVANCES TO LABOURERS	69,889,905.69	30,258,557
SPECIAL SALARY ADVANCES TO LABOURERS	121,437	116,615
	<b>30,258,557</b>	<b>33,204,817</b>

	<b>2016</b>	<b>2016</b>	<b>2015</b>
	<b>Budget</b>	<b>ACTUAL</b>	<b>ACTUAL</b>
	<b>Rs.</b>	<b>Rs.</b>	<b>Rs.</b>
<b>Note 19</b>	<b><u>PAYABLES</u></b>		
		47,586,951	20,973,872
		1,616,402	5,406,344
		14,579	14,579
		8,711	24,074
		800,000	1,272,064
		834,669	324,403
		327,818	187,827
		1,493,648	1,574,744
		49,000	49,000
		731,650	811,359
		<b>53,463,429</b>	<b>30,638,266</b>
<b>Note 20</b>	<b><u>EMPLOYEE BENEFITS</u></b>		
		114,856,361	121,300,245
		<b>114,856,361</b>	<b>121,300,245</b>

*Notes to the Financial Statements (Contd...)*

Assumptions are based on institute's best estimates and recognized as follows.

- i. Discounting Rate: Government Bond rate near to the closing date of financial statement reporting period and 10 years' service per employee.
- ii. Employee Turnover ratio: Consider the employee turnover for the period of 2016.01.01 to 2016.12.31.
- iii. Expected salary increment ratio: Consider the salary increments for the period 2017.01.01 to 2017.12.31 based on MSD circular 2/2016.

<b>Note 21</b>	<b><u>NON CURRENT LIABILITIES</u></b>		
		39,610,746	39,422,168
		6,616,827	6,616,827
		<b>46,227,573</b>	<b>46,038,995</b>

Notes to the Financial Statements (Contd...)

**DISCLOSURE**

1. The following cases are regarding the bond violated officers of CRI

<b>NAME</b>	<b>RECIEVABLE BOND VALUE</b>	<b>ACTION TAKEN</b>
R. A. J. R. PERERA	1,068,165.00	Attorney-General has already informed to write off this amount as a irrecoverable amount already submitted the summons from the department of attorney
K. B. DASSANAYAKE	2,039,715.00	Attorney-General has already informed to write off this amount as a irrecoverable amount already submitted the summons from the department of attorney
H. P. S. JAYASUNDARA	2,078,905.33	The address of the defendant has been already sent to the department of attorney for summons.
M. G. F. S. JAYASUNDARA	3,345,424.66	Address can't be found of the defendant. Called for the instructions from the department of attorney
G. G. P. HEWAWITHARANAGE	1,059,170.00	The file has been submitted to the department of attorney for filing a case against to the defendant & guarantors.
N. A. K. DE SILVA	3,024,297.60	Already submitted the summons from the department of attorney
J. M. M. N. MARIKKAR	2,238,561.17	The case has been Concentrated to the Ministry of Coconut Development & Janatha Estate Development
J. M. M. A. JAYASUNDARA	847,880.00	Submitted the file to the department of attorney for filing a case
B. H. C. MENDIS	1,014,780.00	Submitted the file to the department of attorney for filing a case

1. A basic investigation was done & punished against to the H.M.Lional Gamini & D.M.Vijitha Amarawathi due to stealing coconut & influencing to the security officers. Hence they have file a case in the Department of labour tribunal against to the CRI. Inquire is ongoing at the labour tribunal council Chilaw.
2. An extent of 75 acres from the 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.



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# විගණකාධිපති දෙපාර්තමේන්තුව

## கணக்காய்வாளர் தலைமை அபிபதி திணைக்களம்

### AUDITOR GENERAL'S DEPARTMENT



මගේ අංකය  
எனது இல.  
My No.

පිපිල්/ඩී/සී.ආර්.අයි/1/16/03

ඔබේ අංකය  
உமது இல.  
Your No.

දිනය  
திகதி  
Date

2017 සැප්තැම්බර් 28 දින

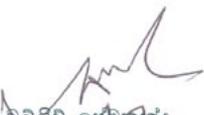


සභාපති,  
පොල් පර්යේෂණ මණ්ඩලය.

පොල් පර්යේෂණ මණ්ඩලයේ 2016 දෙසැම්බර් 31 දිනෙන් අවසන් වර්ෂය සඳහා වූ මූල්‍ය ප්‍රකාශන පිළිබඳව 1971 අංක 38 දරන මුදල් පනතේ 14(2)(සී) වගන්තිය ප්‍රකාර විගණකාධිපති වාර්තාව

මාගේ සමාක හා 2017 අගෝස්තු 17 දිනැති ලිපියට යොමුවේ.

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

  
සී.බී.පී. ප්‍රේමනාන්ද  
අතිරේක විගණකාධිපති  
විගණකාධිපති වෙනුවට

- පිටපත් -
1. ලේකම්, වැවිලි කර්මාන්ත අමාත්‍යාංශය
  2. ලේකම්, මුදල් හා ජනමාධ්‍ය අමාත්‍යාංශය



**විගණකාධිපති දෙපාර්තමේන්තුව**  
**கணக்காய்வாளர் தலைமை அபிபதி திணைக்களம்**  
**AUDITOR GENERAL'S DEPARTMENT**



මගේ අංකය  
எனது இல. } PLA/D/CRI/1/16/03  
My No. }

ඔබේ අංකය  
உமது இல. }  
Your No. }

දිනය  
திகதி }  
Date }

17 August 2017

The Chairman

Coconut Research Board

**Report of the Auditor General on the Financial Statements of Coconut Research Board  
 for the year ended 31 December 2016 in terms of Section 14(2)(C) of the Finance Act No.  
 38 of 1971**

The audit of financial statements of the Coconut Research Institute for the year ended 31 December 2016 comprising the statement of financial position as at 31 December 2016, the statement of financial performance, statement of changes in equity 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 sent to the Chairman of the Board on 24 April 2017.

**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 Sri Lanka Public Sector Accounting Standards 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.

අංක 306/72, පොල්ලු පාර, බත්තරමුල්ල, ශ්‍රී ලංකාව. - இல. 306/72, பொல்துவ வீதி, பத்தரமுல்லை, இலங்கை. - No. 306/72, Polduwa Road, Battaramulla, Sri Lanka

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### 1.3 Auditor's Responsibility

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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 consistent with International Auditing Standards of Supreme Audit Institutions (ISSAI 1000-1810). 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 judgement, including the assessment of the risks of material misstatement 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 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 the financial statements. Sub-sections (3) and (4) of Section 13 of the Finance Act, No.38 of 1971 give discretionary powers to the Auditor General to determine the scope and 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.

### 1.4 Basis for Qualified Opinion

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My opinion is qualified based on the matters described in paragraph 2.2 of this report.



## 2. Financial Statements

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### 2.1 Qualified Opinion

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In my opinion, except for the effects of the matters described in paragraph 2.2 of this report, the financial statements give a true and fair view of the financial position of the Coconut Research Board as at 31 December 2016 and its financial performance and cash flows for the year then ended in accordance with Sri Lanka Public Sector Accounting Standards.

### 2.2 Comments on Financial Statements

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#### 2.2.1 Sri Lanka Public Sector Accounting Standards

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The following observations are made.

##### (a) Sri Lanka Public Sector Accounting Standard 03

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An appropriate Accounting Policy for the accounting of Government Grants had not been identified by the Management in terms of Section 12 of the Standard and further, Foreign Grants amounting Rs.6,616,827 which had received in the preceding years but fully used at present had been shown as non-current liabilities in the financial statements .

##### (b) Sri Lanka Public Sector Accounting Standard 07

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The library books and periodicals valued at Rs. 2,875,563 as at 31 December in the year under review had not been depreciated continuously.

#### 2.2.2 Accounting Deficiencies

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The value of the land in extent of 05 acres where the Thabbowa Model Farm is situated had not been assessed and brought to financial statements.

**2.2.3 Unexplained Differences**

Even though a sum of Rs. 6,927,840 had been shown in the financial statements as receivables from the Coconut Cultivation Board, since the balance of the payable according to the accounts of the Coconut Cultivation Board was Rs.37,990, a difference of Rs.6,889,850 was shown.

**2.2.4 Lack of Evidence for Audit**

The evidence related to the following account items shown against them had not been furnished to audit.

Item in Accounts	Value Rs.	Evidence not made available
Debtors	4,167,418	} Letters of Confirmation of Balances
Creditors	1,616,402	
Buildings	65,369,688	} Register of Fixed Assets
Retention in respect of Contracts	424,352	} Register of Deposits
Library Books and Periodicals	2,875,563	} Boards of Survey Reports
Stock of Publications	4,157,015	

**2.3 Accounts Receivable and Payable**

The following observations are made.

- (a) According to the age analysis of the debtors, the total of the balances of loans older than 05 years amounted to Rs.554,737. A sum of Rs. 530,294 which represented and including in those balances, it could not be confirmed those balances by the accounts of the institutions such as Tea Small Holdings Development Authority, CWE and the Cooperative of Sandalanka.



- (b) Actions had not been taken by the Board to recover the balance of Security Deposits amounting Rs.245,650 receivable from 13 institutions under the other current assets in the financial statements .

### 3. Financial Review

#### 3.1 Financial Results

According to the financial statements presented, the financial result of the Board as at the year ended 31 December 2016 amounted to a surplus of Rs. 28,733,096 as compared with the corresponding surplus of Rs.45,519,601 for the preceding year, thus indicating a deterioration in the financial result of the year under review, as compared with the preceding year, by a sum of Rs.16,786,505. The increase of expenditure of the Research Centres by a sum of Rs. 17,403,829 and the increase of the other expenses by a sum of Rs. 20,307,686 in the year under review had mainly attributed to the above deterioration.

In analyzing the financial results of 04 preceding years and the year under review even though the deficit of Rs.59,537,758 in the year 2012 had increased to Rs.70,181,702 gradually by the year 2014 and from the year 2015 to the year under review it had gradually decreased to 28,738,096 . However, the contribution of the Board in the year 2012 after the adjustments back the employees remuneration, paid taxes to the Government and the depreciation on the non-current assets to the financial result amounted to Rs. 88,418,334 and that had increased continuously and it had been Rs. 236,407,829 by the end of the year 2016.

#### 3.2 Legal Action Instituted Against or by the Institution

The Board had filed 09 cases against 09 external institutions and persons, in the Courts claiming compensation totalling Rs.16,716,899 and 02 cases had been filed by the external parties against the Board claiming compensation from the Board.

#### 4. **Operational Review**

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##### 4.1 **Performance**

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The main functions of the Board according to the Coconut Development Act, No.46 of 1971 are as follows.

- Conduct and improving scientific research on growth and cultivation of coconut palm and growing other crops in coconut palm lands and engage in animal husbandry in coconut plantations and prevent and cure of diseases and pests.
- Conducting and improving of scientific research in respect of establishment and maintenance of research institutes, experimental stations and nurseries, processing of coconut products and establishment of pilot factories, creation of experimental processing equipment.
- The training of advisory and expansive workers to assist the coconut industry and guiding and advising of the coconut industry in all matters of a technical nature.

The following observations are made in connection with the achievement of the above objectives.

##### (a) **Examination of Research Projects**

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A Project was scheduled to commence by the Board in the year under review had not been commenced and the achieved level of physical progress of the 24 Research Projects which were being implemented at the end of the year under review ranged from 0 per cent to 50 per cent.



### **(b) Oil Palm Project**

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The Oil Palm Project had been commenced in the year 2012 as an alternative method for managing the domestic vegetable oil requirement without preparation and obtaining an approval for a Project Feasibility Study Report and a Proposal. It had been planned to implement 08 Research Projects according to the Project Plan of the Project by estimating of Rs.31.17 Million and the Project duration of this had been expanded from the year 2013 to the year 2024. Nevertheless, as a result of that Project had been ceased in the month of July in the year under review the expenditure incurred amounting Rs. 3,879,623 had become an uneconomic expenditure. Further, Research Reports relating to each Researches had not been furnished and it had been impossible to get the benefit even from the model farms carried on in Pallama and Ambakele.

- (c) Even though the Research activities in respect of introducing of new varieties of coconuts were continuously done by the Division of Genetic and Plant Breeding of the Board an introduction of new coconut varieties had not been done after the year 2012. Out of the 06 varieties of coconuts introduced the varieties of coconuts such as Kapruwana, Kapsetha, Kapsuwaya had not been expanded among the people.

### **(d) Examination of Pests Damage to Coconut Cultivation**

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The following observations are made.

#### **(i) Red Weevil Attack**

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The attack of the Red Weevil in the Coconut Estates belonging to the Board as compared with the preceding year has increased and the attack of the Red Weevil had been drasatically increased at the Estates in Ambakele, Makandura, Middeniya and Walpita.

**(ii) Coconut Mite**

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The number of Mite attacked coconuts were 159,141 up to the 30 November in the year under review at the 06 Research Centres, 03 Genetic Resources Centres belonging to the Board and Thabbowa Model Farm and an amount of percentage ranged between 3 per cent to 5 per cent from the entire coconut yield had been focused on this attack during the past 05 years at the Coconut Estates belonging to the Board.

**4.2 Management Activities**

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The following observations are made.

- (a) Even though the Genetic Resources Centre in Makandura was established as a Seed Coconut Garden from the 21 July 1984, obtaining coconut seeds had been ceased due to the untimely damage of coconut palms and the attention of the Management had not been paid in respect of the adaptation of this Centre for another effective activity.
  
- (b) It had been entered into a Memorandum of Understanding by the Coconut Research Board with the Chilaw Plantation Company in the month of January 2013 for 30 years for the establishment of a Seed Coconut Garden named "Kapruka" in the Keeniyama Estate belonging to Chilaw Plantation Company. The present maintenance condition of this Seed Garden had not shown a satisfactory manner and even though the Red Weevil attack had spread to the coconut plants, the attention of the Management had not been drawn to apply remedial action with regard to that.
  
- (c) A sum of Rs. 16,716,899 which should be received to the Board as per the agreements from the 09 foreign scholars who had not reported to the duties during the period from the year 1992 to 2014, the attention of the Management had not been paid to recover from the relevant officers.



**(d) Dunkannawa Watta**

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- i. Even though the land where the Dunkannawa Watta Research Centre is being maintained and obtained by the lease agreement signed on 25 July 2002 for the period of 30 years, after 15 years lease period lapsed, action had been taken as per the request of the Authority to alienate that land again to the Coconut Development Authority in the month of June 2016. Even though the activities were done to increase the yield by inter cropping in this land by the Board during the lease period, as a result of action taken to alienate the land by the Authority the Board had lost the opportunity of earning a high income for a long time period .
  - ii. The salaries amounting Rs.143,532 which had been paid for the daily workers who were employed thereon by the Board after the alienation of the land, action had not been taken to reimburse from the Coconut Development Authority
- (e) Actions had not been taken to strengthening of the internal control systems by paying the attention of the Management in respect of 34 Internal Audit Queries issued in between the year 2014 to the year 2016.

**4.3 Underutilization of Funds**

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The following observations are made.

- (a) In the Current Account which is being maintained relevant to the Estates belonging to the Board an excess cash balance amounted to Rs. 59,155,717 had been maintained without utilization the Funds of the Board to achieve the objectives of the Board as at 31 December in the year under review.
- (b) Even though a sum of Rs. 2,021,532 had been granted to the Board for the Agroforestry Project by the World Agroforestry Centre in the year 2014, as a



result of non-utilization of those funds for the relevant activity a sum of Rs.1,557,808 had been sent in return to the International Water Management Centre on 26 May 2017.

#### **4.4 Idle and Underutilized Assets**

Even though a Heat Conservation Unit had been established in the year 2008 at a cost of Rs.1,719,250 in Bandirippuwa Research Centre for the purpose of drying copra instead of emission of the heat to the environment in the production of charcoal from coconut shells, that was being idle without utilization from the year 2012.

#### **4.5 Staff Administration**

Since the number of approved cadre of the Board was 391 and the number of actual cadre was 280, it was shown 111 vacancies in 31 posts. Accordingly, because of 30 per cent vacancies existed from the approved cadre thus could not be ruled out in audit as it was not a barrier to carrying on the activities of the Board efficiently.

### **5. Accountability and Good Governance**

#### **5.1 Tabling of Annual Reports**

Even though the Annual Report should be tabled in the Parliament within 150 days after the close of the financial year, the Annual Report in respect of the year 2014 had not been tabled in Parliament even as at the date of this report in terms of Section 6.5.3 of Public Enterprises Circular No. PED/12 dated 02 June 2003.

#### **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.



**Areas of Systems and Controls**

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**Observations**

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(a) Human Resources Administration

i. Action not taken to recruit the officers in accordance with the Scheme of Recruitment.

ii. Even though the accuracy of the certificates relating to the educational qualifications and professional qualifications of the officers should be confirmed from those institutions, actions not so done.

(a) Assets Management

Not updating the Assets Register.

H.M. Gamini Wijesinghe  
 Auditor General

**Sgd / H.M. GAMINI WIJESINGHE**  
**Auditor General**