

වාර්ෂික කාර්ය කාඩ්ත වාර්තාව 2013

வருடாந்த செயற்திறன் அறிக்கை

ANNUAL PERFORMANCE REPORT



අපනයන කෘෂිකර්ම දෙපාර්තමේන්තුව
ஏற்றுமதி விவசாயத் திணைக்களம்
DEPARTMENT OF EXPORT AGRICULTURE

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சிறு ஏற்றுமதிப் பயிர் ஊக்குவிப்பு அமைச்சு
MINISTRY OF MINOR EXPORT CROP PROMOTION

2013

வார்க்கை கார்டு காலம் வார்க்கை

வருடாந்த செயற்றிறன் அறிக்கை

Annual Performance Report

அகலயை கால்கரல் டேவார்தலேதலு
கூல் அகலயை லுல துலர்லல அலுலயாண்ட

ஏற்றலுமதல வலவசாலயத் தலணைக்கலம்
சலறு ஏற்றலுமதலப் பயலர் ஊக்குவலப்பு அலைச்சு

Department of Export Agriculture
Ministry of Minor Export Crop Promotion

අපේ දැක්ම

කුලඹවූ හා ආශ්‍රිත නිෂ්පාදන අපනයනයෙන් විශිෂ්ටත්වය

අපේ මෙහෙවර

වැඩි විදේශ විනිමයක් ඉපයීමත්, අපනයන කෘෂි බෝග ක්ෂේත්‍රයේ නිරත සියලු පාර්ශවකරුවන්ගේ නිර්කාර ආර්ථික හා සමාජීය සංවර්ධනයන් පෙරදැරි කර ගනිමින්, පරිසරය සුරැකෙන අයුරින් අපනයන කෘෂි බෝග නිෂ්පාදනවල ප්‍රමාණාත්මක හා ගුණාත්මක ප්‍රවර්ධනයක් ඇති කිරීමට අවශ්‍ය වන්නාවූ පර්යේෂණ හා සංවර්ධන ක්‍රියාවලිය සැලසුම් කිරීම හා ක්‍රියාත්මක කිරීම.

ආපදා නිවැරදිකිරීමට

“ව්‍යාපෘතියේ ප්‍රවර්ධනයට අදාළව පවතින අභියෝගයන්ට සාර්ථකව පිටුවහල් කිරීමට සූදානම්ව සිටීම”

ආපදා නිවැරදිකිරීමට

“උපරිම අගයයන් සලකා බැලීමට සූදානම්ව සිටීම, ආපදා නිවැරදිකිරීමේ ක්‍රියාමාර්ගයන් සම්බන්ධයෙන් සුදුසු පියවර ගැනීමට සූදානම්ව සිටීම, ආපදා නිවැරදිකිරීමේ ක්‍රියාමාර්ගයන් සම්බන්ධයෙන් සුදුසු පියවර ගැනීමට සූදානම්ව සිටීම”

OUR VISION

“Excellence in Exports of Spices and Allied Products”

OUR MISSION

“Planning and Implementation of an appropriate Research and Development Programme with the prime objective of earning more foreign exchange through enhancement of quality and quantity of Export Agricultural Crop production for sustainable development of economic and social standards of all the stakeholders of the Export Agricultural Crop sector while ensuring the safeguards to environment”

ACKNOWLEDGEMENT

It is a great pleasure to extend my sincere gratitude to all Heads of Divisions of the Department of Export Agriculture for the contribution they rendered to complete this annual performance report.

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W.D.L Gunaratne

Director General

Department Of ExportAgriculture.

09/06/2014

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ABBREVIATIONS

AD	-	Assistant Director
CHOGM	-	Commonwealth Heads of Government Meeting
COP	-	Cost of Production
CRS	-	Cinnamon Research Station
DEA	-	Department of Export Agriculture
DS	-	Divisional Secretary
EAAS	-	Export Agricultural Assistance Scheme
EAC	-	Export Agricultural Crops
EO	-	Extension Officer
ERP	-	Eppawala Rock Phosphate
FSA	-	Farmer Service Assistance
GAP	-	Good Agricultural Practices
GDP	-	Gross Domestic Product
GN	-	Grama Niladari
Ha	-	Hectare
HQEO	-	Head Quart Extension Officer
HRD	-	Human Resource Development
IBRS	-	Inter Cropping & Betel Research Station
ICT	-	Information Communication Technology
IPC	-	International Pepper Community
IRP	-	Imported Rock Phosphate
NARP	-	National Agriculture Research Policy
PHASU	-	Post Harvest Advisory Service Unit
PIP	-	Productivity Improvement Programme
R & DA	-	Research & Development Assistance
RO	-	Research Officer
SLTS	-	Sri Lanka Technological Service
SPnDP	-	Small Plantation and Development Programme
VAM	-	Vesicular Arbuscular Micorhiza

FOREWORD BY THE DIRECTOR GENERAL OF EXPORT AGRICULTURE



The Department of Export Agriculture (DEA) continued its activities to promote Spices, Beverage, Essential oil and Stimulant crops of perennial nature, officially known as Export Agriculture Crops (EAC) through bringing more land under cultivation, increase the productivity of the existing cultivated lands and improving the quality of the final product to be more competitive in International markets. During the year 2013, a remarkable increase in overall production and export of EAC products was observed while increasing the total foreign exchanging earnings to the country. Total volume of EAC exports have increased from 37,528.0 Mt in 2012 to 57,192.5 Mt in 2013 recording 52.4% increase. Similarly Total Foreign exchange earning has increased from Rs.35, 321.5 million to 48,392.8 million recording 37.0% increase. Hence the year 2013 recorded the ever highest volume of export and foreign Exchange earnings from EACs. Pepper export volume was the most significant. In comparison to 2012, 103.4% increase in export volume and 85.1% increase in export earnings from pepper could be observed by exporting 21,329.6Mt. Under the guidance of the Ministry of Minor Export Crops Promotion, DEA planned and implemented EAC Research and Development programmes in 2013 to

achieve the mandated objectives. This year is one of the most prominent years for almost all the EACs. Farm Gate Prices of Cinnamon, Pepper, Clove, Nutmeg and Mace have increased impressively over 2012 except for Cardamom and Betel. More attention paid on productivity and quality improvement in order to meet the international standards and trade regulations, have achieved expected results. DEA continued its efforts in 2013 under the theme of **“A Better quality Product with Sustainable Development”**, to ensure the food safety standards in the domestic production system, while promoting Good Agricultural Practices (GAP) and Good Manufacturing Practices (GMP) to meet those needs.

This report summarizes the overall performance and related information pertaining to the four sub-divisions of the Department under the Director General of the Department of Export Agriculture namely Research, Development, Administration and Finance. It includes all activities of the department, strategies used to meet the desired goals and the progress achieved during the year 2013.

W.D.L. Gunaratne
Director General

GENERAL INFORMATION -2013

❖ Growth of the EAC sector in 2013

- Contribution to GDP - 0.4%
- Contribution to export earnings of agriculture - 14.5%
- Export volume (Mt) - 57,192.5
- Export Value (Rs.Mn.) - 48,392.8
- Estimated EAC extent (ha) - 107,671 (With Ginger & Turmeric)

❖ District offices, Research stations and Nurseries of the Department

a) District Offices -14 (Distributed in the following districts.)

- Central Province - Kandy, Matale & Nuwara-eliya
- Sabaragamuwa Province - Kegalle & Ratnapura
- Uva Province - Badulla & Monaragala
- Southern Province - Galle, Matara & Hambantota
- Western province - Colombo, Kalutara & Gampaha
- North Western Province - Kurunegala, Puttalama

b) Research Stations and Sub-Units

1. Central Research Station, Matale.
2. National Cinnamon Research & Training Centre ,Pallolpitiya,Thihagoda.
3. Intercropping and Betel Research Station, Dampelassa, Narammala.
4. Economics and Market Research Unit, Head Office, Peradeniya.
5. Mid Country Research Station, Delpitiya.
6. Tissue Culture Unit & Plant Nursery, Walpita.
7. Research Sub-Unit, Kundasale.
8. Research Sub-Unit, Nillambe.

c) Department Plant Production Nurseries

- Kurunegala District - Serapies Plant Nursery - Polgahawela,
Holongolla Plant Nursery - Dodangaslanda,
Wennoruwa Plant Nursery - Narammala
- Nuwaraeliya District - Blackwater, Plant Nursery - Ginihaththena &
Mulhalkele, Plant Nursery - Walapane
- Matale District - Central Plant Nursery - Elwela
- Matara District - Central Plant Nursery - Mapalana, Kamburupitiya
- Kegalle District - Central Plant Nursery - Gasnawa
- Gampaha District - Central Plant Nursery - Walpita
- Hambantota District - Central Nursery & Spice Park - Middeniya

1. Functions of the Department of Export Agriculture

1.1 Role and objectives

The major responsibility of the Department of Export Agriculture (DEA) is to develop the EAC sector in order to earn more foreign exchange by increasing the export volume and improving the quality of the products. As officially defined, the perennial crops, of which over 50% of the annual production is exported (excluding tea, rubber, coconut and cashew) and any other crop that is named by the Minister in-charge to be brought under the purview of the department are classified as EACs. As to this classification DEA's main emphasis is to improve the production system of Spice crops such as Cinnamon, Pepper, Clove, Nutmeg, Cardamom, Vanilla, Ginger, Turmeric and Garcinia, Beverage crops such as Coffee, and Cocoa, Stimulants such as Betel and Arecanut, Essential oil crops such as Citronella and Lemongrass. The functions of the Department mainly based on technical advisory activities and those are fulfilled through Research and Development activities implemented by the Department.

1.2 Major Functions

The Promotion of Export Agriculture Crops Act no. 46 dated 22nd September, 1992 of Parliament of the Democratic Socialist Republic of Sri Lanka, embodies and gives statutory status to the functions and services mentioned below.

- Organizing and promotion of cultivation and processing of EACs.
- Undertaking multidisciplinary research on crop improvement, crop husbandry, crop protection, post harvest handling and socio economics.
- Production and supply of quality planting material.
- Implementation of EAC assistant schemes on crop production, productivity improvement and quality improvement.
- Providing crop protection advisory services.
- Promotion of Integrated Pest Management.
- Promotion of Integrated Plant Nutrient Management.
- Promotion of Organic Farming.
- Dissemination of information on marketing, quality standards and Prices etc.
- Control of importation of EAC products and planting materials etc.
- Training of personals involved in EAC production, processing & trading and other stakeholders.
- Providing advisory services for the promotion of EACs in estate sector.
- Strengthening of the linkage among public and private organizations involved with EACs.
- Contributing towards EACs related policy matters in other governmental organizations.
- Technology demonstrations.
- Executive authority under the Export Agriculture Act No. 46 of 1992.

1.3 Important Events of 2013

Annual Symposium on Minor Export Crops was held for the second time on 12th and 13th of September, 2013 at Plant Genetic Resource Centre, Peradeniya.

At this Symposium thirty two research papers were presented covering various subjects related to Export Agriculture Crops and Cashew. Compiled proceeding was issued as a publication for further reference.

Shade tree pruning week was declared and implemented on 23rd August for the second time aiming to minimize the competition between support tree and Pepper vine and use the pruned material as a green manure for to improve the productivity of Pepper. The official inauguration of the week was held in the farmer fields in Lemastota in Badulla district.

கர்சுலு
நர்வாகம்
ADMINISTRATION

2. ADMINISTRATION DIVISION

Being headed by the Director of Administration, the Administration Division of the Department assists the Director General of Export Agriculture in the management of human and physical resources which include new recruitments, promotions and transfers, human resource development, disciplinary procedures and matters related to departmental examinations, procurement and maintenance of capital assets of the department. Besides, the major responsibilities, the division handles the welfare services and related activities for the motivation and welfare of the staff, as and when required. The organizational chart of the DEA is given in annexure VI.

The approved cadre of the department was amended as per the letter no: DMS/1 dated 12.01.2012 issued by the Department of Management Services through the Restructuring Process of the Department of Export Agriculture. Accordingly, approved cadre, number of employees in service as at 31.12.2013 and vacancies prevalent at same is depicted in the table 2.1.1.

2.1 Staff

The distribution of the approved cadre and number of employees in service are given in table 2.1.1.

Table 2.1.1: Distribution of Cadre as at 31st of December 2013

No.	Designation	Service & Grade	Salary Code	No. Approved	Number in service as at 31.12.2013	Vacancies
01	Director, General	Sri Lanka Scientific Service	SL 3-2006	01	01	-
02	Additional Director General	Sri Lanka Scientific Service	SL 3-2006	02	-	02
03	Director	Sri Lanka Scientific Service 1	SL 1-2006	07	-	07
04	Director (Administration)	Sri Lanka Administrative Service 1	SL 1-2006	01	01	-
05	Chief Accountant	Sri Lanka Accounting Service -1	SL 1-2006	01	01	-
06	Statistician	Departmental	SL 1-2006	01	-	01
07	Deputy/Assist. Director (Administration)	Sri Lanka Administrative Service 11/111	SL 1-2006	01	-	01
08	Deputy/Assist. Director (R&D)	Sri Lanka Scientific Service 11/111	SL 1-2006	67	40	27
09	Accountant	Sri Lanka Accounting Service 11/111	SL 1-2006	01	-	01
10	Internal Auditor	Sri Lanka Accounting Service 11/111	SL 1-2006	01	-	01
11	Deputy/Assist. Director (planning)	Sri Lanka Planning Service 11/111	SL 1 2006	01	01	-

No.	Designation	Service & Grade	Salary Code	No. Approved	Number in service as at 31.12.2013	Vacancies
12	Assist. Director (Development)	Departmental	SL 1-2006	01	01	-
13	Administrative Officer	Public Management Assist. Service (Supra)	MN7-2006A	03	03	-
14	Extension Officer	Sri Lanka Technological Service(Special Grade)	MN7-2006A	19	04	15
15	Research Assistant	Sri Lanka Technological Service(Special Grade)	MN7-2006A	03	02	01
16	Farmhouse Manager	Sri Lanka Technological Service(Special Grade)	MN7-2006A	01	-	01
17	Translator	Government Translator Service	MN6-2006A	02	01	01
18	*Research and Develop.Assist./ Develop. Assist.	Allied Services	MN 4-2006A	84	84	-
19	Development Officer	Allied Services	MN 4-2006A	411	282	129
20	Budget Assistant	Allied Services	MN4-2006A	01	01	-
21	Extension Officer	Sri Lanka Technological Service	MN 3-2006A	171	144	27
22	Research Assistant	Sri Lanka Technological Service	MN 3-2006A	22	19	03
23	Technical Officer	Sri Lanka Technological Service	MN 3-2006A	01	-	01
24	Librarian	Sri Lanka Librarian Service	MN 3-2006A	03	01	02
25	Farmhouse Manager	Sri Lanka Technological Service	MN 3-2006A	11	-	11
26	Management Assistant	Public Management Assistant Service	MN 2-2006A	83	65	18
27	Computer data entry operator	Combined Service	MN 1-2006A	01	01	-
28	Farm Service Assistant	Departmental	MN 1-2006A	11	11	-
29.	Warden	Departmental	MN 1-2006A	01	01	-
30	Drivers	Combined Drivers' Service	PL 3-2006A	61	49	12
31	Tractor Driver	Departmental	PL 2-2006A	02	-	02
32	Mason	Departmental	PL 2-2006A	01	01	-

No.	Designation	Service & Grade	Salary Code	No: Approved	Number in service as at 31.12.2013	Vacancies
33	Spray Machine Operator	Departmental	PL 2-2006A	02	02	-
34	Budder	Departmental	PL 2-2006A	01	01	-
35	Plumber	Departmental	PL 2-2006A	01	01	-
36	Nursery Keeper	Departmental	PL 2-2006A	02	02	-
37	Cook	Departmental	PL 2-2006A	01	01	-
38	Office Employee	Departmental	PL 1-2006A	35	31	04
39	Watcher	Departmental	PL 2-2006A	47	35	12
40	Lorry Cleaner	Departmental	PL 1-2006A	07	07	-
41	Driver Assistant	Departmental	PL 1-2006A	01	01	-
42	Labourer	Permanent	PL 1-2006A	190	162	28
		Contract basis		97	158	(-61)
43	Circuit Bungalow Keeper	Departmental	PL 1-2006A	02	-	02
Total				1363	1115	309

The number of posts marked with * had been changed according to the letter no: DMS/G/50/12 dated 12.01.2012 issued by the Department of Management Services. The cadre under no. 18 is to be absorbed to the Development Officer Service.

2.2 Senior Managerial Positions of the Department

Director General	- Mr. W.D.L. Gunaratne
Additional Director General (Research), Acting	- Dr. W.W.P.W.M.R.S. Kularathne (01.01.2013 – 14.10.2013) - Dr. A.P. Heenkende (14.10.2013 – 31.12.2013)
Additional Director General (Development), Acting	- Mr. N.K.A. Rupasinghe
Director (Administration)	- Mr. Janaka Dharmakeerthi (01.01.2013 - 08.11.2013) Mr. K.G. Upali Ranawaka (08.11.2013 - 31.12.2013)
Chief Accountant	- Mr. D.M. Jayasena (01.01.2013 – 26.09.2013) - Mr. R.M.D.S.S. Rathnayake (26.09.2013 – 31.12.2013)

Director (Development) I	- Dr. M.A.P.K. Senevirathne
Director (Development) II	- Mrs. Shantha Senevirathne
Director (Development) III	- Mr. M.W. Girihagama
Director (Regulation)	- Ms. A.P.P. Disna
Director (Research)	- Dr. H.A. Sumanasena
Director (Research)	- Mr. K.G.G. Wijesinghe
Director (Research)	- Dr. A.L.S. Dharmaparakrama

• **New Recruitments**

Research Assistant	13
Extension Officer	26
Development Officer	282
Office Employee Service	03
Labourer	01

• **Transfers – In**

Director (administration)	01
Research and Development Assistant	03
Public Management Assistant	10
Office Employee Service	03
Driver	06

• **Transfers – Out**

Director (Administration)	01
Research and Development Assistant	01
Public Management Assistant	10
Office Employee Service	03
Driver	06

• **Resignations**

Extension Officer	01
Research and Development Officer (Vacation of Post)	01
Development Officer	01

• **Release**

Research Assistant	02
Extension Officer	03
Development Officer	17
Farm Service Assistant	01

• **Deaths**

Public Management Assistant	01
Farm Service Assistant	01

• **Retirements**

Chief Accountant	01
Director (Research)	01
Assistant Director	01
Extension Officer	12
Public Management Assistant I	06
Office Employee Service	01
Driver	06
Labourer	11

2.3 : Departmental Examination - 2013

No.	Name of the examination	Date
01	1 st Departmental Examination for Class II/B Extension Officers (SLTS)	07/11/2013
02.	Second Language (Tamil) Oral Test for Officers of Sri Lanka Scientific /Technological Service	31/05/2013 19/12/2013
03.	1st Efficiency Bar Examination for Officers of Sri Lanka Scientific Service (Class II/II)	28/03/2013
04.	Departmental Examination for Research Assistants (Class II B) of SLTS 1 st Efficiency Bar Exam	21/06/2013
05.	1 st Departmental Examination for Research Assistants (Class II B) of SLTS	07/11/2013
06.	Efficiency Bar Examination for Laborer /Watcher (Oral)	23,24/04/2013 07,10/05/2013
07.	2 nd Efficiency Bar Examination for Research & Development Assistants	21/06/2013

Table 2.4 : Foreign Scholarships & Tours – 2013

No.	Name of the Officer	Post	Description	Duration	Country
01	Mr. S.B.U.S.K. Ranaweera	Assistant Director	Workshop on Export Oriented Economy	14/06/2013 - 04.07.2013	China
02	Mr. N.K.A. Rupasinghe	Additional Director General (Development)	International Pepper Community – Marketing	24-25/06/2013	Dubai
03	Mr. I.V.A.D.S. Induruwa	Research Officer	Workshop on Packing and Naming of Organic Agricultural Products	08-12/07/2013	Philippines
04	Mr. W.D.L. Gunaratne	Director General	Promotional Conference on the quality of Cinnamon	12-20/07/2013	USA
05	Mr.R.K.W. Rankethkumbura	Assistant Director	Training on Production Technology of Tropical Spices and Beverage Crops	24/07/2013 - 13/08/2013	China
06	Mr. W.D.L. Gunaratne	Director General	Research and Development Committee Meeting of IPC and The International Conference on Spices and Medicinal Crops	27-31/08/2013	Indonesia
07	Dr. A.P. Heenkende	Additional Director General (Research)	Participating the Official tour of Hon. Minister of Minor Export Crop Promotion	17-24/10/2013	Indonesia
08	Mr. N.K.A. Rupasinghe	Additional Director General (Development)	41 st Session of International Pepper Community	10-15/11/2013	Malaysia
09	Dr.J.M.Senewiratne	Research Officer	41 st Session of International Pepper Community	10-15/11/2013	Malaysia
10	Dr. H.M.P.A. Subhasinghe	Research Officer	41 st Session of International Pepper Community	10-15/11/2013	Malaysia
11	Mr. H.W.S. Jayawickrama	Extension Officer	41 st Session of International Pepper Community	10-15/11/2013	Malaysia
12	Mr. W.D.L. Gunaratne	Director General	41 st Session of International Pepper Community	10-15/11/2013	Malaysia

2.5 Targets Achieved in 2013

2.5.1 Land Transfers

1. The transferring procedure of the land of Research Centre, Delpitiya had been completed and conferred to the Department on 06.09.2013.
2. The transferring procedure of the land of Research Centre, Kundasale had been completed and conferred to the Department on 25.11.2013.

Table 2.5.2: Obtaining Approval for the Scheme of Recruitments

Recruitment Procedure	Approval granted by PSC on
SL - 1 Sri Lanka Scientific Service	31/10/2013
SL - 1 Assistant Director (Development) (Departmental)	27/06/2013
MN - 7 Extension Officer/Research Assistant of Sri Lanka Technological Service (Special Grade)	28 /11/2013
MN - 3 Extension Officer/Research Assistant of Sri Lanka Technological Service	22/10/2013
MN - 1 Warden	27/09/2013
MN - 1 Promotions of Farm Service Assistants	02/11/2013
PL - 2 Recruitment Procedure of Semi-Technical Posts	27/09/2013

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FINANCE

3. FINANCE DIVISION

The Annual Estimates allocated a financial provision for the year 2013 was a sum of RS 721.610 million under the Head 289 in one programme with two Recurrent Expenditure project and two capital Expenditure project. Additionally end of the year additional allocation has been provided by the Department of National Budget (RS.23.375 million).

The allocation of consolidated fund for the Development programme for the year 2013 has increased by Rs.185.02Mn over 2012 which was a 33% increase. Out of total allocation of Rs.745Mn. The Expenditure for the year was Rs.571Mn.

This was a 76.65% of the allocated provision for the year. The financial performances of the project 1 and 2 were 73.61% and 90.76% of the allocated funds. Percentages of the amount spent under capital Expenditure of the project 1 and 2 for the year 2013 were 58.29% and 66.34% respectively and the same for the recurrent expenditure were 99.36% and 98.43% respectively. Despite the serious man power shortages at all field level technical cadres and the financial constraints the spending of 76.65% of the total annual allocation for the year 2013 was an impressive achievement of the Department of Export Agriculture.

3.1: Financial Provision and Expenditure – 2013

Head – 289
 Programme – 02
 Project – 01 (Export Crops Development Programme)

Item	Net Provision (Rs)	Expenditure (Rs)	Expenditure (%)
Capital Expenditure			
Rehabilitation and improvement of Capital Assets	13,300,000	10,650,051	80.08
Buildings and Structures	8,000,000	6,831,027	85.39
Plant , Machinery and equipment	1,300,000	343,626	26.43
Vehicles	4,000,000	3,475,398	86.88
Acquisition of fixed Assets	8,700,000	5,438,346	62.51
Capital Transfers			
Furniture and office equipment	2,200,000	2,112,003	96.00
Plant machinery and equipment	2,500,000	1,963,786	78.55
Lands and land improvements	4,000,000	1,362,557	34.06
Assisting the Farmers for Export crop Development			
Development Assistance	361,000,000	206,672,796	57.25
Capacity Building			
Staff Training	1,200,000	1,199,044	99.92
Total Capital Expenditure	384,200,000	223,960,237	58.29
Recurrent Expenditure			
Personal Emoluments	192,175,000	192,157,220	99.99
Other charges	36,400,000	34,946,593	96.01
General Administration	228,575,000	227,103,813	99.36
TOTAL EXPENDITURE (project -01)	612,775,000	451,064,050	73.61

Project – 02 (Export Crops Research and Integrated pest/disease management (IPM) Programme)			
Item	Net Provision (Rs.)	Expenditure (Rs.)	Expenditure (%)
Capital Expenditure			
Rehabilitation and improvement of Capital Assets	5,200,000	2,289,424	44.03
Buildings and Structures	2,200,000	730,556	33.21
Plant , Machinery and equipment	1,000,000	402,416	40.24
Vehicles	2,000,000	1,156,452	57.82
Acquisition of fixed Assets	21,300,000	13,862,377	65.08
Furniture and office equipment	2,300,000	1,519,873	66.08
Plant machinery and equipment	5,000,000	3,551,834	71.04
Buildings and Structures	8,000,000	6,177,499	77.22
Lands and land improvements	6,000,000	2,613,171	43.55
Capacity Building			
Staff Training	600,000	320,824	53.47
Implementation of National Agricultural Research Plan (NARP)			
Investment	4,500,000	4,490,481	99.79
Total Capital Expenditure	31,600,000	20,963,106	66.34
Recurrent Expenditure			
Personal Emoluments	83,200,000	82,592,612	99.27
Other charges	17,410,000	16,432,969	94.39
General Administration	100,610,000	99,025,581	98.43
TOTAL EXPENDITURE (project -02)	132,210,000	119,988,687	90.76
TOTAL EXPENDITURE	744,985,000	571,052,737	76.65

3.2 Revenue of 2013

Revenue Source	Estimate(Rs.mn.)	Actual(Rs.mn.)
Rent on Govt. Building s & Houses	1.00	1.30
Loan Interests -other	3.00	3.60
Departmental sales	5.00	8.40
Other Receipts	10.00	10.90
W & O P	10.00	10.60
Sale of Capital Assets	0.10	0.01
Total	29.10	34.81

3.3 Advance Account Limits

	Estimate(Rs.)	Actual(Rs.)
Maximum Limit of Expenditure	31,000,000.00	18,833,175.00
Minimum Limit of Receipts	20,000,000.00	22,883,616.00
Maximum Limit of Debit Balance	118,000,000.00	82,334,865.00



கவீர்தன அபிவிருத்தி Development



4. DEVELOPMENT DIVISION

4.1 Introduction

The Development Division plays a significant role in the Department to provide technical advice and guidance, planting materials and cash grants for the promotion of EAC sector. The division is headed by Additional Director General (Development) supported by three Directors (Development), assigned with two provinces for each, for the management and implementation of EAC development programme. Assistant Directors attached to the respective districts, Extension Officers in-charge of the Extension Officer Ranges, Research and Development Assistants and Development Officers attached to the division worked as a supportive staff to continue the services and functions of the Development division.

The development activities and services of the division are mainly focused on the wet and intermediate climatic zones of Sri Lanka covering 14 districts, namely, Kandy, Matale, Nuwara-Eliya, Kurunegala, Colombo, Kalutara, Gampaha, Galle, Matara, Hambantota, Kegalle, Ratnapura, Badulla and Moneragala. In addition several development activities were carried out to introduce and popularize Turmeric, Ginger, Arecanut, Pepper, Cinnamon and Cocoa in non-traditional areas like Puttalam, Anuradapura, Polonnaruwa, Batticaloe and Ampara Districts.

4.2. Crop Development Programme

The following major programmes were carried out by the Development Division.

1. New/Replanting Programme
2. Productivity Improvement Programme
3. Post-Harvest Technology and quality improvement programme of EACs.

The special programmes such as post harvest advisory services, plantation advisory services and plant certification programme for quality assurance of plants and planting material, cultivation of EACs in selected villages as cluster farms, were also implemented during the year 2013. Extension and training of Stakeholders were carried out as a tool of popularising those three major development programmes.

4.3 Investment Assistance Scheme for the promotion of Export Agriculture Crops Sector

This scheme was introduced in 1972 with the inception of the Department and it was revised several times over the past 40 years. The assistance scheme which was revised in 2007 is currently being implemented to promote production, productivity and quality improvement of EACs.

4.3.1. Export Agriculture Crops Investment Assistance Scheme for new planting

Export Agriculture Crops Investment Assistance Scheme currently being

implemented for new planting programme is given in table 4.3.1.1. and the progress of the new planting programme has been summarized in table 4.3.1.2.

Table 4.3.1.1 : EAC Assistance Scheme for New Planting

Crop	Crop spacing	Plants per Hectare	Investment Assistance per Hectare (Rs.)	Minimum period Qualifying for Investment Assist.(Yrs)	Maximum period Qualifying for Investment Assist.(Yrs)
Arabica Coffee	1.8x1.8 m 1.8x2.5 m	3,000 2,200	65,000.00	03	05
Robusta Coffee	3.0x3.0 m	1,100	29,900.00	03	05
Cocoa	3.0x3.0 m	1,100	51,000.00	03	05
Cinnamon	1.2x0.9 m	9,000	101,000.00		05
Black Pepper	2.4x2.4 m	1,700	50,600.00	03	05
Cardamom	2.0x2.5 m	2,000	55,000.00	03	05
Clove	6.0x6.0 m	250	20,000.00	04	06
Nutmeg	6.0x6.0 m	250	30,000.00	04	06
Vanilla	2.4x1.5 m	2,750	16,500.00	03	05
Citronella	0.9x0.9 m 0.6x0.6 m	17,500 30,000	30,625.00	8 Month	02
Lemon grass	0.6x0.6 m	30,000	30,625.00	8 Month	02

Table 4.3.1.2 : Progress of New planting Programme – 2013

Crops	Target	Applications Received		Recommended Applications		Permits Issued		Extent Planted		Rewards paid	
		No.	ha	No.	ha	No.	ha	No.	ha	No.	ha
Cinnamon	717	5926	2335	6763	1944	3341	1160	2379	810	1690	664
Pepper	545	12221	3509	8173	1974	6096	1368	3864	671	1279	336
Cardamom	58	50	33	39	26	36	26	35	24	5	1
Coffee	124	404	173	253	131	258	133	229	114	81	41
Cocoa	380	1077	527	906	327	778	253	761	251	54	24
Clove	40	221	73	164	59	120	45	163	39	8	5
Nutmeg	49	604	177	366	100	289	75	298	64	43	15
Vanilla	18	87	14	68	9	68	10	59	11	-	-
Citronella	7	13	15	26	20	25	21	26	21	11	4
Areca nut	281	1016	382	825	308	705	207	709	210	-	-
Ginger	313	2713	381	1989	269	1801	884	1285	238	-	-
Turmeric	139	768	93	637	51	558	41	1229	48	-	-
Total	2,671	25,100	7,711	20,209	5,218	14,075	4,223	11,037	2,501	3,171	1,090

4.4 Productivity Improvement Programme

Productivity Improvement Programme (PIP) was introduced to increase the production of the existing EAC cultivations per unit area, where production is below the potentials due to low crop density and poor crop management. Growers are assisted with technical advice, supplying of free planting material to fill vacancies and offering outright cash grants for a period of

three years in order to improve the existing pepper, cinnamon, cocoa, coffee, clove and nutmeg cultivations. Adoption of recommended agronomic practices such as filling vacancies, proper soil conservation measures, crop and shade tree pruning, application of organic manure and integrated pest management are required to qualify under the assistance scheme. The details of the Assistance Scheme is given in Table 4.4.1.

Table 4.4.1: Assistance Scheme for Productivity Improvement Programme (Cash grant per hectare for each crop in Rs.)

Crop	1 st Year	2 nd Year	3 rd Year	Total
Cinnamon	13,000	13,000	11,500	37,500
Black pepper	13,000	13,000	11,500	37,500
Cocoa	13,000	13,000	4,000	30,000
Coffee	13,000	13,000	4,000	30,000
Clove	6,500	6,500	2,000	15,000
Cardamom	13,000	13,000	4,000	30,000
Nutmeg	6,500	6,500	2,000	15,000

Target of the productivity improvement programme and the progress of the extent developed under productivity improvement programme in 2013 is given in the table 4.4.2 and 4.4.3

Table 4.4.2 : Target of the productivity improvement programme

Crop	Cinnamon	Pepper	Coffee	Cocoa	Cardamom	Clove	Nutmeg	Total
Target(ha)	888	1083	47	102	18	87	66	2291

Table 4.4.3 : The extent(ha) developed under Productivity Improvement Programme in different District

District	Cinnamon	Pepper	Coffee	Cocoa	Cardamom	Clove	Nutmeg	Total
Kurunegala	21.3	135.6	4.2	5.7	-	9.6	6.2	182.6
Matale	7	95.5	-	18	-	1	2	123.5
Kandy	2.3	138.9	1.1	3.4	4.3	19.7	14.2	183.9
Nuw- Eliya	53.9	4	-	2.4	8.9	-	-	69.2
Badulla	29.4	188.6	10	-	-	-	-	228
Monaragala	5.6	106.8	-	16.5	-	-	-	128.9
Hambantota	106.9	41.3	-	-	-	-	-	148.2
Matara	191.4	3.6	-	-	-	-	-	195.0
Galle	319.5	5.9	-	-	-	-	-	325.4
Kalutara	131.5	-	-	-	-	-	-	131.5
Colombo	9.6	4.3	-	-	-	-	-	13.9
Gampaha	3.4	49.5	-	-	-	-	-	52.9
Kegalle	9.8	82.8	1.4	2.6	8.2	17.4	-	122.2
Ratnapura	53	88.3	-	-	-	-	-	141.3
Total	944.6	945.1	16.7	48.6	21.4	47.7	22.4	2046.5

4.5 Export Agriculture Assistance Scheme for Post-Harvest Development Activities

Post-Harvest Advisory Service Unit (PHASU) initiated in 1998 to upgrade the quality of Export Agricultural products was continued during the reporting year too. The Investment assistance scheme revised in 2007 and three packages suitable for stakeholders of different levels were introduced. The main objective of this assistance scheme is to maintain the quality of the product to be competitive in international markets, product diversification and value addition and to facilitate marketing of EAC products. The details of the three assistance schemes are given below.

1) Group Processing Units

The Farmer Organizations registered with the department are eligible for this assistance scheme, under which machinery required for processing is issued free of charge. The farmer organizations should hold the responsibility of managing the processing unit and handling the machineries. In addition, identifying or Construction of

buildings required for installation of machinery should be performed by the Farmers' Organization itself. The department helps the Farmer Organizations by providing technical knowledge in operation and maintenance of these processing centres.

2) Central Processing Unit

This assistance scheme has been introduced for applicants who are capable of establishing a large scale processing facilities investing more than two million Rupees. The investor is entitled for a cash grant of 25% of the total investment not exceeding 0.5 million Rupees, under this scheme. The investor has the whole authority to maintain the centre and utilization of the profits.

3) Individual Processing Units

Growers or processors wish to set up a private processing unit for post-harvest processing of EAC are eligible to apply for this assistance scheme. They are entitled to obtain cash grants for relevant machineries or post-harvest processing facilities approved by the department as indicated in table 4.5.1

Table 4.5.1: Assistance Scheme for Post-Harvest Activities

	Type of investment	Assistance grant per unit (Rs.)
01	Processing of black pepper	
	a) Blancher	1,000
	b) White pepper processing Machine	25,000
	c) Pepper Thresher	
	➤ Manually Operated	10,000
	➤ Electrically operated	20,000
	➤ Engine Operated	22,500
	d) Green pepper seed sorting Machine	8,000
	e) Grader	15,000

	Type of investment	Assistance grant per unit (Rs.)
02	Processing of Coffee <ul style="list-style-type: none"> ➤ Coffee pulping Machine <ul style="list-style-type: none"> ➤ Manually Operated ➤ Machine/Electrically operated ➤ Coffee Huller 	5,000 15,000 10,000
03	Processing of cocoa <ul style="list-style-type: none"> ➤ Three fermenting boxes larger than 2'x2'x2' (made from grade 1 timber) ➤ Fermenting trays 	4,500 (1500 per box) 6,000
04	Volatile Oil Distillation Unit <ul style="list-style-type: none"> ➤ For new constructions ➤ For repairs 	75,000 75,000 (maximum)
05	Processing Centre – Minimum 400 feet <ul style="list-style-type: none"> ➤ Cinnamon ➤ Other Crops 	40,000 25,000
06	For Dryers <ul style="list-style-type: none"> ➤ Multi functional dryers (Capacity>250 kg) ➤ Solar dryers (100 feet²) ➤ Protected threshing floor ➤ Dryers set above the ground level 	100,000 10,000 (maximum) 25,000 Maximum Rs 25 /feet ² Minimum 200 feet ²
07	Vanilla – fermentation (Minimum Capacity - 20 kg)	10,000

Table 4.5.2 : progress of the Post-Harvest Assistance Scheme in 2013

Item	Number of units granted
Distillation Units	16
Pepper Threshers	33
Dryers	2
Pepper Blanchers	52
Processing sheds	45

4.6 Estate Sector Crop Development Programme

Export Agriculture Crops development programme in estate sector was

introduced in 1998 with the objective of expansion of EAC cultivations to larger estates by utilizing the available resources of the sector. Special emphasis was given for crop diversification programme with EACs in plantation sector to optimize the profit and minimize risk.

Estate management was helped to plan their EAC development programmes by senior officers of the department including researchers, whenever necessary. The following table shows the extent cultivated under the estate sector development programme in 2013.

Table 4.6.1: Extent of crops developed under Estate Sector Crop Development Programme in 2013

District	Crop (ha)				
	Cinnamon	Black Pepper	Coffee	Cocoa	Other crops
Galle	14.5	4.3	-	-	-
Kurunegala	16.2	0.3	-	1.1	1.0
Matale	8.7	0.9	3.8	10.2	3.6
Badulla	13.7	12.8	15.8	7.3	4.1
Nuwara-Eliya	-	-	20.0	-	-
Ratnapura	48.1	1.4	-	-	3.9
Other Districts	23.7	2.95	2.0	3.2	2.3
Total	124.9	22.65	41.6	21.8	14.9

4.7 Production and Issuing of Planting Material

The objective of this programme is to issue quality planting material for new planting and PIP programmes. Planting materials are provided to all farmers who were qualified under the development assistance scheme and successfully completed the land preparation, soil conservation and other field operations as per the instructions given by the department officers. Planting materials were raised in 11 nurseries managed by the department (table 4.7.1) and registered private nurseries under the close supervision of extension staff of the department. There were 427 private nurseries registered with the department during the year 2013. The

distribution of private nurseries is shown in table 4.7.2. The same nurseries were used to produce the planting material requirements for “Divineguma” and other national development programmes.

Table 4.7.1: Department Plant Nurseries in different Districts

District	No. of Government Nurseries
Kurunegala	03
Matale	01
Nuwara-Eliya	02
Matara	01
Gampaha	01
Kegalle	01
Hambantota	01
Kandy	01
Total	11

Table 4.7.2 : Number of private nurseries registered with the Department in different Districts

District	No. of Nurseries	District	No. of Nurseries
Kurunegala	20	Matara	41
Matale	24	Galle	38
Kandy	54	Colombo	18
Nuwara-Eliya	30	Gampaha	18
Badulla	40	Kegalle	27
Monaragala	30	Rathnapura	34
Hambantota	21	Kalutara	32
Total		427	

Prices of the planting materials were revised with effect from 20.08.2012 and the new prices are given in table 4.7.3

Table 4.7.3 : Prices of Seeds and Planting material (Rs.)

Crop	Seed material(Rs.)	Planting Material (Rs.)
Cocoa	20.00 per pod	Plant 10.00
Pepper	0.20 per 3 node cutting	Plant 16.00
Coffee	80.00per kg. of ripped fresh berries Parchment, dry coffee beans 150.00	Plant 10.00
Cinnamon	80.00 per kg of seeds	Plant 9.00
Cardamom	-	Sucker 10.00
Arecanut	2.00	Plant 9.00
Vanilla	5.00 per 1m cutting	
Clove		Large Plant 40.00
Nutmeg	5.00 per seed	Large 60.00
Garcinea	-	Budded 80.00 Seedlings 15.00
Kitul	-	Large 10.00 Small 4.00
Citronella	-	0.75 per sucker
Lemongrass	-	0.75 per sucker

4.8 Plant Certification Programme

Supplying of certified planting materials to the growers has made a mandatory requirement by the Department. Planting with good quality planting materials is a well recognized phenomenon in achieving high productive cultivations. To ensure the supply of quality planting material

through EAC development programme, a team of officers consisting of a Director, District AD and/or RO and an Extension Officer, or officer appointed by the Director General visited each nursery and plant certification is performed using the guidelines introduced by the Department. The details are given in table 4.8.1.

Table 4.8.1: Details of the Plants Certified in 2013

Crop	Total Number of Plants Produced	Number of Plants (Certified)
Pepper	3,462,439	1,807,779
Coffee	369,346	319,650
Cocoa	435,530	369,930
Cinnamon	19,024,830	12,658,759
Areca nut	622,823	510,004
Clove	56,748	21,375
Nutmeg	49,345	19,962
Grand total	24,021,061	15,707,459

4.9 Issuing of Plants under the Export Agriculture Crops Assistance Schemes

Table No 4.9.1 Illustrates the details of plants issued under the assistance schemes during the year.

Table 4.9.1 Issuing of Planting Material (in numbers)

Crop	New Planting	Other	Total
Cinnamon	7,913,922	3,477,313	11,391,258
Cardamom	40,800	-	40,800
Pepper	1,347,446	509,188	1,856,634
Coffee	171,815	149,380	321,195
Cocoa	258,482	49,707	308,189
Citronella	231,000	-	231,000
Arecanut	246,118	93,852	339,970
Clove	10,090	11,185	21,275
Nutmeg	26,395	5,369	31,746
Betel	96,000	-	96,000
Total	10,342,068	4,295,994	14,638,062

4.10 Development of other Export Agricultural Crops

The department is dealing with certain crops which have a potential for enhancing foreign exchange earnings other than the main crops mandated to DEA. Crops identified under this programme were Vanilla, Lemongrass, Garcinia (Goraka) and Kithul. In addition, Ginger and Turmeric were included in this category in 2007. The programme is being continued during the year 2013 and planting materials and necessary technical advice were provided to relevant farmers under this programme. During the year, 297,875 kg of Ginger and 71,655 kg of Turmeric seed tubers were distributed among the growers.

Table 4.10.1 : Progress of the Vanilla Cultivation Programme in Major Growing Areas

District	No. of cutting distributed
Matale	8,500
Kandy	8,330
Kurunegala	2,380
Total	19,210

4.11. Organic Farming Programme

Considering the growing demand for organically produced food in the international market, the department initiated the promotion of organic farming in the year of 1998. Major role of the Department in this regards was to educate growers on organic farming and principles behind that, establishment of demonstrations in selected villages, encourage them to keep records and, promotion of the use of organic manure

and integrated pest management. Farmers were facilitated for marketing their products through the introduction of buyers/exporters.

Table 4.11.1 Extent established under Organic Farming Development Programme in 2013

District	Crop	Extent (ha)
Kurunegala	Pepper/Cinnamon	13.2
Matale	Pepper/Cinnamon	21.3
Kandy	Pepper/Nutmeg/ Clove	23.0
Galle	Cinnamon	7.0
Total		64.5

4.12. Farmer Training

Farmer training programs were organized and conducted by the Assistant Director in-charge of each district with their supporting technical staff in order to improve knowledge and skills of farmers and other stakeholders with updated technological information and to motivate farmers to adopt improved Good Agricultural Practices (GAP) in cultivation and processing of EACs. Required resource personals and other services were obtained from the Research Division, wherever necessary, to conduct the training programs. Details of the training classes conducted in the year reviewed are given in table 4.12.1

Table 4.12.1: Progress in Farmer Training 2013

Activity	Number of Programmes		Number of Beneficiaries
	GAP	GMP	
Farmer Training Classes	2,447	385	72,307
Field Days	436	56	14,489

4.12.2 Cinnamon Peeler Training Programmes

Experienced Cinnamon peeler shortage has become a serious problem in cinnamon industry. Hence, the department has introduced a cinnamon peeler training programme as a self-employment project in 1988 and continued during the year 2013. A five day on-the-job training was given for the selected beneficiaries at divisional level. All the participants who have successfully completed the training programme were provided with a toolkit necessary for cinnamon peeling. The progress of cinnamon peelers training programme is given in the following table.

Table 4.12.2.1: The progress of cinnamon peelers training programme

District	Number of Beneficiaries
Kegalle	110
Gampaha	80
Rathnapura	124
Colombo	20
Kalutara	150
Galle	130
Badulla	120
Matale	30
Nuwara-Eliya	40
Hambantota	46
Matara	195
Kurunagala	100
Kandy	75
Monaragala	80
Total	1300

4.13. Demonstrations

Field demonstrations were established and maintained at each Extension officer division to educate growers on Good Agricultural Practices (GAP) to increase crop yield and to reduce the cost of production. Field demonstration are used for training programmes and for dissemination of technology too. The details of demonstrations established are shown in table 4.13.1.

Table 4.13.1: Demonstrations established and maintained in different Districts in 2013

District	Number of Demonstrations
Kurunegala	20
Matale	16
Kandy	20
Nuwara Eliya	0
Badulla	7
Moneragala	0
Hambantota	2
Matara	8
Galle	0
Colombo/Kalutara	0
Gampaha	2
Kegalle	18
Ratnapura	6
Total	99

4.14 “Divi Neguma” National Development Programme – 2013

In 2013 four development programs were carried out under the Divi Neguma National Development Programme which was funded by the Ministry of Economic Affairs aiming overall development of Export Agriculture Crop sector.

4.14.1 Establishment of Export Agriculture Crop based Home Gardens

EAC planting materials were distributed to beneficiaries through Divisional Secretaries of respective districts. Progress of the programme is given in table 4.14.1.1.

Table 4.14.1.1 Issue of planting materials to homegardens

District	Cinnamon	Pepper	Coffee	Arecanut	Garcinia	Nutmeg	Clove
Colombo	2,000	22,364	-	1,365	-	-	-
Gampaha	-	14,589	-	-	-	-	-
Kalutara	-	25,000	-	3,000	-	-	-
Galle	124,055	24,970	-	-	-	-	-
Hambantota	73,800	23,100	750	-	-	-	-
Kandy	14,920	16,895	1,200	1,290	-	-	-
Matale	36,750	18,000	-	5,100	500	-	-
NuwaraEliya	10,000	4,375	1,500	-	130	-	-
Kegalle	350	29,431	-	13,000	-	-	-
Rathnapura	53,500	29,150	-	3,000	-	-	-
Badulla	14,000	2,200	5,550	-	5,000	1,500	5,000
Kurunegala	11,112	49,007	2,981	5,800	-	-	-
Total	340,487	259,081	11,981	32,555	5,630	1,500	5,000

4.14.2 Establishment of Commercial Crop Unit

Under this programme EAC cultivations with land extent of 0.5-2.5 acres were established targeting increased production through the adoption of scientific agronomic practices and income generation

for growers. They were supplied with technical advice, cash grants and planting material free of charge. A sum of Rs. 76.87 million was invested in this programme and the physical progress of establishing commercial crop units are given in table 4.14.2.1

Table 4.14.2.1: Physical Progress of Establishing Commercial Crop Units (ha)

District	Target (Units)	Progress (Units)	Physical Progress(ha)				Total Progress Extent in ha
			Cinnamon	Pepper	Cocoa	Nutmeg	
Colombo	10	12	15	-	-	-	15
Gampaha	50	82	26	43	-	-	69
Kalutara	90	126	144	-	-	-	144
Galle	90	181	221	-	-	-	221
Matara	90	125	176	-	-	-	176
Hambantota	70	100	104	22.75	-	-	126.75
Kandy	90	123	14.5	81.25	-	11.75	107.5
Matale	60	66	18.75	74.50	2.5	5.25	101
NuwaraEliya	50	71	8	48.25	-	-	56.25
Kegalle	70	88	36.25	46.75	-	2	85
Rathnapura	90	122	88.75	72.25	-	-	161
Monaragala	90	72	6.5	16	50.5	-	73
Badulla	60	87	10.5	75	-	-	85.5
Kurunegala	90	119	37.75	72.50	6.5	6	122.75
Total	1000	1374	907	552.25	59.5	25	1543.75

4.14.3 Development of EAC based Cottage Industries

This programme was launched with the intention of increasing income level of beneficiaries and encourage value addition of EACs. Beneficiaries were

supported to purchase prescribed machinery. Table 4.14.3.1. highlights the physical progress of the programme implemented in 2013.

Table 4.14.3.1 Progress of EAC Based Economic Household Units

Economic Household Units	Prescribed Machinery	Number
High Quality Pepper Production	Pepper Thresher	12
	Pepper Grader	01
White Pepper Production	White Pepper Processing Machine	09
Spice Grinding Unit	Spice Grinding Machine	12
	Electrical Balance	01
	Polythene Sealer	01
Value addition of Cinnamon	Stainless Steel Utensils	01
	Cinnamon Cutting Machine	01
High Quality Coffee Production	Coffee Pulper	02
Value addition of Turmeric & Ginger	Cutting Machine	01
Total		41

4.14.4 Training of Pepper Shade Pruners as a self - employment Project.

Pruning of shade trees of pepper plant is one of the most important agronomic practices, since it increases the productivity of pepper nearly by 50% and reduce the inorganic fertilizer application by 50%. Due to lack of trained personnel, pepper growers neglect this practice and as a result lose their harvest and income considerably. This programme was carried out to maximize the pepper productivity as well as create self-employment opportunities for rural youth. Under this programme 110 beneficiaries were selected from pepper growing districts. They were trained and supplied with pepper shade pruning equipment worth Rs. 2 million and released to the fields.

4.15 Second Community Development and Livelihood Improvement Project

This programme was implemented in ten districts: Badulle, Monaragala, Nuwara-Eliya, Polonnaruwa, Hambantota, Galle, Mathara, Kurunegala, Kegalle and Rathnapura. Under this programme 69 training sessions were held and 1,803 farmers were trained and post-harvest equipment have also been distributed in different districts (details are given in table 4.15.1). Hundred and sixty cinnamon peeling kits have been distributed among cinnamon peelers in Katiyape and Makandura in Matara district. Details of plant distribution and conducting of farmer training programmes in different districts under this programme is given in Table 4.15.2.

Table 4.15.1: Distribution of Machineries under Second Community Development and Livelihood Improvement Project

District	Distributed Machinery	Number
Kegalle	Threshers	13
Badulla	Threshers	08
	Multi Choppers	08
Kurunegala	Threshers	01
	Decorticator	01

Table 4.15.2 : Distribution of plants and conducting farmer training programme under Second community Development and Livelihood Improvement Programme in different districts

District	Distribution of plants		Farmer training programme	
	Pepper	Cinnamon	Number of programme	Number of beneficiaries
Badulle	10,000	-	2	50
Monaragala	8,000	-	2	100
Nuwaraeliya	8,400	-	13	202
Polonnaruwa	30,000	-	2	100
Hambantota	-	-	2	110
Matara	2,800	16,000	3	150
Galle	10,570	10,000	8	235
Kurunegala	1,070	9,000	5	140
Kegalle	12,000	-	29	610
Ratnapura	10,030	-	3	106
Total	92,870	35,000	69	1,803

4.16 Introduction of Export Agricultural Crops in to non-traditional areas

Growing of EAC in Polonnaruwa District and Batticaloa District were two programmes implemented in non-traditional areas. The programme in Polonnaruwa was carried out in collaboration with Mahaweli Authority of Sri Lanka while Batticaloa District programme was implemented with

District Director of Department of Agriculture.

4.16.1 Establishment of EAC in Polonnaruwa District

Under this programme pepper, cinnamon, arecant plants and betel cuttings were distributed among the famers in the Districts. The details were given in the table 4.16.1.1

Table 4.16.1.1 : Distribution of plants in different Divisional Secretariat Divisions in Polonnaruwa District

Divisional Secretariat Division	Crop and Number of plants/ cuttings distributed			
	Pepper	Cinnamon	Betel	arecanut
Mediri-giriya	2,900	-	4,500	-
Thaman-kaduwa	8,500	1,000	5,000	-
Asela-pura	-	-	-	3,700
Aralaganwila	500	-	-	1,000
Total	11,900	1,000	9,500	4,700

4.16.2 Establishment of EAC in Batticaloa district

A plant distribution programme was carried out in June 2013. Arayampathy DS Division was selected for planting arecanut seedlings. Three arecanut seedlings were given to a beneficiary and 1,200 arecanut seedlings were distributed. Similarly, Paddipolai and Eravur Pattu DS Divisions were selected for cinnamon planting and a farmer was given 25 seedlings. Five thousand cinnamon seedlings were distributed among 200 farmers.

During Maha season, 2,000 cinnamon seedlings, 3,000 arecanut seedlings and 1,000 pepper plants were distributed in Paddipolai, Vaharai, Kiran and Oddamavady DS Divisions, 10 arecanut seedlings and 20 cinnamon seedlings were given to each farmer in the above three DS Divisions.

4.16.3 Distribution of plants along irrigation canals

In collaboration the Department of Irrigation, 6,500 and 5,000 arecanut seedlings were planted along Ambagaswewa and Girithale area respectively to protect canal reservation.

4.17 Pepper pruning week

Pepper pruning week was meant for mass-scale pruning of gliricidea shade trees of pepper cultivations in order to facilitate light penetration to increase yield of pepper vines. The pepper pruning week lasted from 19th to 26th August 2013. The official celebration was held at Lemastota village in Badulle district. This programme was implemented island wide covering 3,113.7 ha of pepper cultivations belong to 8,821 farmers. The details of the programme are given in the Table 4.17.1.

Table 4.17.1: Progress of pepper pruning week (from 19th to 26th August)

District	Number of DS Divisions covered	Number of GN Divisions	Number of pepper growers involved	Extent of pepper cultivations pruned (ha)
Kegalle	11	18	519	109.2
Hambantota	3	7	193	370.0
Galle	8	9	213	9.3
Matara	9	10	240	18.8
Kurunagala	3	10	560	180.0
Badulle	2	5	309	102.0
Nuwaraeliya	5	16	472	80.0
Kalutara	9	12	299	29.9
Colombo	3	3	55	9.02
Ratnapura	9	51	1676	618.0
Monaragala	6	34	868	308.9
Matale	8	42	1639	814.0
Kandy	16	118	1558	416.6
Gampaha	11	11	220	47.8
Total	103	346	8821	3113.7

4.18 Kitul Development Programme

Two training programmes on kitul product quality improvement were conducted in Kandy district and trained 40 small-scale entrepreneurs. An exhibition stall was arranged at “Kitulaka Waruna” exhibition held at Kandy City Center from 1st to 3rd August 2013. Thousand kitul seedings were issued to Ministry of Traditional Industries from

Giningathena nursery to be distributed among the farmers.

4.19 Small Plantation Development Programme (SPnDP)

EAC were distributed among members of farmer societies in Kandy, Nuwaraeliya and Kegalle districts for intercropping with tea. The details were given in table 4.19.1.

Table 4.19.1: Distribution of plants for intercropping with tea

District	No. of farmer societies	Number of plants distributed			
		Cinnamon	Pepper	Coffee	Arrecanut
Kandy	23	-	12,663	2,190	2,780
Nuwaraeliya	6	-	2,428	-	-
Kegalle	2	2,500	-	-	-
Total	31	2,500	15,091	2,190	2,780

A productivity improvement programme was also implemented under the SPnDP. Under this programme, Productivity of pepper vines, which have already been established in tea cultivations, were improved. In this programme 500 farmers

in Kandy Districts and 32 farmers in Nuwara-Eliya District benefited. Two thousand four hundred and eighty three farmers were trained as follows (Table 4.19.2)

Table 4.19.2 : Training programmes conducted under SPEnDP for beneficiaries of EAC

District	Number of training programmes held	Number of beneficiaries
Kandy	29	480
Nuwaraeliya	9	234
Kegalle	2	24
Monaragala	70	1,745
Total	110	2,483

4.20 E-learning programme for DEA officers

The “Capacity Building of Export Agriculture Extension Officers in usage of ICT in Agriculture Extension” was initiated in collaboration with Open University of Sri Lanka. The objectives of the programme were,

1. To enhance the knowledge of Extension Officers in ICT and its application in agriculture
2. To effectively bridge the knowledge gap between Extension Officers and farmers and increase the accessibility to improve lifelong learning capacity of farmers through ICT and ensure their livelihood security.
3. To enable Extension Officer to serve the large farming population effectively and efficiently.

The programme consisted of five modules and was conducted from 13th December 2012 to 5th April 2013 at eight regional

centers of the Open University. In addition to that extension officers, other categories of officers, Assistant Directors, Research Assistants, Farm Service Assistants and Research and Development Assistants were also given an opportunity to follow the programme.

Out of 175 officers enrolled for the programme 135 officers completed the course successfully and received the certificates of participation from the Open University of Sri Lanka. Participants who completed all modules along with mini-projects received the certificate of completion offered jointly by the Open University of Sri Lanka and Commonwealth of Learning.

4.21 Communication Division

Following programmes were carried out during the year 2013.

Electronic media

1. Two video documentaries *viz* “Cinnamon the Master Spice” and “pepper the king of spice” were produced for the benefit of CHOGUM participants.
2. ‘*Divinagumen apanayanaya nagumata*’ was also produced to depict the success stories of the ‘*Divinaguma*’ programme.
3. Ten TV news clips were prepared and telecasted.
4. Digital versions of the Administration Report for the year 2010 and 2011 (700 copies) were printed.

5. Five technical bulletins PDF form of the bulletin 'Spice mixture', Administration Reports, already telecasted TV programmes, producers' weekly price of EAC and staff details etc. have been included in department website.

Print media

- Price information on Export Agricultural Crops produce was published on weekly basis in *Dinamina* newspaper.
- Posters on pepper shade tree pruning week (5,000 copies) and EAC assistance scheme and its benefits (2,500 copies) were printed.
- Twenty thousand leaflets on betel and arecanut were printed for *deyata -kirula* exhibition held in Ampara, both in Sinhala and Tamil media. Similarly 25,000 leaflets on 'Advantages of pepper pruning' and 5,000 on kitul industry were also printed and distributed.



**അഭ്യർത്ഥന
ആര്യംഗ്ഗി
Research**



5. RESEARCH DIVISION

5.1 Technical functions and organization of Research Division

The Research Division of the Department operates under the supervision of the Additional Director General (Research) to develop and introduce appropriate technology for the enhancement of EAC sector. Research division consists of three main units; Commodity Research Unit, Economic Research Unit and Plant Protection Unit. Central Research Station and six sub-stations engage in developing appropriate technologies to solve farmers' problems and new technology to enhance the production, productivity and quality of Export Agriculture Crops. The locations of the Research stations and their functions are given below.

- Central Research Station, Matale - Multidisciplinary Research on EACs except Cinnamon, Citronella and Betel.
- Cinnamon Research Station, Pallolpitiya, Thihagoda, Matara - Multidisciplinary Research on Cinnamon and Citronella.
- Intercropping & Betel Research Station, Narammala - Intercropping of EACs with Coconut and research on Betel cultivation.
- Tissue Culture Laboratory and Plant Production Nursery, Walpita - Tissue Culture Research and Plant Propagation.

- Sub-Research Station , Kundasale - Multidisciplinary Research mainly on Cocoa, Ginger and Turmeric
- Sub-Research Station, Nillambe - Cropping Systems.
- Sub-Research Station, Delpitiya - Organic Farming and Spice Park.
- Economic Research Unit, Head Office, Peradeniya - Conducting of Economics and Marketing Research.

Central Research Station and Plant Protection Unit function under the Director (Research) of Matale. Cinnamon Research Station and Intercropping and Betel Research Station are also operated under two Directors (Research), while other sub-research stations function under the supervision of the respective Assistant Directors and Deputy Directors of Research in-charge. The progress of the research projects conducted in 2013 at the main research station and other sub-stations are described below, on crop and discipline basis.

5.2 Research achievements on EAC's during the year of 2013

5.2.1 Cinnamon

❖ Agronomy

Leaf oil (%) and Eugenol content of oil are increased with the maturity of Cinnamon leaf but when the leaf is fully matured and turns to yellow before senescence both the contents are decreased while Cinnamile acetate content of oil is increased. There are

five different leaf flush colours and highest leaf oil content is observed from mature leaves of dark red leaf flush at early stage.

A study on formation of sandy textured bark of Cinnamon revealed three types of sandy texture plants as follows. (a) Sandy texture appeared only after over maturity (b) Sandy texture appeared only in the base of the over matured stems. (c) Sandy texture appeared from the early maturity of the stem. Out of hundred plants, only 4 % was found as permanent sandy texture condition. However, Plants of that nature cannot be identified visually (morphologically) until plants get matured.

Screening and data collection of existing 48 hybrid plants in the field helped to identify 24 plants free from Rough Bark Disease, 33 plants free from Wood Boring Moth (WBM), 01 plant free from Leaf Blight, 02 plants free from Leaf Galls and 09 plants free from Stem Canker. Furthermore, out of Rough bark free plants, 21 are free from WBM and 09 are free from Stem Canker.

Study on cultivation of Ginger and Turmeric with Cinnamon revealed that both the crops can be successfully cultivated in the 1st year of cinnamon cultivation without any negative effect on cinnamon growth. When considered the first year yield of the intercrop, turmeric 3 rows (20t/ha) and ginger 3 rows (18t /ha) gave significantly higher yields than 2 rows.

❖ **Soil and Plant Nutrition**

Observations from the experiment of cinnamon established in Middeniya with

Gliricidia and *Arachis* spp (“mal ratakaju”) revealed that established *Arachis* spp can succeed under cinnamon crop giving notable support for soil fertility improvement with respect to soil chemical, physical and biological means.

A study conducted to investigate the relationship of soil fertility characteristics among three different cinnamon bark yield levels (mean values of high; 817.1 and low; 114.1 kg bark/ha/yr) revealed that all tested soil characteristics were positively associated with bark yield level of cinnamon. The mean values of different soil variables of high and low yield classes were, 0.34% and 0.20% for total N, 17.81 and 5.18 mg/kg for available P (Olsen), 8.68 and 3.83mg/kg for available P (Bray), 54 and 34 mg/kg for exchangeable K, 8.88 and 5.95mg/kg for available S, 5.38 and 4.95 for soil pH, 0.043 and 0.028 dS/m for EC, respectively.

❖ **Crop Protection**

A survey was conducted in Galle, Matara, Kalutara, Ratnapura & Hambantota districts to find out the crop health based management practices used by the Cinnamon growers in their fields. Proper soil conservation, harvesting in 6 month interval, intermediate selective pruning in between two harvesting intervals, slash weeding and heaping of soil into the plant bases reduce the pests & diseases incidences and increase the yield.

Mite galls, thrips and leaf blight were the serious pests & disease occurred in

Cinnamon nurseries in Matara. Most effective chemical were Abamectin, Imidacloprid for managing mite galls and thrips and Tabuconazole for leaf blight.

Soil invertebrates' diversity & abundance in different weed control methods were investigated. Slash weeding was the least effective weeding method for the soil invertebrates' community in cinnamon ecosystem.

Two types of cinnamon thrip species were observed; one type feed on the immature cinnamon leaves and nymphs are creamy white colour. The other type is living inside the immature cinnamon shoots like apical buds and nymphs have red colour body with black patches. Those cinnamon thrips have not yet been taxonomically described. Their taxonomic identification and other studies will be continued in 2014.

❖ **Post Harvest Technology**

Investigation on seven major leaf types of cinnamon and their oil composition was investigated in three locations of Matara district. Normal leaf type was the most abundant and most scared types are large, curled and long narrow. The effect of environment factors were considerable and no common pattern of distribution can be identified. Small leaves had higher oil content than large leaves.

Effect of leaf drying period and duration of distillation on citronella oil production was investigated. Oil content does not have significant relationship with duration of field drying when oil content is calculated

on the basis of dry weight. But with the increase of distilling period oil content is increasing. Further studies need to find the effect of distillation period on oil content and composition of oil.

Economic feasibility of freeze peeling of cinnamon was investigated during the year 2013 during February to August, including easy and difficult periods for peeling. Efficiency of peeling is increased under freeze peeling by 140% for whole period. Electricity consumption per day by the commercial freezer was 3.25 kWh. Therefore cost of electricity for a month is Rs. 1,168.00. If labour cost per day is Rs 800.00, then cost of processing per kg under freeze peeling would be Rs 245.00 and under conventional peeling it would be Rs 330.00. Thus if labour is available on wage basis freeze peeling will be a cost-effective technology.

5.2.2 Black Pepper

❖ **Agronomy**

A study on effect of supplementary irrigation on initial growth performances of black pepper was conducted with different supplementary watering rates of 4, 2 and 1L/day with no irrigation as control. Plant establishment rate (66%), vine growth (72cm) and number of leaves per vine (51) were highest with the highest irrigation level of 4L/day and all the above parameters were increased with increasing the amount of irrigation. Lowest performances of the above parameters (Plant establishment rate-38%, vine growth

-51cm and number of leaves per vine -31) were observed with no supplementary irrigation.

Flowering behaviour of black pepper were monitored at different agro-ecological zones with three pepper cultivars namely, MB-12, GK-49 and Panniyur -1. Number of rainy days and rainfall was highest at Matale (77 days and 1780mm) and other two locations namely Narammala and Walpita recorded significantly less number of rainy days of 51 and 49 days, respectively and total rainfall of 1,055mm and 815mm respectively during the study period. The highest (34.7°C) and the lowest (27°C) daily maximum temperature were recorded at Narammala and Matale, respectively and minimum temperature also varied on same order (25°C and 16°C, respectively). However, the difference between minimum and maximum temperature was the highest at Matale (> 8°C) and other two locations recorded less difference (<5°C). Bisexual flower ratio was more than 80% in all pepper cultivars at Walpita and Narammala, but it was less than 80% for all cultivars at Matale. Lowest % of bisexual flowers were (<50%) observed in Panniyur-1 at Matale. Female flowers varied from 20% to 45% at Matale for all three cultivars but it was less than 2% at other two locations for all the cultivars. Male flower ratio was less than 5% in all cultivars at all the locations and no male flowers were observed in Panniyur-1 at any location. Number of different spike stages per vine was also recorded during January to June, 2013 and it was highest at Matale (approx.

4 stages) and the lowest was at Walpita (approx. 2 stages).

In another study different management practices of support tree pruning and mulching (T1 – Pruned Gliricidia canopy + without mulch, T2 – Pruned Gliricidia canopy + with mulch, T3 – un-pruned Gliricidia canopy + without mulch and T4 – un-pruned Gliricidia canopy + with mulch) were applied with pepper variety Panniyur-1 at their spike initiation stage. Variation of Photosynthetically Active Radiation (PAR) absorption, soil moisture and different yield parameters of pepper were monitored with two weeks interval. Highest PAR absorption was observed in T1 and T2 (approx. 95%) followed by T3 and T4 (approx. 20%). Highest soil moisture status were recorded with T4 and followed by T2, T1 and T3 treatments (29.4 %, 25.9%, 23.0 % and 20.5% respectively). Observed all yield parameters (Number of spikes per vine - 382, spike length -11.3cm, spike filling rate -87.0%, number of fruits per spike -54.5, fresh berry weight/10 spikes – 60.5g and dry berry weight/10 spikes – 10.3g) were highest in T2 and followed by T1 and lowest was in T3 (Number of spikes per vine -263, spike length -9.3cm, spike filling rate - 62.5%, number of fruits per spike -37.8, fresh berry weight/10 spikes – 36.5g and dry berry weight/10 spikes – 5.5g). It clearly revealed that importance of support tree pruning and mulching on yield enhancement of black pepper.

Seven local pepper varieties with Panniyur – 1 were evaluated under organic conditions at Dalpitiya Research Station. Panniyur-1,

UD 21, TG 7 and MB 12 showed the highest survival rate. According to the growth data obtained, MB 12 is more superior to the other 7 varieties.

❖ **Genetics and Plant Breeding**

Six high yielding pepper lines were identified from hybridization programme using local pepper cultivars with Panniyur-1 and Kuching. Pepper hybrid line 14/3 was the most superior line with 2,724.2 g of dry black pepper as the mean annual yield/vine (4,570 kg/ha/year). The rest five superior pepper lines 27/1, 11/2, 31/1, 3/1 and 2/6 gave an annual yield/vine of 2,340.7 (3930kg/ha/yr.), 2,245.3 (3780 kg/ha/y), 2,181.0 (3,660 kg/ha/yr.), 2,064.0 (3460 kg/ha/yr.) and 1,994.0g (3,343 kg/ha/yr), respectively. All six superior lines (14/3, 27/1, 11/2, 31/1, 3/1 and 2/6) have yielded black pepper with high oil and oleoresin contents compared to Panniyur-1. Reciprocal hybridization and single seed to single line approaches were found to be very much useful in black pepper crop improvement activities.

❖ **Physiology and Plant Production**

Rooted plants of three cutting types i.e., orthotropic terminal cuttings with 6-7 nodes, plagiotropic cuttings with 2-3 nodes and single nodal cuttings of two local cultivars (GK 49 and MB 12) from Bamboo Rapid Multiplication System originated were field planted in December 2009. Plant height was significantly higher in each plants originated from orthotropic cuttings (255.3cm) and single nodal cuttings (241.1cm) than plants originated from

plagiotropic cuttings (66.2cm) irrespective of cultivar. Similarly lateral spread was significantly higher in plants originated from orthotropic cuttings (92.2cm) and single nodal cuttings (90.2cm) than plants from plagiotropic cuttings (67.6cm). Significantly higher number of spikes per vine was produced from plants raised from orthotropic cuttings (156) and single nodal cuttings (107) than plants originated from plagiotropic cuttings (17) at 30 months after field planting.

In vitro clonal propagation technique was developed for new improved local selections of Black Pepper (*Piper nigrum* L.). Shoot tips and nodal segments (lateral buds) from three local selections i.e., GM 28, BD/MN 41 and MT/DM 7 were cultured on modified MS medium and woody plant medium (WPM) at 1/3 strength of nitrate supplemented with BA, IAA and GA₃. GM 28 and BD/MN 41 selections performed successfully in modified MS medium and WPM promoted growth of DM 7 selection. Testing of suitable concentration of cytokinin for shoot multiplication revealed that concentration of 1.5 mg/L is appropriate as higher number of shoots were observed. Similarly testing of suitable concentration of IBA for rooting revealed that 1.0mg/L concentration level is appropriate. Hardening was done using humid chamber and plants showed higher survival rate (82 -100%).

Bio control agents *Trichoderma* sp. and *Pseudomonas fluorescens* isolated from black pepper rhizosphere soil were identified by microscopic and macroscopic

features along with the emission of green fluorescence under ultra violet radiation. As the both bio control agents showed antagonistic ability over *Phytophthora capsici* under *in-vitro* condition, showing significantly higher growth inhibition. At nursery experiment was conducted using six different combinations of treatments to find out *in vivo* bio control ability. Treated plants showed greatest mean plant height than untreated control ($P < 0.05$). The highest leaf area of 125.37 cm² was recorded in *P. fluorescens* treated plants while the lowest value of 89.8 cm² was in untreated control. The results indicate that *Trichoderma* sp. and *P. fluorescens* enhanced plant survival rate and growth that could serve as bio-control agents and growth promoters.

5.2.3 Cocoa

❖ Soil and Plant Nutrition

The inoculation ability of two Arbuscular Mycorrhizal (AM) isolates; DEAAAMS1, *Glomus mosseae* and their effect on cocoa seedlings were investigated under 5, 50 and 100 µg g⁻¹ soil P fertility (Eppawela rock phosphate) levels revealed that the effect of both AM was significant ($p < 0.05$) for mean fresh weight of shoots per plant as 53.03 g, 50.24 g respectively compared to 46.7 g for non-AM plants. Other growth parameters also followed the same pattern of response. Overall plant and soil chemical parameters suggested that local AM isolate DEAAAMS1 is effective enough and can be

further upgraded for cocoa plant inoculation.

❖ Genetics and Plant Breeding

The first phase of clonal cocoa evaluation experiment was completed and revealed that WK-2 and WK-7 clones from WK series yielded 5,600g and 5,050g of processed cocoa beans /tree/year respectively. WK-2 clone exhibited the lowest pod value (12) and the largest bean size and weight (224.5g/100 dry beans). The clones S-306, S-181, W5/5-1, SCA6 X ICS6-1 and NA 32 X ICS1-1 gave yield of 5,800g, 6,275g, 5,350g, 5,550g and 5,295g respectively. All these clones had butter fat content of above 50%. These clones are recommended for mass propagation for cultivation.

5.2.4 Coffee

❖ Agronomy

Progenies of 8 *Coffea arabica* varieties are being evaluated. Preliminary results showed that all the 8 varieties have 100 % survival rate. According to the growth data, CAM/S42 and CAM/S45 showed high growth performance.

❖ Entomology

A study conducted to investigate the effect of different agricultural by products on spore production of *Beauveria bassiana* revealed that molasses is the most effective over the coir dust, saw dust, tea refuse, maize cob, oil cake and coconut water

A simple low cost trap was design to capture coffee berry borer. Different

combinations of methyl alcohol and ethyl alcohol with four different colour traps were used in this study. Red colour traps with 3:1 Methanol: Ethanol combination lured the highest number of coffee berry borer adults. This trap is very successful and field evaluation is in progress.

❖ **Post Harvest Technology**

Green coffee powder was produced from 4 cultivars i.e. S9, Arabica-bulk, IMY and Robusta-bulk. Subsequent sensory evaluation of hot water extract of green coffee powder indicated that S9 (Arabica) and Arabica-bulk samples got higher preference than IMY(Robusta) and Robusta-bulk. Panellists' preference for hot water extract of green coffee increased when blending with cinnamon, cardamom and ginger. As Arabica found to be preferable, Arabica-bulk coffee was blended with each 25% of cinnamon powder, 7% cardamom and 15% of ginger powder. The best preferable sample was Arabica green coffee blended with 25% of cinnamon powder. According to the results, green coffee powder and spice blended green coffee powder can be introduced to the market as novel products.

5.2.5 Clove

❖ **Plant Pathology**

Cylindrocladium sp was identified as a causal agent of leaf fall disease of clove. The activity of Thiophanate methyl and Carbendazim was checked *in vivo* using infected nursery plants.

Carbendazim and Thiophanate methyl showed effective control of the fungus. Field screening of above two fungicides is in progress.

5.2.6 Ginger

❖ **Soil and Plant Nutrition**

Field experimentation over four years confirmed that 15.6 and 22.0 Mt/ha of average yield was obtained from local and Chinese cultivars, respectively through application of a basal dressing of 20t compost per hectare and 100 kg of TSP per hectare. In addition, 82 kg of urea and 42 kg of MOP per hectare were applied at 45 and 90 days after planting. Application of 10t of Gliricidia leaves per hectare as 5 equal splits with a basal dressing of 20t/ha compost without chemical fertilizer could be recommended for organic ginger cultivations, which gave 17.4 and 26 Mt/ha of average yield respectively for local and Chinese cultivars, respectively.

❖ **Post Harvest Technology**

Volatile oil percentages of different types of ginger

Volatile oil percentages of different types of ginger were analyzed. Average volatile oil percentages (dry basis) of Local, Rangoon and Chinese ginger (having very large rhizome) were 1.74, 1.48, 1.12 in respectively.

Study on making bleached Ginger revealed that oil % of Ginger decreased with increasing soaking duration and lime concentration. The oleoresin content

increased with lime concentration but decreased with increasing soaking period. The lowest colour difference was obtained with soaking the rhizomes in 4 % lime for 6 hrs compared to the market sample imported from India. Among the tested treatments, soaking in 4 % lime for 6 hrs was the best to produce bleached ginger.

❖ **Physiology and Plant Production**

***In- vitro* propagation of Ginger**

Explants cultured in MS basal medium supplemented with 3.0 mg/l BAP and 0,25mg/l NAA showed highest rate of shoot multiplication. Maximum rooting response was observed in shoots cultured in half strength MS medium with 1.5mg/l NAA with an average number of 6.6 roots per plantlet and average root length of 3.18cm. Rooted shoots were transplanted to potting media containing equal parts of sand, coir dust, organic fertilizer and granular fertilizer and kept in a growth chamber for hardening. The plants established well with 90% survival rate.

5.2.7 Turmeric

❖ **Agronomy**

Selection of suitable protocol for *in vitro* propagation of Turmeric

The highest percentage of survival of buds was recorded with the sterilization of 0.1% Mercuric chloride for 20 minutes. The highest multiplication rate was observed on MS medium fortified with 3.0mg/l BAP and plantlet elongation was observed on MS

medium fortified with 1.0mg/l BAP. Development of multiple shoots and roots were observed after 80 days on MS medium fortified with 3.0mg/l BAP.

❖ **Soil and Plant Nutrition**

Four years field study conducted on turmeric fertilizer application gave an average yield of 23.3t/ha at fertilizer mixture of 104kg of TSP, 65kg of urea and 100kg of MOP applied at each 45 and 90 days after planting, along with a basal dressing of 20 t of compost and 104kg of TSP per hectare. In addition to inorganic recommendations, application of 10t of Gliricidia per Ha (applied in 5 equal splits) along with a basal application of 20t/ha compost also gave an equivalent higher yield.

❖ **Post Harvest Technology**

Comparison of boiling time on drying and colour of turmeric powder was tested. Drying time for Tubers and Fingers were 56 and 48minutes, respectively, after 45 minutes boiling and Curcumin contents for the same were 6.4% and 5.0%. The drying time for 30 min of boiling were 60 hrs for tubers and 50 hrs for fingers and curcumin contents were 6.4% and 4.7%, respectively. However, there was no significant difference in mean curcumin content for both tubers and fingers for the blanching treatments of 45 min and 30 min. Therefore, the optimum blanching time for turmeric tubers and fingers in order to obtain quality turmeric powder would be 30 min.

5.2.8 Arecanut

❖ Plant Pathology

An unknown disease reported in arecanut at Pudukudierippu area in Northern Province of Sri Lanka was identified as Anthracnose disease caused by *Colletotrichum* spp. Four different commercially available fungicides namely Mancozeb 80% WP, Copper oxychloride 50% WP, Tebuconazole EW 250 and Hexaconazole 5% EC with three different concentrations, and 1% “Bordeaux mixture” were used for the *in vitro* fungicidal assay and results revealed that Tebuconazole EW 250(125ppm) and 1% “Bordeaux mixture” showed as an effective control method for the causal organism of anthracnose disease of Arecanut.

❖ Physiology and Plant Production

***In- vitro* propagation of Arecanut**

Ideal sterilization procedure for embryo culture of arecanut is dipping in 100% ethyl alcohol followed by open flame sterilization. Embryos were established in both MS and woody plant medium, but the higher proliferation rate was observed in basal woody plant medium (WPM) under the dark condition.

5.2.9 Nutmeg

❖ Plant Pathology

Colletotrichum spp was reconfirmed as causal agent of nutmeg leaf fall disease. Seven different commercially available fungicides namely Copper Oxichloride 50% W/W, Thiophanate Methyl (Topsin® 70% W/W), Carbendazim 50% W/W, Hexaconazole (Eraser® 50g/1 EC), Bitertanol (Baycor® EC300), Thiram 80% W/W and

Captan 50% were tested under *in vitro* condition. The results revealed that copper Oxichloride 50% W/W, Thiophanate methyl (Topsin® 70% W/W), Carbendazim 50% W/W, Hexaconazole (Eraser® 50g/1 EC) and Bitertanol (Baycor® EC300) had ability to control casual organism of nutmeg leaf disease at *in vitro* condition. Field evaluations were started at Bokalawela area in Harispatthuwa EO range for selected fungicides.

5.2.10 Goraka

❖ Entomology

Application of Actara® 25WG (Thiamethoxam 25% WG), Regent® 50 SC (Fipronil), Provado®(Imidacloprid WG) and Kalani Shaka Saraya® were significantly effective against Soft Wax Scale insects (*Ceroplastes* sp.) on Garcinia (*Garcinia questitia* Pierre.) plants.

5.3. On going Research during the year 2013

5.3.1 Cinnamon.

- Evaluation of recommended two cinnamon accessions (Sri Gamunu, Sri vijaya) under coconut (*Cinnamomum zeylanicum*)in different agro-ecological zones of Sri Lanka
- Studies on Genus *Cinnamomum*
- Effect of compost and inorganic fertilizers and their combinations on growth and yield of cinnamon

- Development of Integrated Pest Management (IPM) programme for cinnamon wood boring moth (*Ichneumoniptera cinnamomumi*)
- Effect of dolomite application on growth and yield of Cinnamon grown in acid soils
- Effect of growing gliricidia & legume cover crops on growth, yield and soil fertility status in Cinnamon
- Development of crop health based IPM package for managing major pests of cinnamon
- Isolation and confirmation of disease making fungi in cinnamon cultivation
- Effect of different combination of organic and inorganic fertilizers on growth and quality of cinnamon.
- Improvement of sub soil as a potting mixture by adding vermicompost and microbial compost for cinnamon seedlings (*Cinnamomum zeylanicum Blume*).
- Investigation of possibility of using sub soil to make potting mixture for cinnamon with different organic/inorganic fertilizers and bio-fertilizers.
- Characterization and evaluation of soil fertility status of selected soils of major cinnamon growing areas and crop productivity relations.
- Nursery studies in Cinnamon: Effect of cinnamon wood charcoal and scraping charcoal on cinnamon (*Cinnamomom zeylanicum Blume*) seedling growth.
- Intercropping ginger and turmeric with early stage of Cinnamon cultivation.
- Fine tuning the method of seed storage of cinnamon.
- Study the formation of sandy texture on cinnamon bark tissues.
- Improvement of cinnamon peeling method with using cooling and thawing techniques.
- Development of pests & diseases management package for cinnamon nurseries.
- Investigation of soil invertibrate activities in cinnamon field.
- Introduction of new mulching techniques for matured cinnamon plantation to induce higher numbers of shoot formation.
- Evaluation of three pruning method affected to yield performance of vegetative propagated cinnamon cultivation.
- Evaluation and comparison of superior quality characteristics of *Pieris* cinnamon with selected cinnamon accessions (Sri Gemunu and Sri Wijaya) luation of effect of fertilizer application time on growth and yield of cinnamon.

- Screening and evaluation of selected hybrid cinnamon plants for quality, growth, and yield performance.
- Damage Assessment and Evaluation the Efficacy of Protection methods of Cinnamon Plants from vertebrate pests.
- Identification and Isolation of Attractive Chemical Compound for Cinnamon Wood Boring Moth.
- Identify the Cinnamon Thrip Species, their biology and suitable attractive chemical compound to monitor and control them
- Evaluate the efficacy of suitable control method for white root disease of cinnamon.
- Effect of Ozone on Store Pests of Cinnamon.
- Study the Effect of nitrogen based fertilizer application on peelability of cinnamon.
- Effect of distilling duration and leaf drying period on citronella oil production.
- Design and evaluation of further modified peeling table.
- Economical Evaluation of cinnamon processing by freezing.
- The effect of, different techniques to cover the cut surface on formation of healthy shoot and prevent the juice secretion from cutting edge of cinnamon bush.
- Study the potential uses and applications of cinnamon wood charcoal.
- Investigation on Three Major Leaf Types of Cinnamon (*Cinnamomum zeylanicum* Blume).
- Evaluation of selected Cinnamon VP lines in the mid country region.

5.3.2 Black Pepper

- Multifaceted pepper development programme (NARP Project) (component for low country intermediate zone under coconut).
- Comparison of black pepper (*Piper nigrum*) yield per unit area of plants originated from orthotropic and plageotropic branches.
- Studies on variation of flowering, fruit setting and yield of black pepper under different agro-ecological zones (Coconut Intercropping component).
- Study the potential use of coconut tree as a live supporting material for Pepper (*Piper nigrum*).
- Effect of different pruning levels on canopy development and yield of pepper.
- Incorporation of partially burnt paddy husk, phosphorous and mycorrhizae to enhance potting media for propagation of pepper (*Piper nigrum* L).

- Hybridization of selected black pepper (*Piper nigrum* L) cultivars for low country intermediate zone.
- Studies on use of soil moisture conservation methods and agronomic management practices for improvement of black pepper productivity as climate change adaptation techniques.
- Detection of microbial contamination of different stages of post harvest practices of EACs mainly black pepper(*Piper nigrum* L.) and its cont.
- Evaluation of pepper germplasm from the local gene pool.
- Evaluation of pepper Introductions.
- Hybridization of local pepper selections (PNM-1) with Panniyur -1 and Kuching.
- Mutation Breeding of Pepper.
- Multi locational evaluation of Black Pepper selections.
- Hybridization of local pepper selections (PNM-1) with Panniyur -1 and Kuching.
- Collection, characterization, conservation and utilization of *Piper* species exist in Sri Lanka.
- Studies on variation of vegetative growth, flowering, fruit setting and yield of black pepper under different agro-ecological zones.
- Improvement of resource use efficiency of black pepper to increase the yield through support tree manipulation.
- Effect of micro-irrigation on plant establishment, growth and yield of black pepper.
- Investigation of effect of Mg on growth and yield of pepper.
- Investigation of effect of source of nitrogen on growth and yield of black pepper.
- Comparison of growth and yield of pepper (*Piper nigrum* L.) raised from orthotropic, plagiotropic (lateral branches) and single nodal cutting plants.
- Comparison of growth and yield of pepper (*Piper nigrum* L.) raised from tissue cultured plants and single nodal cutting plants.
- *In -vitro* clonal propagation of pepper (*Piper nigrum* L.) local selections with higher yield and quality.
- Effect of cover crops on soil properties, growth and yield of black pepper.
- Identification of suitable bio – indicators to monitor soil qualities responsible for black pepper yellowing.
- Effect of soil amendments at planting on field establishment rate of black pepper.
- Study of pepper vine borer, biology, damage and control.
- Determination of oil, oleo-resin and piperine content in pepper from different locations in Sri Lanka.
- Design, fabrication and evaluation of steam blancher for pepper.
- Detection of microbial contaminations at different stages of post harvest practices of Export Agricultural Crops (EACs) mainly black pepper (*Piper nigrum* L.) and its control.

- Evaluation of local pepper varieties under organic conditions.
- Evaluation of selected accessions of black pepper.
- Investigation of the effect of the light berry harvesting on subsequent yield of Black pepper.
- Evaluation of vegetative propagation methods of Pepper for commercial production (Bamboo method, Heap method, and serpentine method).
- Field evaluation of bush pepper (Local and Pannyur).

5.3.3 Cocoa

- Selection of high yielding cocoa (*Theobroma cacao*) lines for mixed cropping and further improvement of mass propagation through bud grafting and rooted cuttings.
- Productivity improvement of cocoa (*Theobroma cacao* L.) through integrated soil and plant nutrient management system including good management practices under coconut and rubber (coconut component) (NARP Project).
- Evaluation of cocoa (*Theobroma cacao*) germplasm under coconut.
- Evaluation of selected cocoa lines for mid country intermediate zone under rubber.
- Characterization of available cocoa (*Theobroma cacao* L.) lines and establishment of a clonal garden.
- Evaluation of field performance of rooted cocoa (*Theobroma cacao* L.).
- Productivity improvement of cocoa through integrated soil and plant nutrients management under rubber and coconut.
- Development of soil conditioner using cocoa pod husk for reclamation of poor quality cocoa field.
- Screening of capsid bug (*Helopeltis ceylonensis*) resistant/tolerant cultivars of cocoa.

5.3.4 Coffee

- Evaluation of catimor coffee.
- Evaluation of coffee introductions & local selections for mid country intermediate zone.
- Evaluation of coffee introductions & local selections for intercropping with tea in up country wet zone.
- Evaluation of hybrids and selected lines of coffee.
- Evaluation of arabica coffee accessions for yield, quality and resistant to major pest and diseases.
- Strategies for organic cultivation of Arabica coffee.
- Use of *Beauveria brasssiana* for the control of coffee berry borer.
- Investigation of biological control agents of coffee berry borer.
- Design a trap for coffee berry borer.
- Progeny evaluation of selected Arabica coffee lines

5.3.5 Cardamom

- Selection of high performing plants from subsequent seedling populations of cardamom under rubber at low elevation
- Evaluation of promising cardamom lines for low elevation under Mahogany
- Development of control measures for cardamom thrips.

5.3.6 Clove

- Management of leaf fall (Die-back of branches) disease of mature clove trees in clove growing areas.
- Application of plant growth regulators (paclobutrazol) (PBZ) for flowering induction of clove (*Eugenia caryophyllus*).
- Management of leaf fall disease (leaf blight & leaf spots) of clove (*Eugenia caryophyllus*) in mid country.

5.3.7 Nutmeg

- Field evaluation of grafted nutmeg (*Myristica fragrans*) selections.
- Nutmeg leaf fall disease and its control.

5.3.8 Goraka

- Field evaluation of grafted goraka (*Garcinia quaesita*) selections.
- Efficiency of certain chemical insecticides against the soft wax scale insects (*Ceroplastes* sp.) on garcinia plants and identification of its parasitoids.

5.3.9 Betel

- *In vitro* Propagation of Betel.
- Evaluation of different fertilizer mixtures for betel (*Piper betle*) produced for local market.
- Breeding of 'Maneru' and 'Mala bulath' with 'Ratadalu' and comparison of the yield parameters of their subsequent generations with 'Ratadalu.
- Investigation on use of indigenous techniques for controlling Bacterial Leaf Blight in Betel (*Piper betle*).
- Evaluation of department fertilizer mixture for single supporting system in betel (*Piper betle* L) cultivation.
- Phosphorous solubility improvement using mycorrhizae and commercial sulfur powder for EACs under coconut(Betel).

5.3.10 Arecanut

- Study of Anthracnose Diseases of Arecanut (*Areca catechu* L), a new disease of Arecanut in Sri Lanka.
- Evaluation of arecanut germplasm for intermediate zone
- Evaluation of arecanut germplasm for dry zone
- Selfing and evaluation of arecanut
- Hybridization and evaluation of arecanut
- A study on Leaf blight & Yellow leaf diseases of Areca nut (*Areca catechu* L.) and its control
- *In vitro* Propagation of Arecanut

- Evaluation of growth performances of seedlings for selected arecanut lines

5.3.11 Ginger

- Investigation on effect of paddy husk ash on the field performances and post harvest characteristics of ginger.
- Management of major diseases of ginger (*Zingiber officinale* Rosc.)
- Management of nutmeg leaf fall disease
- Effect of planting time and plant spacing on growth and yield of Ginger under different agro-ecological zones
- Effect of different rates of inorganic fertilizer on different cultivars of ginger
- Effects of rhizome scales on germination and subsequent yield of ginger
- Study on storage of fresh ginger.
- Production of ginger jam and ginger mixed fruit jam.
- Production of ginger sauce.
- Determination of physical and chemical qualities of ginger with maturity.
- Management of major diseases of ginger (*Zingiber officinale*)
- Studies on use of organic manure - water extracts to control soil-borne diseases of ginger.

5.3.12 Turmeric

- Determination of curcumin content in turmeric from different locations in Sri Lanka.

5.3.13 Other

- Preparation of bio fertilizer (Arbuscular Mycorrhiza-AM), Bio control agents (*Trichoderma* spp. *Pseudomonas fluorescens*) and mass culturing.
- Determination of curcumin content in turmeric from different locations in Sri Lanka.
- Home garden model of Export Agricultural crops at Matale
- Studies on mammalian pests and their control methods
- Evaluation of storage pest damages of EAC's
- Production of healthy spicy yoghurt using Cinnamon, Pepper, Ginger and Aspartame as a non sugar sweetening agent.
- Variation in chemical constituents of *Piper* species exist in Sri Lanka
- Performance evaluation of medium essential oil extraction unit
- Design, fabrication and evaluation of vacuum distillation unit.
- Development a small scale coffee roaster.
- Development of tray drying technology to improve quality of export agricultural crops.
- Preparation of bio fertilizer (Arbuscular Mycorrhiza-AM), Bio control agents (*Trichoderma* spp. *Pseudomonas fluorescens*) and mass culturing

- Technology innovation for large scale in-vitro multiplication of cardamom, pepper, ginger, turmeric and cinnamon.

5.4 Progress of Other Activities of the Research Division

5.4.1. Maintenance of Germplasm/Seed garden

Two seed gardens were field planted at IBRS, Narammala and Viharagama Estate, Weragama, Matale using selected promising Cocoa lines such as WK-2, WK-7, S-306, S-181, W5/5-1, SCA6 X ICS6-1 and NA 32 X ICS1-1.

Coffee seed garden at Research Station, Matale with promising Robusta coffee lines (I 44/1, I 26/1, BS 1 and C x R) and four Arabica selections (S 4/2, S 4/5, HK and S 4711) which produce highest yield has been maintained.

Two promising accessions with Ec 201 (720 Kg/ha) and Ec 301 (450 Kg/ha) have been maintained as a nucleus materials at the Research Station, Matale for high elevations.

Arecanut seed gardens have been maintained from line J 22 (>750 nuts/year) at Matale, Gasnewa, Nillambe and Middeniya.

1500 plants of Sri Gemunu and Sri Vijaya Cinnamon varieties were established as a seed garden at Nillambe Sub Station. These plants will be used for the multiplication program of above varieties in future.

5.4.2 Spice Park

Spice park development program '*Medarata Kulubadu Arana*' was carried out at Dalpitiya Sub Research Station. Steps were taken to establish a medicinal plant collection and this is still in progress. Spice park establishment at the site of Central Research Station, Matale is also in progress.

5.4.3 Plant certification programmes attended by the research staff

Number of visit for plant certification in Matale district - 24

5.4.4 Estate Visit for Advisory Services on Special Request

1. Entomology - 7
2. Soil and plant nutrition - 3
3. Pathology - 12

5.4.5 Training Programmes carried out by the research staff

Pepper cultivation	- 06
Cocoa cultivation	- 05
Cinnamon cultivation	- 06
Nursery management	- 05
Postharvest technology	- 19
Soil and plant nutrition	- 04
Training programs for stake holders	- 06

National Cinnamon Training unit was established in 2012 as first time in Sri Lanka to fulfill training requirement of cinnamon industry. During the year 2013, total numbers of 328 persons were trained as:

Training programme for cinnamon processing with novel technology	} -85
Executive level training programme	

For management of Cinnamon lands } -37.0
with good Agricultural practices }

Basic awareness programme for }
Cinnamon industry } - 110.0

Post harvest technology - 8.0

Cinnamon cultivation management - 88.0

5.4.6. Pest and Disease Control

The following activities have been carried out by Plant Protection Unit.

Field visit - 118
Farmer training class - 14
Field day - 29
Nursery inspection - 13
Direct treatments - 48

5.4.7 Planting material issued by the Research Division

Crop	No. of plants	No. of seeds
Cinnamon	138,305	-
Pepper	66,776	-
Bush pepper	515	-
Coffee (plants)	545	-
Coffee (seeds)	1,383	34.9kg
Cardamom	30,061	-
Cocoa	2,861	615(pods)
Nutmeg	3,258	-
Kitul	349	-
Arecanut (seeds)	73,550	-
Arecanut (plants)	56,120	-
Clove	251	-
Garcinia	203	-
Betel	454	-

5.5 Economics & Market Research on EAC

5.5.1 Studies and Surveys

5.5.1.1 Study on the Performance of Value Added Producers of EAC

A study was started in 2013 to assess the performance of value added product producers related to Export Agriculture Crops. Main emphasis was given to the self entrepreneurs who produce value added products introduced by the Research Division of DEA (eg. Nutmeg products, Ginger products, pepper sauces etc.) Objective of the study was to identify their market competitiveness, business attitudes, scale of production, quality aspects of value chain etc.

A number of training programs have been conducted by the Post Harvest Unit and the In-Service Center of DEA on value added products of EAC but only a few people had used the knowledge practically. Only seven Entrepreneurs had identified in 2013 as there were not many people involved with the production of value added products of EAC. None of them were producing those products at commercial scale because they did not have an assured market. They had used to make those products if they get an order or when they have to participate for an exhibition. Those producers had felt that the consumers were not used to the tastes of many value added products of EAC and therefore preferred to traditional products such as wood-apple jam over jam produced from nutmeg rind. Changing consumer attitudes could be done by making them

aware about the unique qualities of EAC products but those entrepreneurs had no financial resources or technical skill to perform such task.

5.5.1.2 Estimation of Average Annual Productivity Levels of EAC at the field level

A survey had been done to assess productivity levels of EAC in 2012 and the same survey had been conducted in 2013 too. Altogether 2,312 farmers had been

interviewed in all main growing districts of EAC by the Development Officers attached to District offices. Survey has been already completed and analysis is being done.

5.5.2 Extent of EAC

Newly established extent of EAC in 2013 was computed based on the acreage of 3rd successful inspections completed under the New Planting Assistance Scheme of the department (table 5.5.2.1).

Table 5.5.2.1 : Newly Established Extent(ha) under EAC Assistance Scheme – 2013

District	Cocoa	Coffee	Cinn.	Card.	Pepper	Clove	Nutmeg	Total
Kandy	8.5	8.7	13.1	1.2	73.5	4.0	16.5	125.5
Matale	14.4	9.7	26.5	0.8	75.9	5.4	2.4	135.1
N'elliya	-	3.4	0.8	-	1.5	-	0.8	6.5
Kurunegala	1.0	0.5	7.0	-	17.0	-	-	25.5
Badulla	5.0	0.4	6.9	-	5.0	-	-	17.3
Moneragala	-	-	1.5	-	7.2	-	-	8.7
Kegalle	-	0.3	23.2	-	42.5	1.0	0.4	67.4
Ratnapura	-	-	71.4	-	37.2	-	-	108.6
Colombo	-	-	8.6	-	0.5	-	-	9.1
Kalutara	-	-	58.4	-	3.2	-	-	61.6
Gampaha	-	0.8	23.2	-	41.4	-	-	65.4
Galle	-	-	84.4	-	9.7	-	-	94.1
Matara	-	-	60.5	-	3.5	-	-	64.0
Hambantota	-	-	116.3	-	12.0	-	-	128.3
Other dis.	-	-	-	-	-	-	-	-
Total	29	24	502	2	330	10	20	917.0

Source: Monthly Progress Reports of the Development Division

Under the DEA assistance scheme 917ha of EAC has been established in 2013 throughout main growing districts. However, over 1,500 ha. of EAC had been field planted in 2012 under the“ Divinaguma” program which could not be taken into consideration into above figures.

Considering the performances in table 5.5.2.1 and taking ‘Agriculture Census 2002’ as the base line district wise extent figures and total extent of EAC in 2013 were estimated. (Annex 1)

5.5.3 Estimated Production of EAC in 2013

Due to large number of scattered trees in the field and complex bearing habits of EAC, estimation of actual production using field data has become extremely difficult. Therefore the annual production of EAC is usually estimated considering exports, local consumption in different sectors in the economy (house hold consumption based on per capita annual consumption reported by the Dept. of Census & Statistics, industry consumption, and Food service industry consumption) and imports. Substantial amounts are allocated for withholding stocks and unreported exports. Based on those assumptions, the estimated production of EAC for 2010-2013 is given below (table 5.5.3.1).

Table 5.5.3.1 : Estimated Production of EAC s (2010-2013)

Crop	2010	2011	2012	2013
Cocoa	520	525	513	515
Coffee	3,164	2,974	3,000	3,000
Cinnamon	16,435	18,250	17,165	17,500
Pepper	17,332	10,834	18,604	28,000
Cardamom	48	57	80	50
Clove	9,551	5,533	4,009	6,190
Nutmeg (& mace)	2,376	2,116	2,002	2,545
Areca nut	24,361	24,485	23,450	24,000
Betel	30,046	30,645	28,200	30,000
Citronella oil	19	9	13	14
Ginger(raw)	12,052	13,663	14,911	14,075
Turmeric(raw)	8,304	9,308	8,708	11,282

Source: Dept. of Census & Statistics & DEA data base. * Not available

5.5.4 Exports and Export Earnings of EAC in 2013

Export Agriculture Sector has been emerging as a pioneer agriculture sub sector in last decade as export volumes and export earnings have been increasing at every year at remarkable rates. In 2013, significant increases in both export and export earnings could be observed in almost all main Export Agriculture Crops. Meanwhile total export earnings from EAC in 2013 had increased by 37% over 2012 from Rs. 35321.5. in 2012 to 48,392.7mn. in 2013. Historic growth was recorded in the export volume of EAC in 2013 and it has exceeded 50,000mt. in the first time of the history of EAC. The growth of export volume in 2013 was 52% over 2012 from 37,528mt. in 2012 to 57,192mt. in 2013 (Annex II).

Among EAC, spice sector had shown an excellent progress in 2013 mainly due to the marvelous growth of black pepper exports but highly positive contributions from exports of clove and nutmeg should also be quoted. Sri Lanka is gradually strengthening her position in the world black pepper trade as exports increased to 21,330mt. in 2013 from 10,487mt. in the previous year. It was highest ever black pepper volume exported by Sri Lanka and growth rate was 103% over 2012. Such higher export performance in 2013 was due to the expanded productive extent in the recent past as a result of the research and development activities of DEA and highly

satisfactory harvests received in both 2012 and 2013.

The next best performance was shown by clove which had grown impressively in both export volume and export earnings. Export volume of clove in 2012 was only 1427mt. but it had increased to 4,379mt. in 2013 showing 206.9% growth rate over 2012. Export earnings from clove too had increased by 192.7% over 2012 from Rs. 2,092.1mn. in 2012 to Rs. 6,123.8mn. in 2013.

Export volumes of both nutmeg and mace had also increased significantly in 2013 but export earnings had shown only a little progress. Among other spices, a marginal decline was noted in the export volume of cinnamon in 2013 but earning had increased slightly over 2012. As usual export of cardamom was insignificant even in 2013.

The notable feature of EAC export in 2013 was the increase of areca nut export volume by four- fold than 2012. Annual export of areca nut has been fluctuating between 2000mt-4000mt. throughout past decade but in 2013 it had reached to 9782.8 from 2120.6mt. in 2012. That was the highest export volume of areca nut in past three decades. Since 2012 the government had permitted private sector to import areca nut and re-export but there are no evidences that such higher volumes have been imported to the country (annex iii). Therefore it is difficult to explain the reason for such massive export but the contribution of the expansion of cultivated

extent due to the DEA assistance scheme could be considered as a highly positive factor for such increased export.

Cocoa and cocoa products export had declined by 64% in 2013 over 2012 suggesting low domestic production and poor performance in re-export business. The government had allowed importing cocoa for local chocolate industry as well as for re-export of value added products. In 2013 Sri Lanka had exported only 1212.6mt. of cocoa and cocoa products but export in 2012 was 3,426.7mt.

Export of betel had also shown a success story in 2013 with increased exports and export earnings. Betel export and earnings in 2012 were 1934.2mt. and Rs. 637.7mn. respectively but those figures had increased to 3,024.5mt. and Rs.1,368.3mn. respectively in 2013.

Essential oil sector as a whole had not shown a progress in 2013 and export had declined by 10.4% over 2012. Among essential oils cinnamon bark oil, clove oil, cardamom oil, citronella oil and nutmeg oil had shown positive growth rates but cinnamon leaf oil and pepper oil had shown negative performances. Other essential oils had been exported in very small quantities.

5.5.5 Exporting Countries

No noticeable shift was seen in main importing countries of EAC from Sri Lanka and traditional buyers had played the main role in the market. As usual, Mexico had

purchased around 40% of total cinnamon export and many Latin American countries had purchased large bulks. India was the main buyer of pepper, cloves, nutmeg, mace and areca nut from Sri Lanka. India had purchased 48% of Sri Lankan pepper in 2012 but the share had declined to 34% in 2013. India imported 9770.4mt. of areca nut out of 9782.8mt. of total areca nut export volume of Sri Lanka in 2013. Pakistan had increased its share of imports of Sri Lankan pepper, nutmeg and cinnamon in 2013 under the concessions of free trade agreement and 99% of betel had also been purchased by Pakistan.

5.5.6 Behaviour of Prices

Annual average prices of almost all main EAC had been on the decline in 2013. Positive growth was observed only in the prices of clove and cinnamon quills but prices of pepper, coffee, cocoa, nutmeg, mace, cardamom, betel, areca nut and turmeric had been on the decline from minimum -4.8% to maximum 27.3%. However, farm gate price of ginger had increased by almost 100% from Rs. 106.78/kg in 2012 to Rs. 214.4/kg. (Annex III).

5.5.7 Trends in EAC Imports in 2013

At least a small quantity of all Export Agriculture Crops had been imported to Sri Lanka in 2013 with increased volumes than 2012. Total import volume had increased by 14.8% to 13,148.42mt. in 2013 from 11,456.4mt. in 2012. Import expenditure too had increased by 1.3% from Rs.4544.6mn. in 2012 to Rs.4,604.87mn. in 2013.

Among imported commodities cocoa lead in terms of both volume and value. In 2012 Sri Lanka had imported 6754.67mt. of cocoa and cocoa products spending Rs.3,693.67mn. while those figures had declined to 6330.22mt. and Rs. 3,391.45mn. in 2013. Import volume of turmeric had increased to 4,118.73mt. in 2013 from 3,807.53mt. in 2012 and import expenditure of turmeric too had increased from Rs.476.23mn. in 2012 to Rs.595.54mn, in 2013. Import of areca nut had increased by 118,373% from 1.01mt. in 2012 to 1,196.8mt. in 2013 while import expenditure had increased by 57,265.6% from Rs. 0.26mn. in 2012 to Rs.150mn. in 2013 (Annex IV).

5.6 Research Publications

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Annexure 1 : Estimated Extent(ha) of EAC by Districts - 2013 *

District	Cinnamon	Pepper	Clove	Cardamom	Coffee	Cocoa	Nutmeg	Areca nut	Betel	Citronella	Total	Ginger	Turmeric	Grand Total
Kandy	113	5,902	3,003	720	1,319	289	801	2,319	78	-	14,544	459	388	15,391
Matale	260	6,315	674	1,133	659	1,067	68	1,185	46	-	11,407	43	92	11,542
Nuwaraeliya	35	876	337	116	1,075	5	4	554	7	-	3,009	128	138	3,275
Kurunegala	157	2,996	403	8	706	152	50	815	1,067	-	6,354	483	102	6,939
Badulla	188	2,482	55	10	335	35	-	1,423	55	-	4,583	88	54	4,725
Monaragala	79	1,783	6	-	192	599	1	1,304	56	-	4,020	6	1	4,027
Galle	11,159	468	192	-	107	3	2	755	240	-	12,926	96	60	13,082
Matara	8,381	775	489	34	172	4	5	1,131	111	-	11,102	110	76	11,288
Hambantota	3,131	1,808	54	1	116	-	-	492	17	788	6,407	18	16	6,441
Colombo	215	242	59	1	58	2	2	215	85	-	879	90	8	977
Gampaha	249	1,682	114	2	369	8	6	1,123	693	-	4,246	300	94	4,640
Kalutara	3,345	312	130	3	139	4	4	684	219	-	4,840	106	28	4,970
Ratnapura	3,985	3,229	403	338	226	23	6	1,898	138	389	10,635	67	37	10,739
Kegalle	249	3,072	1,703	434	594	173	43	1,668	211	-	8,147	244	154	8,545
Other Districts	5	55	-	-	50	1	-	731	274	-	1,116	38	22	1,176
Total	31,551	31,997	7,622	2,800	6,117	2,365	992	16,297	3,297	1,177	104,215	2,276	1,270	107,761

Source: Census of Agriculture -2002 , Department of Export Agriculture , Agricultural Statistics – Department of Census & Statistics.

*provisional

Annexure II: Export Volume and Value of Export Agriculture Crops – 2012/2013

Commodity	Units	2012	2013*	Growth% 2012/13
Cinnamon	Vol (mt.)	14,435.0	13,799.3	-4.4
	Val (Rs.mn)	16,654.7	17,129.2	2.8
Cinnamon Leaf Oil	Vol (mt.)	318.2	265.1	-16.7
	Val (Rs.mn)	482.7	479.7	-0.6
Cinnamon Bark Oil	Vol (mt.)	9.0	16.8	87.5
	Val (Rs.mn)	259.5	323.5	24.7
Clove	Vol (mt.)	1,427.0	4,378.8	206.8
	Val (Rs.mn)	2,092.1	6,123.8	192.7
Clove Stems	Vol (mt.)	1,487.1	1,099.4	-26.1
	Val (Rs.mn)	247.7	237.1	-4.3
Clove Oil	Vol (mt.)	3.7	4.5	20.9
	Val (Rs.mn)	33.0	39.5	19.7
Cocoa & Cocoa Products@	Vol(mt.)	3,426.7	1,212.6	-64.6
	Val (Rs.mn)	2,182.6	682.1	-68.7
Coffee	Vol(mt.)	9.6	19.1	99.5
	Val (Rs.mn)	8.0	15.3	91.1
Pepper	Vol(mt.)	10,487.3	21,329.6	103.4
	Val (Rs.mn)	8,904.4	16,478.4	85.1
Pepper Oil	Vol(mt.)	12.3	7.6	-38.6
	Val (Rs.mn)	278.9	101.1	-63.8
Cardamom	Vol(mt.)	10.5	4.1	-61.1
	Val (Rs.mn)	32.2	21.4	-33.6
Cardamom Oil	Vol(mt.)	0.9	1.7	101.8
	Val (Rs.mn)	43.5	73.8	69.5
Citronella	Vol(mt.)	12.6	13.9	10.0
	Val (Rs.mn)	28.2	45.7	62.4
Nutmeg	Vol(mt.)	1,390.2	1,741.5	25.3
	Val (Rs.mn)	1,948.8	2,029.8	4.2
Mace	Vol(mt.)	192.1	297.1	54.7
	Val (Rs.mn)	578.9	667.4	15.3
Nutmeg Oil	Vol(mt.)	25.9	33.2	28.3
	Val (Rs.mn)	333.8	419.7	25.8
Areca nut	Vol(mt.)	2,120.6	9,782.8	361.3
	Val (Rs.mn)	408.4	2,064.9	405.6
Betel	Vol(mt.)	1,934.2	3,024.5	56.4
	Val (Rs.mn)	637.7	1,368.3	114.6
Vanilla	Vol(mt.)	0.3	0.1	-56.0
	Val (Rs.mn)	4.6	4.0	-13.8
Vanilla Oil	Vol(mt.)	-	0.04	-
	Val (Rs.mn)	-	0.1	-
Lemon Grass Oil	Vol(mt.)	0.5	0.6	28.8
	Val (Rs.mn)	1.9	2.7	44.2
Mace oil	Vol(mt.)	0.002	0.1	3250.0
	Val (Rs.mn)	0.03	0.4	1221.8
Total EAC	Vol(mt.)	37,303.5	57,032.3	52.9
	Val (Rs.mn)	35,161.5	48,307.8	37.4
Ginger	Vol(mt.)	194.5	92.3	-52.5
	Val (Rs.mn)	122.9	29.0	-76.4
Ginger Oil	Vol(mt.)	0.9	1.0	11.8
	Val (Rs.mn)	13.2	16.4	24.8
Turmeric	Vol(mt.)	29.2	66.9	129.5
	Val (Rs.mn)	23.9	39.5	65.5
Total (Ginger & Turmeric)	Vol(mt.)	224.6	160.2	-28.6
	Val (Rs.mn)	160.0	84.9	-46.9
Total (with Ginger & Turmeric)	Vol(mt.)	37,528.0	57,192.5	52.4
	Val (Rs.mn)	35,321.5	48,392.7	37.0

Source: Sri Lanka Customs
@ with re-exports

** provisional

Annexure III: Annual Average Prices of Export Agricultural Crops (Rs/Kg) in 2010-2013

Crop	Price	Year				Growth % 2012/13
		2010	2011	2012	2013	
Cocoa	FG	282.49	322.13	266.92	193.97	-27.3
	AU	359.78	347.16	346.94	361.63	4.2
	WM	354.60	332.71	304.31	315.35	3.6
Coffee	FG	223.63	234.09	249.51	220.7	-11.5
	AU	268.00	266.16	251.49	249.39	-0.8
	WM*	207.72	282.20	309.54	286.33	-7.5
Pepper	FG	342.14	691.90	832.05	731.06	-12.1
	AU	364.31	703.46	826.83	765.98	-7.4
	WM	451.94	726.58	934.61	945.12	1.1
Clove	FG	542.99	1,250.35	1,159.70	1,233.93	6.4
	AU	592.13	1,376.14	1,225.95	1330.13	8.5
	WM	594.37	1,291.82	1,367.58	1,591.14	16.3
Cinnamon Quills	FG	726.57	921.85	1,042.08	1,109.41	6.5
	AU	589.02	822.82	889.53	895.53	0.7
Nutmeg	FG	459.62	742.53	838.45	683.88	-18.4
	AU	513.37	790.02	909.83	777.85	-14.5
	WM	1,430.92	2,442.44	3,118.39	2,798.13	-10.3
Mace	FG	1,716.73	2,847.77	2,096.51	1,536.27	-26.7
	AU	1,999.13	3,092.01	2,374.48	1,825.41	-23.1
	WM	2,304.88	3,758.72	3,141.56	2,650.38	-15.6
Cardamom	FG	3,320.96	2,713.12	1,945.75	1,731.68	-11.0
	AU	3,592.12	2,482.81	1,300.00	1,925.00	48.1
	WM	-	-	1,667.93	1,864.16	11.8
Betel (Rs./1000 leaves)	FG	2,208.29	2,042.19	2,018.96	1,922.22	-4.8
Areca nut	FG	115.28	215.31	201.25	177.47	-11.8
	AU	128.63	226.46	284.22	213.83	-24.8
Vanilla	WM	2,800.00	2,848.00	-	-	-
Ginger (Raw)	FG	114.67	76.51	106.78	214.40	100.8
Turmeric (Raw)	FG	50.75	47.70	36.54	34.54	-5.5

Source: ERU data base FG: Farm-gate Price; AU: Auction Price; WM: World Market Price *Robusta coffee

Annexure 1V: Import Volume and Value of Export Agriculture Crops – 2012/2013

Commodity	Units	2012	2013*	Growth% 2012/13
Cinnamon	Vol (mt.)	60.5	45.8	-24.3
	Val (Rs.mn)	56.94	64.75	13.7
Cinnamon Leaf Oil	Vol (mt.)	0.07	0.22	238.5
	Val (Rs.mn)	0.23	1.03	357.3
Cinnamon Bark Oil	Vol (mt.)	0.02	0.99	4,850.0
	Val (Rs.mn)	0.02	12.24	56,164.9
Clove	Vol (mt.)	1.67	5.00	200.1
	Val (Rs.mn)	2.79	7.52	169.8
Clove Oil	Vol (mt.)	2.08	2.04	-2.1
	Val (Rs.mn)	5.91	5.77	-2.4
Cocoa & Cocoa Products	Vol(mt.)	6,754.67	6,330.22	-6.3
	Val (Rs.mn)	3,693.67	3,391.45	-8.2
Coffee	Vol(mt.)	57.94	43.11	-25.6
	Val (Rs.mn)	43.74	44.18	1.0
Pepper	Vol(mt.)	3.97	31.33	689.4
	Val (Rs.mn)	4.78	14.42	201.6
Pepper Oil	Vol(mt.)	0.20	0.81	300.5
	Val (Rs.mn)	5.01	1.20	-76.1
Cardamom	Vol(mt.)	14.95	42.07	181.3
	Val (Rs.mn)	14.60	42.29	189.8
Cardamom Oil	Vol(mt.)	0.47	1.80	286.9
	Val (Rs.mn)	16.23	23.53	45.0
Citronella	Vol(mt.)	1.21	1.36	12.6
	Val (Rs.mn)	2.12	2.45	15.4
Nutmeg	Vol(mt.)	17.30	27.102	56.6
	Val (Rs.mn)	40.33	34.613	-14.2
Mace	Vol(mt.)	-	0.50	
	Val (Rs.mn)	-	1.21	
Nutmeg Oil	Vol(mt.)	3.91	1.80	-53.9
	Val (Rs.mn)	38.53	20.40	-47.0
Arecanut	Vol(mt.)	1.01	1,196.58	118,373.5
	Val (Rs.mn)	0.26	150.66	57,265.6
Betel	Vol(mt.)	-	-	
	Val (Rs.mn)	-	-	
Vanilla	Vol(mt.)	0.05	0.26	420.4
	Val (Rs.mn)	0.07	0.15	102.3
Vanilla Oil	Vol(mt.)	6.16	0.824	-86.6
	Val (Rs.mn)	8.40-	1.89	-77.5
Lemon Grass Oil	Vol(mt.)	0.47	1.50	217.8
	Val (Rs.mn)	1.01	3.00	195.6
Total EAC	Vol(mt.)	6,926.64	7,733.32	11.6
	Val (Rs.mn)	3,934.656	3,822.78	-2.8
Ginger	Vol(mt.)	721.60	1,295.60	79.5
	Val (Rs.mn)	127.161	177.88	39.9
Ginger Oil	Vol(mt.)	0.63	0.76	21.7
	Val (Rs.mn)	6.53	8.67	32.7
Turmeric	Vol(mt.)	3,807.53	4,118.73	8.2
	Val (Rs.mn)	476.23	595.54	25.1
Total (Ginger & Turmeric)	Vol(mt.)	4,529.76	5,415.10	19.5
	Val (Rs.mn)	609.92	782.09	28.2
Total (With Ginger & Turmeric)	Vol(mt.)	11,456.40	13,148.42	14.8
	Val (Rs.mn)	4,544.57	4,604.87	1.3

Source : Sri Lanka Customs

* Provisional

Annexure V : Deployment of Extension Officers – 2013

NO	District: Nuwaraeliya	NO	District: Rathnapura
1	Ginigathena	1	Godakawela
2	Kothmale	2	Kalawana
3	Nildandahinna	3	Palmadulla
4	Hanguranketha	4	Kolonna
5	Rikillagaskada	5	Ehaliyagoda
6	Walapane	6	Rathnapura
7	Helboda	7	Embilipitiya
8	Maldeniya	8	Waligepola
		9	Ayagama
NO	District: Kandy	10	Nivithigala
1	Galagedara	11	Kalle
2	Kurunduwatta	12	Alapatha
3	Gangawatakoralya	13	Pothupitiya
4	Udapalatha	14	Balangoda
5	Thalatuoya	15	Pallebadda
6	Alawathugoda		
7	Theldeniya	NO	District: Badulla
8	wattegama	1	Passara
9	Rambukpitiya	2	Soranathota
10	Huluganga	3	Bandarawela
11	Kundasale	4	Nikapotha
12	Hatharaliyadda	5	Ridimaliyadda
13	Harispattuwa	6	Haldummulla
14	Madapitiya	7	Haliela
15	Udadumbara	8	Uwaparaganagama
16	Yatinuwara	9	Welimada
17	Udunuwara	10	Meegakivula
18	Minipe	11	Kandakatiya

19 Poojapitiya

20 Galaha

NO District: Matale

1 Rattota
2 Ukuwela
3 Weragama
4 Yatawatta
5 Hunukataella
6 Thanna
7 Palapathwala
8 Pallepola
9 Alugolla
10 Laggala/ Pallegama

NO District: Monaragala

1 Monaragala
2 Bibile
3 Madulla
4 Meegahayaya
5 Madagama
6 Badalkumbura
7 Wellawaya
8 Hingurukaduwa
9 Kotagama
10 Padiyathalawa

NO District: Kegalle

1 Galigamuwa
2 Warakapola
3 Kegalle
4 Aranayaka
5 Bulathkohupitiya
6 Ussapitiya
7 Mawanella
8 Dadigama
9 Ruvanwella
10 Rambukkana
11 Panawala
12 Deraniyagala
13 Yatiyantota

NO District: Kluthara

1 Bandaragama
2 Kaluthara
3 Mathugama
4 Baduraliya
5 Beruwela
6 Ittapana
7 Madurawela
8 Harana
9 Bulathsinhela
10 Palawatta
11 Agalawatta

NO Districts: Kurunegalla and Puttalam

1	Bingiriya
2	Katugampola
3	Dambadeniya
4	Dodamgaslanda
5	Karandagolla
6	Mawathagama
7	Rambadagalla
8	Wariyapola
9	Polgahawela
10	Malsiripura
11	Polpithigma
12	Kuliyapitiya
13	Panduwasnuwara
14	Madampe
15	Nattandiya

NO District: Galle

1	Aluthwala
2	Hiniduma
3	Habaraduwa
4	Ambalangoda
5	Akmeemana
6	Athkandura
7	Alpitiya
8	Karandeniya
9	Niyagama
10	Nagoda
11	Balapitiya
12	Baddegama
13	Hikkaduwa
14	Yakkalamulla

NO District: Gampaha

1	Minuwangoda
2	Divulapitiya
3	Mirigama
4	Biyagama
5	Dompe
6	Pallewela
7	Badalgama
8	Attanagalle
9	Mahara
10	Gampaha
11	Udugampola

NO District: Matara

1	Deniyaya
2	Deiyandara
3	Pasgoda
4	Akurassa
5	Pitabaddara
6	Weligama
7	Devinuwara
8	Hakmana
9	Kamburupitiya
10	Matara
11	Ransagoda

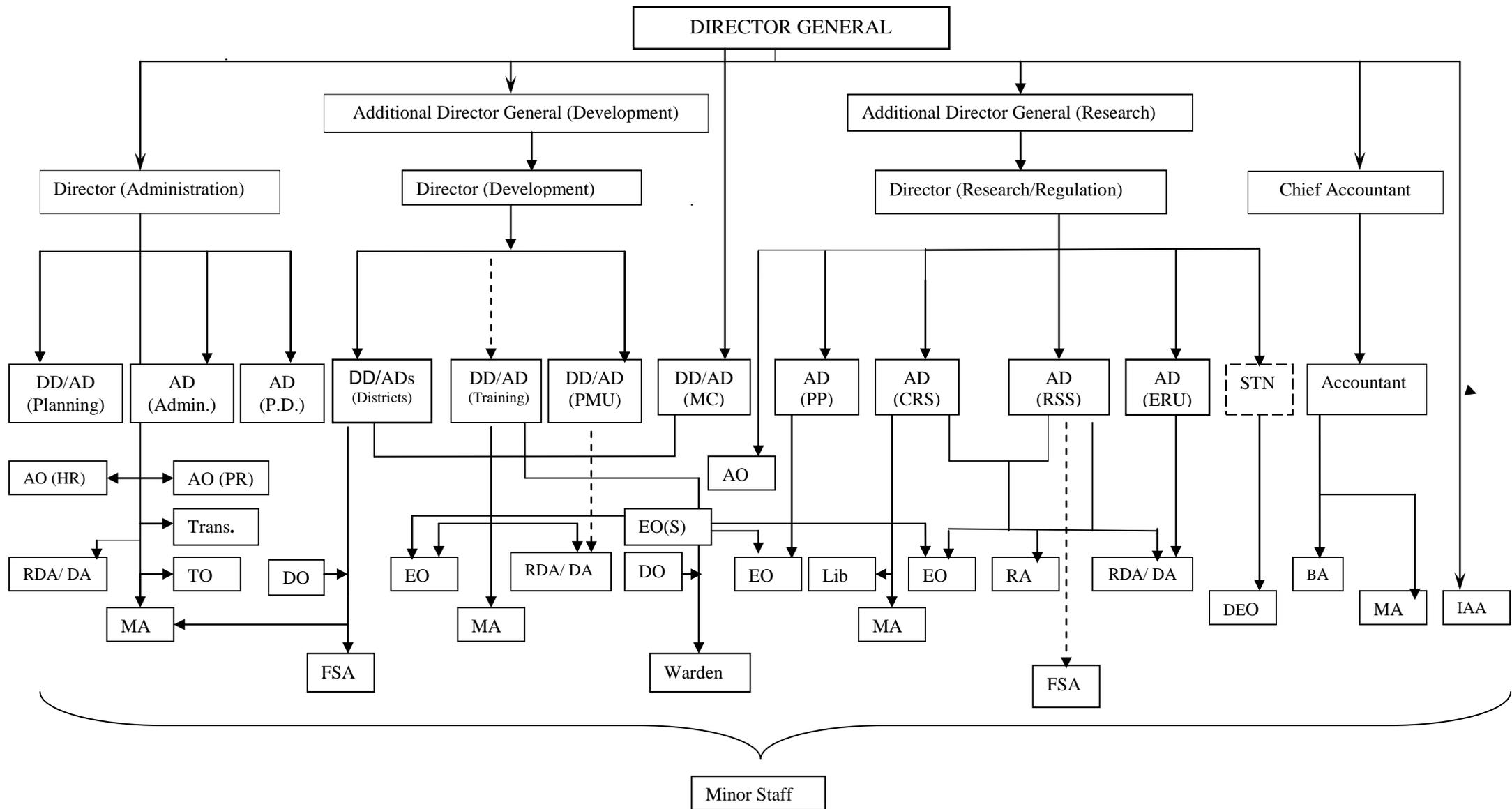
No District : Hambantota

1	Belliatta
2	Okewela
3	Walasmulla
4	Katuwana
5	Tangalla
6	Weeraketiya
7	Warapitiya
8	Middeniya
9	Sooriyawewa

No District : Colombo

1	Homagama
2	Avissawella
3	Padukka

Annexure VI : ORGANIZATION CHART - DEPARTMENT OF EXPORT AGRICULTURE -2013



DD - Deputy Director, AD - Assistant Director, P.D- Physical & Development , PMU -Progress monitoring Unit, MC- Mass Communication, PP – Plant Protection, CRS – Central Research Station, RSS – Research Sub Station, ERU- Economic Research Unit , STN – Statistician(attached from DCS),AD-Assistant Director (attached from Ministry of Agriculture)) AO (HR)-Administrative Officer- Human Resource, AO (PR)- Administrative Officer -Physical Resource, Tran. – Translator, RDA-Research and Development Assistant, DA-Development Assistant, BA-Budget Assistant, DO-Development Officer, TO -Technical Officer, MA- Management Assistant, IAA-Internal Audit Assistant, Lib-Librarian, EO(S)-Extension Officer(Special), EO – Extension Officer, RA- Research Assistant, DEO-Data Entry Operator , FSA –Farm Service Assistant.



අපනයන කෘෂිකර්ම දෙපාර්තමේන්තුව - අතමිට සරු හෙට දිනකට
ஏற்றுமதி விவசாயத் திணைக்களம் - வளமான எதிர்காலத்திற்கு

DEPARTMENT OF EXPORT AGRICULTURE - FOR A PROSPEROUS FUTURE